Tchelery Wind Farm, Keri Keri East, NSW

Aboriginal Cultural Heritage Assessment

April 2025

This document has been redacted to exclude any sensitive information

Navin Officer

heritage consultants

acn: 092 901 605

Number 4
Kingston Warehouse
71 Leichhardt St.
Kingston ACT 2604

ph 02 6282 9415

Document control

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Project Manager:	Nicola Hayes
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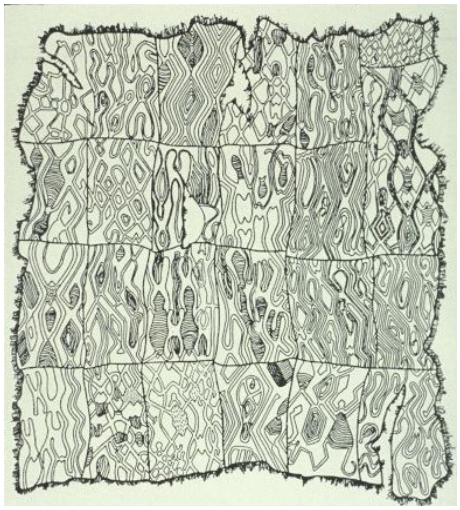

NOHC acknowledges Australia's Aboriginal and Torres Strait Islander people, their many diverse communities across our nation and their rich culture. We pay respect to their Elders past and present. We acknowledge Aboriginal and Torres Strait Islander peoples as Australia's first peoples and as the Traditional Owners and custodians of the land and water across the Australian landscape and seascape. We recognise and value the ongoing contribution of Aboriginal people to Australian life and how their contribution continues to enrich our society. In our daily work we recognise, cherish, celebrate and defend the evidence of Aboriginal and Torres Strait Islander peoples rich and complex history and prehistory which extends back from the present day into a deep and distant past. We understand that this archaeological evidence has meaning to the descendants of those who created it. Through our research and conservation efforts we strive to unlock hidden meanings from these traces of the past and to make that knowledge available to current and future generations of Aboriginal and Torres Strait Islander people.

EXECUTIVE SUMMARY

Neoen proposes to construct and operate the project, a utility scale renewable energy development near Keri Keri in the Riverina Murray region of New South Wales (NSW). The project site is located at 46 Kerri East Road, Moulamein, within Edward River Local Government Area (LGA), shown in Figure 3.1 of the Environmental Impact Statement (EIS). Approval is sought under Division 4.7 of Part 4 State Significant Development of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Part 9, Division 1 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Fully constructed, the project would include up to 74 wind turbine generators (WTGs) providing a total generation capacity of up to 577 megawatts (MW) and up to 350 MW Battery Energy Storage System (BESS) with a maximum energy storage capacity of 1,450 megawatt-hours (MWh). The project would be connected into the National Electricity Market (NEM) through Project EnergyConnect (NSW – Eastern Section) or the existing 220 kilovolt (kV) transmission line (both of which run through the project site) or similar electricity network infrastructure. The project supports the NSW Government's objectives to increase renewable energy generation, storage and investment in the South West REZ under the Electricity Infrastructure Roadmap (Department of Planning, Industry and Environment (DPIE), 2020).

Key features of the project include:

- up to 74 WTGs with a hub height of 170 metres to a maximum tip height of 270 metres (subject to available technology at construction)
- generating capacity of around 577 MW, the final capacity would be determined through the Original Equipment Manufacturer selection process
- a BESS with a maximum energy storage capacity of 1,450 MWh
- temporary ancillary infrastructure, including construction compounds, laydown areas and stockpiles, concrete batching plants and workforce accommodation camp
- permanent ancillary infrastructure, including operation and maintenance (O&M) facility, internal access tracks and hardstands, transmission lines, a 330 kV switchyard, three collector substations and up to six meteorological masts.

The project is being assessed as a State Significant Development (SSD) under Part 4 of the EP&A Act (Application Number: 59701722). Planning Secretary's Environmental Assessment Requirements (SEARs) for the project issued on 25 July 2023 identified key issues that must be addressed in the EIS. Revised SEARs based on the current project description including the BESS and port to site transport routes were issued by NSW Department of Planning, Housing and Infrastructure (DPHI) on 14 February 2025.

This report was commissioned by WSP Australia Pty Ltd on behalf of Neoen.

A total of 80 Aboriginal recordings were listed on the Aboriginal Heritage Information Management System (AHIMS) within a 50 by 30 kilometre area centred on the project site during initial searches for the project. Of these sites, 16 were located within the project site.

During the field assessment:

- a total of 73 new Aboriginal sites, including 12 areas of potential archaeological deposit (PAD), were recorded in the project site
- one area of PAD was tested during the works program, TWF PAD12
    - a total of 14 test pits were excavated across two transects

- no archaeological material was located from subsurface testing.

Of the 89 Aboriginal sites (previously and newly identified), and PADs within the project site, 65 would not be impacted at all by the project. Seven sites are at risk of indirect harm but can be avoided by the project by following the recommended mitigation and management measures provided in Section 11.2.

The project has aimed to avoid all heritage items as a first principle, where this is not possible, design has prioritised the avoidance/minimisation of impacts and harm at locations of moderate and above scientific significance, as well as moderate and high archaeological potential. Initial survey of the property investigated a potential 120 WTG locations to provide options for harm minimisation by understanding the risks associated with each WTG location. Over the course of the assessment process, this number has been reduced and refined to avoid areas of archaeological and ecological significance. The number of WTG to be constructed is up to 74.

The placement of some facilities associated with the WTGs has also been modified to reduce impacts to Aboriginal sites, and areas of higher archaeological sensitivity. Initial design for the project had a workforce accommodation camp, batching plant, laydown areas, substation and site compound in areas of high archaeological sensitivity that contained PADs and surface sites. These have been moved to avoid impact to PADs, with preference for areas of low and moderate sensitivity. One site (TWF Site49) is anticipated to be impacted by the construction of a workforce accommodation camp.

All areas of PAD have been avoided by the project, as well as all sites of high and moderate-to-high significance. Of the 28 sites of moderate significance, one would be subject to direct impact and one would be subject to partial direct impacts, three may be subject to potential indirect impact if not properly mitigated, and 23 would be avoided by the project. Of the 54 sites of low archaeological significance, 12 would be subject to direct impact and two would be subject to partial direct impacts, four may be subject to potential indirect impact if not properly mitigated, and 36 would be avoided by the project. This totals 16 sites to be directly or partially impacted by the project, and seven sites in proximity to the project with potential to be impacted if not properly managed.

It is recommended that:

1 all portions of artefact scatters and isolated finds that are to be directly impacted would require surface collection and salvage prior to construction commencement in those areas

2 hearths that are to be directly impacted would be subject to photographic recording and sampling of hearth material prior to disturbance

3 no areas of PAD would be impacted by the project

4 retrieved archaeological materials would be stored in appropriate, secure facilities confirmed in consultation with the relevant Aboriginal stakeholders. The strategy for the long-term conservation of salvaged or collected Aboriginal objects would be determined in consultation with the Registered Aboriginal Parties (RAPs)

5 construction planning and management would make sure that indirect impacts that could potentially result in a loss of known heritage values due to harm would not occur. Indirect harm could result from physical disturbance from surface water drainage or construction workers driving over sites that are to be protected

6 Aboriginal heritage exclusion zones would be established to protect sites, including known features/items of significance that have been identified to remain in-situ throughout construction

7 Aboriginal heritage zones would be demarcated by a suitably qualified archaeologist in consultation with the RAPs prior to the commencement of construction at each location. Suitable controls include temporary site fencing and, where required, sediment control. Fencing would consist of high visibility construction style machine proof fencing that is not able to be removed or altered during all works. Signage would be included to indicate no-go areas

8 Aboriginal cultural heritage awareness training would be carried out for all personnel working on the project prior to the personnel participating in construction activities. The training would cover features of heritage significance within and adjacent to project locations and project protocols that would be complied with to minimise and manage potential impacts to those features

9 if at any time during construction, any items of potential Aboriginal archaeological or cultural heritage significance outside previously recorded sites or PAD, or human remains are discovered, they would be managed in accordance with the Aboriginal Heritage Unexpected Finds Protocol in Appendix 4.

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GLOSSARY AND DEFINITIONS

Aboriginal object	Defined in the NPW Act 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 (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains'.
Aboriginal place	An area of land that is or was of special significance with respect to Aboriginal culture and is declared to be an Aboriginal place under Section 84 of the NPW Act.
Aboriginal resource and gathering	An Aboriginal site feature related to everyday activities such as food gathering, hunting, or collection and manufacture of materials and goods for use or trade (OEH 2012:8).
Aboriginal site	An Aboriginal object or Aboriginal place associated with past or contemporary Aboriginal occupation of NSW.
Aboriginal heritage impact permit (AHIP)	An AHIP is the statutory instrument issued by Heritage NSW under Section 90 of the NPW Act to manage harm or potential harm to Aboriginal objects and places (OEH 2017:1).
AHIMS	Aboriginal Heritage Information Management System – a database of known Aboriginal site records in NSW and a repository of Aboriginal heritage survey, assessment and investigation reports.
Archaeological site	A place or location with material traces or evidence of Aboriginal land use. The boundaries of an archaeological site may be defined by the spatial extent of visible Aboriginal objects, or direct evidence of their location; obvious physical boundaries where present; or identification by the Aboriginal community based on cultural information (DECCW 2010a:14).
Artefact	Objects such as stone tools, and associated flaked material, spears, manuports, grindstones, discarded stone flakes, modified glass or shell demonstrating evidence of use of the area by Aboriginal people (OEH 2012:8). Stone artefacts are the most common type of Aboriginal object and are usually the only remains left at the locations where Aboriginal people lived in the past (DECCW 2010a:28).
Artefact scatter	A formerly used site type consisting of two or more stone artefacts situated in proximity to each other. Typically, this category did not include isolated finds. The use of the term 'scatter' was intended to be descriptive and did not infer the original human behaviour that formed the site. Now referred to as an 'artefact' site feature (see Artefact).
Background discard/scatter	There is no single concept for background discard or 'scatter', and therefore no formal definition. Commonly agreed is that background discard of artefacts occurs in the absence of 'focused' activity involving the production and/or discard of stone artefacts in a particular location. An example of unfocused activity is occasional discard of isolated artefacts during travel along a route or pathway. Examples of 'focused'

	activities are camping, knapping and heat-treating stone, cooking in a hearth, and processing food with stone tools. Definitions of background scatter comprising only qualitative criteria do not specify the numbers (quantity) or density (artefacts/m^2) of artefacts required to differentiate activity areas from background discard.
Burials	A traditional or contemporary (post-contact) burial of an Aboriginal person, that may occur outside designated cemeteries and may not be marked (OEH 2012:8). Aboriginal ancestral remains are most frequently found in middens, sand dunes, lunettes, bordering dunes and other sandy or soft sedimentary soils (DECCW 2010a:34).
Isolated find	A formerly used site type defined as a single stone artefact, not located within a rock shelter, that occurs without any associated evidence of Aboriginal occupation. Isolated finds may represent single discard events, be constituent components of background scatter, or be indicative of a larger obscured, remnant or disturbed site. Now referred to as an 'artefact' site feature (see Artefact).
Modified tree	Trees that show the marks of modification as a result of cutting of bark from the trunk for use in the production of shields, canoes, boomerangs, burial shrouds, for medicinal purposes, foot holds etc, or alternately intentional carving of the heartwood of the tree to form a permanent marker to indicate ceremonial use/significance of a nearby area. These carvings may also act as territorial or burial markers (OEH 2012:9).
NOHC	Navin Officer Heritage Consultants
Potential archaeological deposit (PAD)	An area where Aboriginal objects may occur below the ground surface (OEH 2012:9).
Shell	An accumulation or deposit of shellfish from beach, estuarine, lacustrine or riverine species resulting from Aboriginal gathering and consumption. Usually found in deposits previously referred to as shell middens. Must be found in association with other objects like stone tools, fish bones, charcoal, fireplaces/hearths, and burials. Would vary greatly in size and components (OEH 2012:10).

ABBREVIATIONS

ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
cm	centimetre
DECCW	NSW Department of Environment, Climate Change and Water (former), now DCCEEW
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water (current)
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ESC	effective survey coverage
ESD	ecologically sustainable development
GIS	Geographic Information System
GPS	Geographic Positioning Systems
GSE	ground surface exposure
GSV	ground surface visibility
ha	hectare
km	kilometre
kV	kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
m	metre
m^2	square metre
mm	millimetres
MNES	matters of national environmental significance
MW	megawatt/s
MWh	megawatt hour/s
NOHC	Navin Officer Heritage Consultants Pty Ltd

NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
NT Act	*Native Title Act 1993* (Cth)
OEH	NSW Office of Environment and Heritage, now Heritage NSW
PAD	potential archaeological deposit
PCA	principal component analysis
RAPs	registered Aboriginal parties
SEARs	Secretary's Environmental Assessment Requirements
WTG	wind turbine generator

1 INTRODUCTION

1.1 Project description

Neoen proposes to construct and operate the project, a utility scale renewable energy development near Keri Keri in the Riverina Murray region of New South Wales (NSW). The project site is located at 46 Kerri East Road, Moulamein, within Edward River Local Government Area (LGA), shown in Figure 3.1 of the Environmental Impact Statement (EIS). Approval is sought under Division 4.7 of Part 4 State Significant Development of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Part 9, Division 1 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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Key features of the project include:

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Additional project details are provided in Chapter 3 of the EIS.

This report was commissioned by WSP Australia Pty Ltd on behalf of Neoen.

1.2 Statutory requirements

The project is being assessed as a State Significant Development (SSD) under Part 4 of the EP&A Act (Application Number: 59701722). Planning Secretary's Environmental Assessment Requirements (SEARs) for the project issued on 25 July 2023 identified key issues that must be addressed in the EIS. Revised SEARs based on the current project description including the BESS and port to site transport routes were issued by NSW Department of Planning, Housing and Infrastructure (DPHI) on 14 February 2025.

The SEARs contain the following environmental assessment requirements in relation to Aboriginal heritage:

SEARs Requirements	Section Addressed
An assessment of the impact to Aboriginal cultural heritage items (archaeological and cultural) in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in*	Sections 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 11.2

New South Wales (OEH, 2011) and the *Code of practice for archaeological investigations of Aboriginal objects in NSW* (DECCW, 2010a), including results of archaeological test excavations (if required).	
Evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the Aboriginal cultural heritage consultation requirements for proponents (DECCW, 2010b).	Section 4

1.3 Project site

The project site for the proposed Tchelery Wind Farm (the project) is in the Edward River LGA, south of the Sturt Highway and is approximately 35 kilometres east of Keri Keri, 19 kilometres northeast of Moulamein and 58 kilometres southwest of Hay (see Figure 1.5-2 and Figure 1.5-3). It is traversed by Maude Road (north–south) and Booroorban-Tchelery Road (east–west).

The project is located within the boundaries of a single agricultural property owned by the Tchelery Pastoral Company Pty Ltd and accessible from Maude Road via Dry Lake Road and Keri East Road. It is zoned RU1 Primary Production (except existing roads) with current land uses mostly comprising sheep grazing and cropping.

Several buildings are present in the project site, including a homestead and shearing shed, but none have been listed as a heritage item in the *Conargo Local Environment Plan 2013* or *NSW State Heritage Register*.

1.3.1 Local Aboriginal Land Council Area

The region containing the project site is located within the southwest Wiradjuri region of the NSW Land Council Areas. The project site lies within the Deniliquin Local Aboriginal Land Council (LALC) area, and also borders the Wamba Wamba, Balranald, and Hay LALC areas (see Figure 1.5-4). Local Aboriginal Land Councils are statutory bodies established under the *NSW Aboriginal Land Rights Act* 1983 and are not necessarily representative of Traditional Owners. As per comment by Wakool Indigenous Corporation representative Gary Pappin the “project site lies between the Mutthi Mutthi and Wiradjuri tribal boundaries with Dry Lake generally accepted as the boundary location. The Watti Wattie tribal boundary is also close by to the south.” (Section **Error! Reference source not found.**).

1.4 Contributors

This report was written by Jasmine Fenyvesi (NOHC, Senior Archaeologist and Senior Heritage Advisor, B, Archaeological Practice, Australian National University) and Darren Curnoe (NOHC, Senior Archaeologist and Senior Heritage Advisor. BA (Hons), PhD Australian National University), with assistance from Christian Keyes (Archaeologist and Heritage Advisor, BSc (Hons) University of NSW), Ellaine Dickens (Archaeologist and Heritage Advisor. B. Archaeological Practice, BA (Hons) Biological Anthropology, Australian National University). This report was edited by Nicola Hayes (NOHC, Associate Director. BA/BSc, Grad.Dip.Arts (Archaeology) Australian National University).

1.5 This report

1.5.1 Outline

This document examines the impacts of the proposed development on the Aboriginal heritage of the project site. This report:

- describes the proposed development (Section 1)
- describes the statutory context of the development (Section 2)

- details the study methodology (Section 3)
- describes consultation with Aboriginal people (Section 4)
- describes the environmental setting of the project site (Section 5)
- outlines the Aboriginal heritage context for the project site (Section 6)
- provides information relevant to the Aboriginal cultural context of the project site (Section 7)
- outlines the results of fieldwork and provides an analysis of archaeological richness of the landscape and site distribution including the results of sensitivity analyses (Section 8)
- assesses the significance of the heritage values of the project site (Section 9)
- outlines the potential impacts to heritage of the project (Section 10)
- assesses the impacts to heritage of the project with consideration of the principals of ecologically sustainable development (Section 11)
- provides management recommendations based on the results of this investigation (Section 12).

1.5.2 Restricted information

Information in this report relating to the exact location of Aboriginal sites should not be published or promoted in the public domain. The following sections of this report should be restricted in all public versions of this document:

- Sections 5, 6, 7, and 8 (site location information)
- Figures 5.3-5, 5.4-1, 5.5-1, 5.7-1, 5.7-2, 5.7-5, and 5.7-6; Figures 6.1-1, 6.3-2, 6.3-3, 6.3-4, 6.3-5, 6.3-6, 6.3-7, and 6.3-9; Figures 8.5-3 and 8.5-4, Figures 11.2-1 to 11.2-7; and Figures 31.2-1 to 13.2-178 (site location information), and
- Appendices 2 and 3 (AHIMS search results and details of sites recorded during fieldwork).

No information provided by Aboriginal stakeholders in this report has been specifically identified as requiring access restrictions due to its cultural sensitivity.

1.5.3 Confidentiality

No information in this report has been classified as confidential.

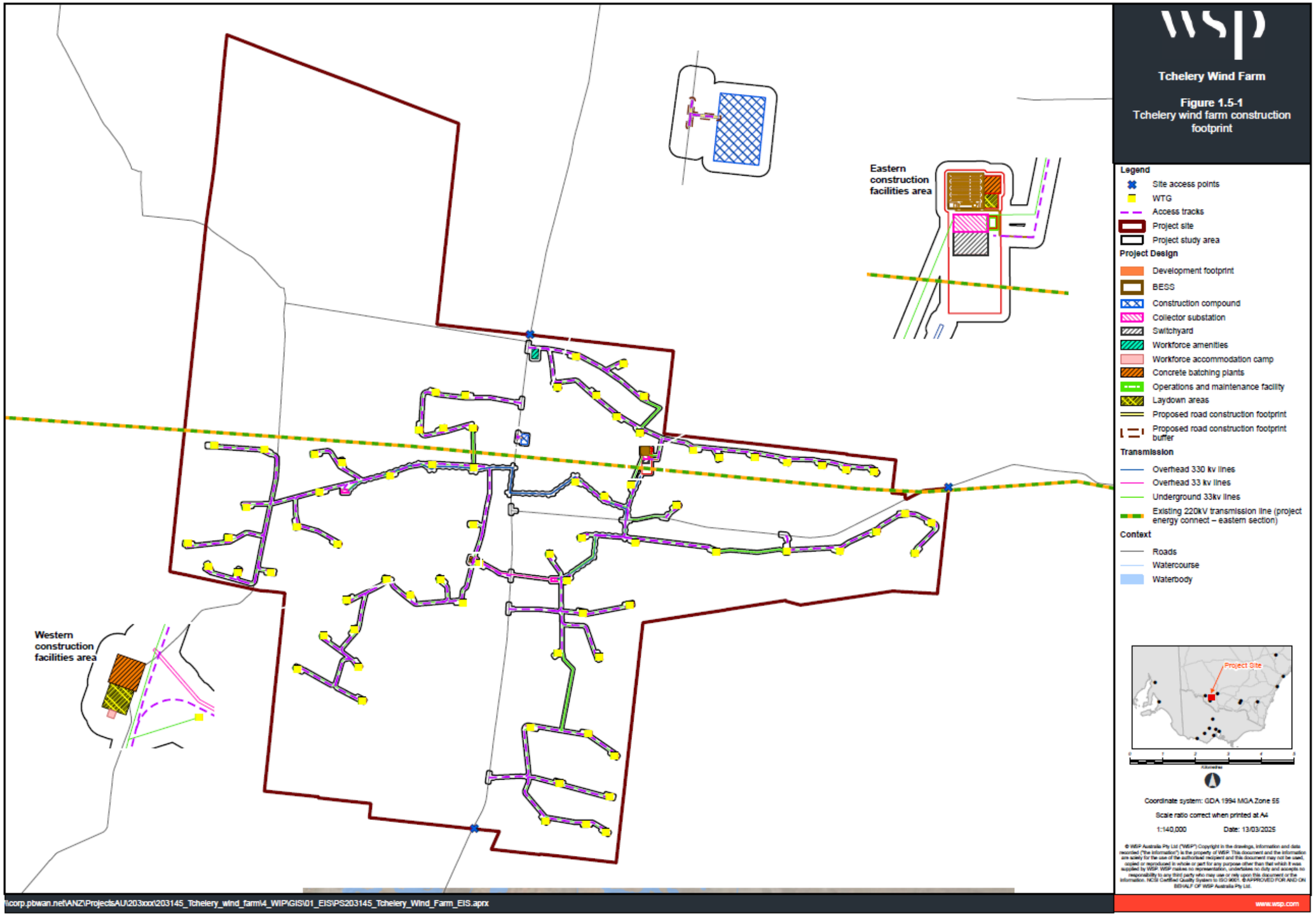

Figure 1.5-1 Tchelery Windfarm Current Proposed Impacts (map provided by WSP)

Figure 1.5-2 Location of the project site, southwest NSW

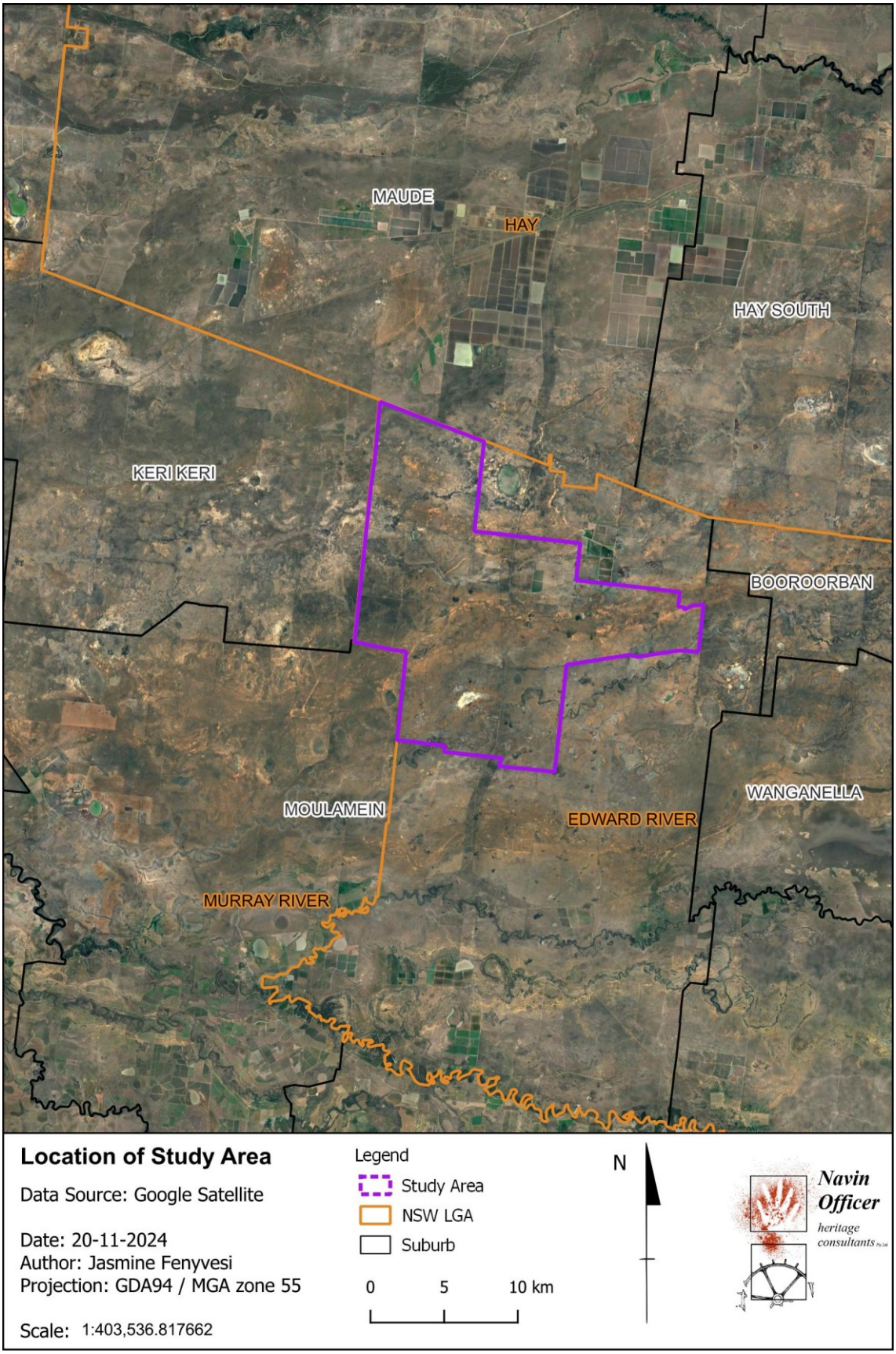

Figure 1.5-3 Shire councils in relation to the project site and adjacent region

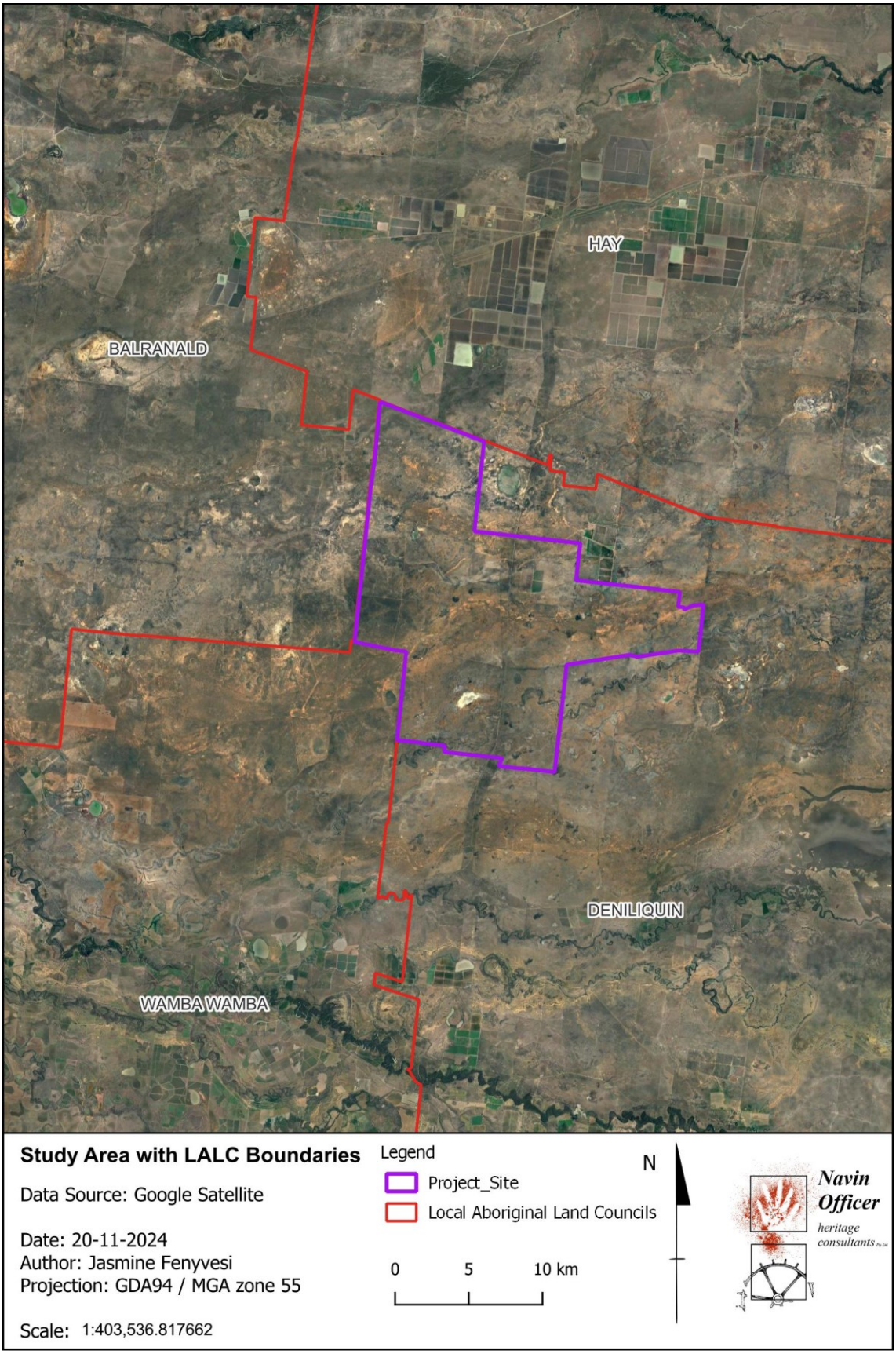

Figure 1.5-4 Project site indicating the Local Aboriginal Land Council boundaries

2 STATUTORY CONTEXT

2.1 Commonwealth legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act is the Australian Government's key piece of environmental legislation. It focuses Australian Government interests on the protection of matters of national environmental significance (MNES), with the states and territories having responsibility for matters of state and local significance. A person must not take an action that has, would have, or is likely to have, a significant impact on any MNES without approval from the Australian Minister for the Environment and Water (the Environment Minister).

Objectives of the EPBC Act include:

- the protection of the environment, especially those aspects of national significance
- to promote the conservation of biodiversity and ecologically sustainable development, and
- to recognise the role of Indigenous people and their knowledge in realising the aforementioned objectives.

Under the EPBC Act, a project is required to be referred to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) for activities that have the potential to significantly impact on MNES. If the project is considered likely to significantly affect MNES, the Environment Minister may deem the project a controlled action, and their approval is required prior to proceeding with construction. A controlled action requires a set of conditions be met in order to mitigate impact of the MNES to an acceptable level to meet the requirements of the EPBC Act.

The current project has been determined to be a 'controlled action' as it is likely to have a significant impact on certain listed threatened species. The project would be assessed under the bilateral agreement between the NSW and Australian Governments under Section 45 of the EPBC Act. With respect to heritage (for the project as exhibited), MNES could include World Heritage properties and National Heritage places; no World Heritage properties are located within the project site. The Australian Government also maintains two heritage registers: 1) the National Heritage List and 2) the Commonwealth Heritage List. There are no listed items within the project site.

2.1.2 Native Title Act 1993 (NT Act)

The *Native Title Act 1993* (Cth) (NT Act) provides for the recognition and protection of native title where it may still exist. The NT Act sets up a process for native title claims and compensation claims to be determined in the Federal Court, a determination of native title provides a declaration that native title continues to exist in the area. A successful compensation claim would provide recompense, monetary and other forms to native title holders whose native title was extinguished by inconsistent grant of interests in land after 1975 (when the *Racial Discrimination Act 1975* [Cth] was enacted). Prior to this any extinguishment of native title does not provide a legal right to compensation.

One of the main purposes of the NT Act was to protect native title where it still exists; however, the Government realised that there would still be future necessary works and other activities that would affect and impair native title. In order to do this legally the Australian Government provided that any impairment of native title would be valid if according to the procedures set out in the NT Act, any effect on native title rights and interests would be converted to a right to compensation. This is called the future act regime.[1]

It is important to remember that the NT Act protects all native title, not only in areas where there is a registered native title claim or a determination of native title. If native title has not been extinguished, and native title holders still have a connection to the land, then the processes outlined in the NT Act must be followed. It is only for mining and other certain acts (like compulsory acquisition) that give rise to the right to negotiate, that a native title claim must be registered. The National Native Title Tribunal imposes the registration test.

Part of the future act regime provides for Indigenous Land Use Agreements. An Indigenous Land Use Agreement is a special type of agreement between a native title group and the State or third parties dictating the use and management of land and waters. It allows for proposed works and other activities to validly affect native title. Flexible, pragmatic agreements that suit particular circumstances, and that outline all compensation for the impairing effects of native title, can be made using an Indigenous Land Use Agreement.

While there is no explicit linkage in NSW between heritage legislation and the NT Act, the guidelines state:

> *In the first instance 'traditional owners or custodians' are to be identified as native title holders, registered native title claimants, and Aboriginal Owners registered under the Aboriginal Land Rights Act 1983 (NSW). Where native title has been determined to exist for an area, only the native title holders or the relevant prescribed body corporate need to be consulted. Otherwise, as well as contacting native title claimants and Aboriginal Owners, the person or company is also required to seek input more broadly from a range of organisations, including Heritage NSW, the Local Aboriginal Land Council, Catchment Management Authorities, Native Title Services, and also to place a notice in the local newspaper'* (DECCW 2010b).

In summary:

- where native title has been **determined** consultation is required only with the native title holders
- where a native title claim has been **registered and/or lodged** but not yet determined the proponent must ensure that they involve the registered applicants in consultation regarding the cultural knowledge of the area in addition to any other RAPs for the project under the NSW Aboriginal Consultation Guidelines (DECCW 2010b).

There are no active native title claims within the current project site.

2.2 State legislation

2.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act provides a framework for environmental planning and assessment in NSW. The project has been declared a SSD in accordance with Division 4.7 of the EP&A Act and requires the approval of the NSW Minister of the Department of Planning, Housing and Infrastructure (or their delegate) under Section 4.38 of the EP&A Act.

[1] 'Future' means after the date the NT Act came into effect in 1994.

Under Section 4.41 of the EP&A Act, the following authorisations are not required under other legislation for the project:

- approvals under Part 4, or an excavation permit under Section 139 of the *Heritage Act 1977*
- Aboriginal heritage impact permits under Section 90 of the *National Parks and Wildlife Act 1974* (NSW) (NPW Act).

The EP&A Act and its regulations, schedules and associated guidelines require that environmental impacts are considered in land use planning and decision making; environmental impacts include cultural heritage assessment. The SEARs for this project require adequate consultation with the local Aboriginal communities and other relevant stakeholders, in accordance with the *Aboriginal cultural heritage consultation requirements for proponents* (DECCW, 2010b).

2.2.2 National Parks and Wildlife Act 1974

Part 6 of the NPW Act provides protection for Aboriginal cultural heritage in NSW, including Aboriginal objects and declared Aboriginal places.

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 (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains (Part 1.5, NPW Act)*.

An **Aboriginal place** is any area of land in NSW declared by the NSW Minister for the Environment and Water to be of special significance to Aboriginal culture.

It is an offence under Section 86(4) of the NPW Act to harm (destroy, deface, or damage) or desecrate an Aboriginal object or place. The definition of harm includes moving an Aboriginal object from the land that it is situated. Where harm cannot be avoided, an Aboriginal Heritage Impact Permit (AHIP) issued by the Heritage NSW under Section 90 of the NPW Act is required. An AHIP application must be accompanied by an Aboriginal Cultural Heritage Assessment Report (ACHAR), that details the results of an archaeological investigation, assesses the Aboriginal cultural heritage values associated with the area, and identifies any potential harm the proposed activity may cause. Consultation with Aboriginal communities must also be carried out in relation to the AHIP application and adhere to the consultation process set out in clause 60 of the National Parks and Wildlife Regulation 2009.

Heritage NSW have published several codes that regulate how ACHAR assessments and Aboriginal consultation are to be carried out, they include:

- *Aboriginal cultural heritage consultation requirements for proponents* (DECCW, 2010b)
- *Code of practice for archaeological investigations of Aboriginal objects in NSW* (DECCW, 2010a)
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in New South Wales* (OEH, 2011).

As stated in Section 1.2, the project is a SSD, and an AHIP is not required. Nonetheless, the assessment has been carried out with reference to the above guidelines.

The Aboriginal Heritage Information Management System (AHIMS) was also established to collate information on known Aboriginal objects, sites and places. The AHIMS is a database kept by Heritage NSW that contains information about Aboriginal objects and places in NSW, including site records and cultural heritage assessment reports. If an Aboriginal object is found that is not already recorded on the AHIMS database, it is a requirement under Section 89A of the NPW Act to notify Heritage NSW of the object's location.

2.2.3 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act 1983* (NSW) was established to return land to Aboriginal peoples through a process of lodging claims for certain Crown lands and the establishment of Aboriginal Land Councils. Aboriginal Land Councils constituted under the Act in NSW can claim Crown land.

The purposes of the *Aboriginal Land Rights Act 1983* are:

- to provide land rights for Aboriginal persons in NSW
- to provide for representative Aboriginal Land Councils in NSW
- to vest land in those Councils
- to provide for the acquisition of land, and the management of land other assets and investments, by or for those Councils and the allocation of funds to and by those Councils
- to provide for the provision of community benefit schemes by or on behalf of those Councils.

A portion of Crown land in the project site has been claimed by an Aboriginal Land Council. Lot 7301 DP 1158623 and Lot 7004 DP 1025393 within the Travelling Stock Route along Maude Road are subject to Aboriginal Land Claim by the Deniliquin Local Aboriginal Land Council. There are however provisions to exclude land from a claim if it is required for an essential public purpose, such as a power line.

3 STUDY METHODOLOGY

3.1 Literature and database review

A range of archaeological and historical data was reviewed for the project site and the surrounding Riverina region. This literature and data review were used to determine if known Aboriginal and historical sites were located within the project site, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The review of documentary sources included heritage registers and schedules, local histories, and archaeological reports.

Aboriginal literature sources included AHIMS and associated files and catalogue of archaeological reports. Sources of historical information included regional and local histories, heritage studies and theses; parish maps; and where available, other maps, such as portion plans.

Searches were carried out of the following statutory and non-statutory heritage registers and schedules.

Statutory listings:

- AHIMS
- World Heritage List
- National Heritage List (Australian Heritage Council)
- Commonwealth Heritage List (Australian Heritage Council)
- State Heritage Register (NSW Heritage Branch, Office of Environment and Heritage)
- Heritage Schedule(s) from the Queanbeyan Local Environmental Plan 2012.

Non-statutory listings:

- State Heritage Inventory (NSW Heritage Branch, Office of Environment and Heritage), and
- Register of the National Trust of Australia (NSW).

3.2 Field survey methodology

The archaeological survey and data collection were carried out in accordance with the requirements of the *Code of practice for archaeological investigations of Aboriginal objects in NSW* (DECCW 2010a).

The purpose of the field investigation is to:

- verify the nature, location, and extent of any known Aboriginal sites within the project site
- identify and record any new Aboriginal sites or landforms with archaeological potential observed
- document the conditions encountered (survey units, landforms, general soil information, ground surface exposures, and vegetation) to assess the effectiveness of the survey.

The field investigation can also be used to enable registered Aboriginal stakeholders to visit the project site and to discuss the management of Aboriginal sites and cultural heritage values across the project site.

Field survey within the project site was initially carried out between 19 and 28 June 2023, with additional field surveys carried out between 5 and 8 February 2024 and 15 and 19 July 2024. Initial

surveys focused on 120 location that were being explored as options for WTG locations, as well as proposed access tracks and associated infrastructure. This design was further refined, and additional surveys were conducted to investigate areas of altered disturbance that were not covered by past surveys.

The archaeological field survey was completed on foot by 4–10 people walking selected traverses, spaced a regular distance apart between approximately five metres and twenty metres apart. Extra focus was applied to locations of previously recorded sites and areas yielding high ground surface visibility/exposures.

Aboriginal field participants were encouraged to communicate knowledge regarding the cultural heritage values of the project site, archaeological and cultural sites, and the overall landscape. The project team consulted with the Aboriginal community in order to conduct the cultural assessment program in a culturally sensitive manner and have treated all information provided with respect. No material was identified by the Aboriginal participants as confidential.

3.2.1 Site recording

All encountered surface archaeological objects, sites, PADs and places of Aboriginal cultural value were documented. All sites had the following details recorded using standardised recording forms:

- site name, recorder and date
- site type
- global positioning system (GPS) coordinates
- landscape and landform character
- context information – cultural/spiritual location, proximity to other objects/sites etc.
- site dimensions
- site condition and potential to be larger
- site content including numbers and artefact types, raw materials and detailed recording of a sample of artefacts
- photos
- any other relevant information, such as oral information and informant details.

3.2.2 Recording parameters

The archaeological survey aimed at identifying the material evidence of Aboriginal occupation as revealed by surface artefacts and areas of archaeological potential not associated with surface artefacts. Potential recordings fall into two broad categories: sites and PADs.

3.2.2.1 Site types

A site is defined as any material of evidence of past Aboriginal activity that remains within a context or place that can be reliably related to that activity.

Most Aboriginal sites are identified by the presence of three main categories of artefacts: 1) stone or shell artefacts situated on or in a sedimentary matrix; 2) marks located on or in rock surfaces; and 3) scars on trees. The most frequently encountered site types in this region of southeastern Australia include:

- burials
- earth mounds
- hearths, heat retainers and earth ovens
- stone artefact occurrences – such as isolated finds and open artefact scatters
- freshwater middens
- scarred trees.

3.2.2.1.1 Burials

Burials possess special significance to Aboriginal communities because they provide physical and spiritual connections to the land, culture and history. Burial places have been important to all cultures as they give an enduring link to the ancestral past.

The Riverina Bioregion contains an unusually high concentration and large number of Aboriginal burials especially its southwest associated with the Murrumbidgee River and Murray River, their tributaries, lakes, palaeo-channels and palaeo-lakes. The large concentration in this region is scientifically significant (see Section 7.2) but not easily explained. Some researchers have argued they reflect a large and expanding Aboriginal population that inhabited the region during the mid- to late- Holocene (Pardoe, 1988), from 5,000 years ago onwards. Yet other archaeologists have argued the large number of burials is more likely to result from landscape factors such as the availability of sandy sediments to construct durable graves and burial monuments (Littleton and Allen, 2020). Additionally, burial in sandy and calcareous soils leads to the long-term preservation of human skeletal remains (Clark and Hope, 1985).

3.2.2.1.2 Earth mounds

Anthropogenic earth mounds are a common feature in the landscape around the southern Riverina Bioregion (Lyons, 1988; Balme and Beck, 1996; Littleton and Allen, 2020; Pardoe and Hutton, 2020). They are associated with lake margins and riverbanks and often include burials, artefacts, charcoal and food waste. Their purpose has long been debated (Batten, 1975; Balme and Beck, 1996; Martin, 2011) but likely represents a complex of mixed uses including:

> *…long-term residence in particular places: people building houses, cooking in earth ovens, and living in exactly the same place repeatedly for long periods. They are often situated on raised natural features, such as levee banks, and are identified by dark organic soils and vegetation that differ from the surrounding area. They are largely circular and contain ash, charcoal, baked clay cooking bricks used in earth ovens, burnt animal bone, mussel shell, other domestic material and the detritus of daily life. Sometimes they contain burials. Depending on their environmental context, mounds functioned principally as ovens for cooking, for processing plants for string, as habitation sites, or all three (Pardoe and Hutton, 2020:4).*

The oldest earth mounds in the region have been dated to more than 6,000 years old (Martin, 2011) and their presence has been suggested to signal a major shift after this time in the demography and economic activities of Aboriginal communities including greater intensification signalling population growth (Pardoe, 1988; Ulm, 2013). Some researchers have even interpreted clusters of mounds near swamps, such as the nearby Pollack Swamp, to represent hamlets or villages built by Aboriginal communities prior to European settlement (Pardoe and Hutton, 2020).

3.2.2.1.3 Hearths, heat retainers and earth ovens

One of the most common types of archaeological occurrences in southwestern NSW is hearths, heat retainers or earth ovens (Fanning et al., 2009). These are normally highly visible in the landscape and were used by Aboriginal people to cook food (Allen, 1972).

Fanning et al. (2009) note that hearths were originally constructed by excavating a depression in the soil that formed the body of the oven and into stones and then food items were placed for cooking. Abandonment of a hearth led, in many cases, to the infilling of the depression with soil, thereby

burying and preserving them. Like stone artefacts, they are commonly associated, their visibility in western NSW today is a consequence of erosion processes that are exposing them at the surface and concurrently causing their destruction (Fanning et al., 2009).

3.2.2.1.4 Stone artefact occurrences

Stone artefact occurrences are the most commonly site type recorded in Australia. They may consist of single artefacts – described as isolated finds – or as a distribution of more than one artefact – often described as an artefact scatter or 'open camp site' when recording surface artefacts, or as a subsurface artefact distribution when dealing with an archaeological deposit.

Where artefact incidence is very low, either in terms of areal density (artefacts per square metre [m^2]) or volumetric density (artefacts per cubic metre), then the differentiation of the recording from background artefacts counts or *background scatter* may be an issue.

3.2.2.1.5 Isolated finds

An isolated find is a single stone artefact, not located within a rock shelter, and occurs without any associated evidence of Aboriginal occupation within a radius of 60 metres. Isolated finds may be indicative of:

- random loss or deliberate discard of a single artefact
- the remnant of a now dispersed and disturbed artefact scatter
- an otherwise obscured or sub-surface artefact scatter.

Except in the case of the latter, isolated finds may be constituent components of the *background scatter* present within any particular landform.

The distance used to define an isolated artefact varies according to the survey objectives, the incidence of ground surface exposure, the extent of ground surface disturbance, and estimates of *background scatter* or *background discard* densities. In the absence of baseline information relating to background scatter densities, the defining distance for an isolated find must be based on methodological and visibility considerations. Given the varied incidence of ground surface exposure and deposit disturbance within the project site, and the lack of background baseline data, the specification of 60 metres is considered to be an effective parameter for surface survey methodologies. This distance provides a balance between detecting fine scale patterns of Aboriginal occupation and avoiding environmental biases caused by ground disturbance or high ground surface exposure rates. The 60 metres parameter has provided an effective separation of low-density artefact occurrences in similar southeast Australian topographies outside semi-arid landscapes.

3.2.2.1.6 Artefact scatters

Artefacts situated within an open context are classed as an open artefact scatter (or 'open camp site') when two or more occur no more than 60 metres away from any other constituent artefact. The 60 metre specification relates back to the definition of an isolated find (see 3.2.2.1.5). The use of the term *scatter* is intended only to be descriptive of the current archaeological evidence and does not infer the original human behaviour that formed the site. The term *open camp site* has been used extensively in the past to describe open artefact scatters. This was based on ethnographic modelling suggesting that most artefact occurrences resulted from activities at camp sites. However, in order to separate the description from the interpretation of field evidence, the terms *artefact scatter*, *artefact distribution* or *artefact occurrence* are now more extensively used. The latter two options can also be used to categorise artefacts occurring in sub-surface contexts.

3.2.2.1.7 Freshwater middens

Middens are concentrations of shells and other materials, including artefacts and bone, that have been discarded and are typically associated with food consumption. Freshwater middens in western NSW are frequently lens shaped and have not normally been deliberately mounded or shaped (Pardoe and Martin, 2011).

3.2.2.1.8 Scarred trees

Culturally modified trees have been scarred by Aboriginal people through the deliberate removal of bark or wood (Long, 2005). Bark provided a versatile and plentiful material that could be used for a wide variety of commonplace tasks including the construction of shelters, watercraft and containers. Long (2005) attributes importance to scarred trees in the following ways:

- scarred trees provide an important record about traditional places and events in Aboriginal history and can help us visualise how the landscape would have looked before clearance
- represent places where an event took place. This may have involved the manufacture of an artefact, such as a canoe, the erection of a shelter, or food collection. This allows us to study where these activities generally occurred and identify aspects of culture distinctive to a particular region or tribal group
- characteristics of a scar can tell us much about the nature of an activity and the role that bark performed in the activity. For instance, by looking at the shape, size and position of a group of scars we can tell whether bark sheets were commonly used for building shelters, or whether other materials were used
- natural characteristics of the tree, the scar and its overgrowth can tell us much about the age of a scar and the age of a tree when it was scarred
- the number of times a tree has been scarred can tell us much about the local availability of suitable bark, that gives us information about the intensity of scarring activities and the number of Aboriginal people living in that area.

Scarred trees are common in the NSW landscape especially around lakes and waterways (Lyons, 1988; Pardoe and Martin, 2011). Like all Aboriginal objects and sites, they are protected under the *Heritage Act 1977* (NSW) regardless of whether they have been recorded and registered on AHIMS.

The presence of Aboriginal culturally modified trees in the landscape around the project site, as confirmed by the results of the AHIMS search (see Section 7.1.2), indicates further potential for scarred trees to be found.

3.2.2.2 Potential Archaeological Deposits

A potential archaeological deposit, or PAD, is defined as any location where the potential for subsurface archaeological material is considered to be moderate or high, relative to the surrounding project site landscape. The potential for subsurface material to be present is assessed using criteria developed from the results of previous surveys and excavations relevant to the region. Where necessary, PADs can be given an indicative rating of their 'archaeological potential' based on a combined assessment of their potential to contain artefacts, and the potential archaeological value of the deposit. Table 3.2-1 illustrates the matrix that this assessment is based. Locations with low potential for artefacts fall below the threshold of classification. In such cases the potential incidence of artefactual material is considered to be the same as, or close to that for background scatter. Where there is moderate potential for artefacts, the predicted archaeological potential parallels the potential significance of the deposit. For deposits with high potential for artefacts, the assessed archaeological potential is weighted positively.

The boundaries of PADs are generally defined by the extent of particular micro-landforms known to have high correlations with archaeological material. A PAD may or may not be associated with surface artefacts. In the absence of artefacts, a location with potential would be recorded as a PAD. Where one or more surface artefacts occur on a sedimentary deposit, a PAD may also be identified where there is insufficient evidence to assess the nature and content of the underlying deposit. This situation is due mostly to poor ground surface visibility.

Table 3.2-1 Matrix showing the basis for assessing the archaeological potential (shown in bolded black text) of a potential archaeological deposit

		Potential to contain Aboriginal objects		
		Low	*Moderate*	*High*
Potential archaeological significance	*Low*	---	**low**	**moderate**
	Moderate	---	**moderate**	**high**
	High	---	**high**	**high**

3.3 Methodology for archaeological test excavation program

Within an earlier project design, one of the PADs identified by the field surveys, TWF PAD12, was proposed to be impacted by the installation of an underground power line. As such a test excavation program was completed at the PAD within the areas to be impacted. Both the project design and the boundary of the PAD were altered following testing and TWF PAD12 is no longer being subject to impact.

3.3.1 Study aims

The aim of the investigation was to ascertain the archaeological deposits within the TWF PAD12 that has potential to be directly impacted by the project. The methodology was designed to test the density, horizontal and vertical, of substantial archaeological deposits. The following methodology was employed during the testing program.

3.3.2 Test excavation methodology

Within the PAD proposed to be impacted by an underground power line (TWF PAD12), two transects of test pits were placed along the proposed power line alignment. Pits were placed 20 metres apart.

Following an on-site review, the test pit locations were varied slightly in order to avoid hazards and obstructions including the following:

- large stone cobbles or tors
- outcropping bedrock
- highly disturbed or eroded ground including rabbit burrows, ant nests, buried infrastructure such as pipes or cables
- substantial vegetation.

If substantial or significant deposits were identified during the test excavation program this would indicate the need for the relocation of the power line or for a future mitigation program that might include salvage.

Where required, excavation procedures and protocols were modified at the discretion of the Excavation Director, Jasmine Fenyvesi, in consultation with the RAPs and client as the conditions in the field and nature of the excavations developed.

3.3.3 Hand excavation

The test excavation program was carried out in accordance with the *Code of practice for archaeological investigations of Aboriginal objects in NSW* (Part 6 NPW Act) (DECCW 2010a) requirement 16a. All pits were excavated by hand, combining four 0.5 m x 0.5 m units into 1 m x 1 m test pits. Indicative testing methodology consisted of the following:

1. mark out and record pit location(s) - the size of an individual test pit was 1 m x 1 m. Each test pit was excavated and recorded in quadrants units (0.5 m x 0.5 m).

2. excavate pit – pits were excavated by shovel and trowel using standard by-hand archaeological methodologies including vertical and horizontal recording of spit levels and sedimentary, cultural and stratigraphic features. The first excavation unit at each site was excavated and documented in 5 centimetres (cm) spits. Depending upon the results of the first excavation unit, subsequent spit intervals were at 10 cm, except in circumstances where the excavation of cultural features or stratigraphic units necessitated a smaller interval. Excavation ceased when the natural B-horizon or to the base of Aboriginal object baring units or until deposits were sterile. The first pit excavated in 5 cm spits extended 1 spit to below the sterile layer.

3. archaeological investigation did not go beyond 150 cm in depth or beyond a depth considered unsafe based on field conditions

4. for each pit photographic and scale-drawn records of the stratigraphy/soil profile were completed

5. where cultural features were identified, such as heat treatment pits or hearths, knapping floors, then three-dimensional co-ordinates were taken, detailed plans drawn, and samples of dateable material collected

6. other samples would be obtained for the potential analysis of paleoenvironmental indicators such as pollen, phytoliths and microfauna

7. all excavated material was sieved through at least a 5 millimetre (mm) mesh, with use of a top larger mesh (10 mm x 10 mm) where appropriate. All identified or suspected cultural material recovered from sieving was retained, bagged and labelled.

Bioarchaeological material that may have been encountered during testing and salvage include faunal remains, shell, macrobotanicals, and charcoal. Collection of this material provides information on subsistence, past environments, and are a source for dating materials. Recovery of these materials can occur in three situations: 1) associated with hearths, 2) from middens, 3) low density or isolated materials collected from sieves. Collecting material from these contexts during sub-surface investigations varies:

- **hearth materials:** materials would be collected and recorded *in situ* where possible. This includes charred organics, bone, and shell. A series of charcoal samples would be collected from appropriate stratigraphic contexts for possible further analysis. Bone and shell found during sieving would be bagged separately to lithics, and if wet, allowed to dry prior to storage to prevent bacterial and fungal growth

- **midden materials:** a bulk sample of midden materials would be collected (i.e. all sediment and organics), and not sieved during excavation. Sieving and analysis would take place under controllable conditions in the NOHC laboratory. This provides a valuable analysis of midden materials as biological materials, and small bone and shell tools (e.g. bone points), are frequently not identified during onsite excavations. Remainder of the midden samples would be sieved in the field and bagged separately to the lithic assemblage

- **isolated materials:** isolated shell and bone from archaeological deposits would be recorded and recovered *in situ* where possible, however biological materials are likely to be found during sieving. Only faunal bone and shell would be recovered from sieves and bagged separately to lithics. If wet, all organic materials were allowed to dry prior to storage to prevent bacterial and fungal growth.

4 CONSULTATION PROCESS

The *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010b) establish the requirements for consultation with Aboriginal people as part of the heritage assessment process in cases where AHIPs are required. These guidelines are also often specified in SEARS even though AHIPs are not required. The aim of undertaking the consultation is to understand the cultural heritage values present in the project site, and the views and concerns of Aboriginal people about the project.

The requirements specify four stages of consultation:

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

The actions for each stage of consultation are summarised below.

4.1 Consultation stages

4.1.1 Stage 1 – Notification of project and registration of interest

An advertisement was placed in *The Guardian* that invited registration of interest by 17 June 2022.

Letters were sent to:

- Deniliquin LALC
- Edward River Council
- Murray Local Land Services
- Heritage NSW;
- Native Title Services Corporation Ltd; and
- Office of the Registrar Aboriginal Land Rights Act 1983.

A search was made of the National Native Title Tribunal registers on 31 May 2022.

Following advice received from Heritage NSW and the native title search results, letters were sent to all groups/individuals identified. The closing date for expressions of interest was 22 June 2022.

Four registrations of interest were received from the following Aboriginal parties:

- Wakool Indigenous Corporation (Gary Pappin)
- Yarkuwa Indigenous Knowledge Centre Aboriginal Corporation
- Barap Wamba
- Deniliquin LALC.

Additional registrations were received over the life of the project from the following Aboriginal parties:

- Dennis Charles (5/02/2024)
- Pappin Family Aboriginal Corporation (5/07/2024).

4.1.2 Stage 2 and 3– Presentation of information about the proposed project and Gathering information about cultural significance

A copy of the survey methodology and cultural information request was sent to registered groups on 22 August 2022. No responses were received regarding the methodology.

A copy of the test excavation methodology was sent to registered groups on 11 June 2024. No responses were received regarding the methodology.

4.1.3 Stage 4 – Review of draft cultural heritage assessment report

A draft copy of the survey report was provided to the RAPs for their input and comment on 03/03/2025 with a comment period until 31/03/2025.

A response was received on 5 March 2025 from Wakool Indigenous Corporation:

> "Thankyou for providing the ACHAR for review. I have some minor comments:
>
> 1. In Section 1 you need to recognise that the Local Aboriginal Land Councils are statutory bodies established under the NSW Land Rights Act 1983 and are not representative of Traditional Owners. The Tchelery Wind Farm project site lies between the Mutthi Mutthi and Wiradjuri tribal boundaries with Dry Lake generally accepted as the boundary location. The Watti Wattie tribal boundary is also close by to the south.
>
> 2. On page 44 you mention Swan Hill as being 30km to the south. This is incorrect. Swan Hill is 130km to the south.
>
> 3. You have spelt Yarramundi wrong on two occasions.
>
> 4. Darren Curnoe is an Anthropologist not an Archaeologist. Please correct or provide proof of his archaeology degree. Please also identify if other members of your staff listed are appropriately skilled and experienced persons as per the "Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW"."

NOHC responded to the comments and amended the report as appropriate, response shown below:

> "Thanks for your comments Gary, I will amend the report to reflect them.
>
> Regarding point 4, I think there may have been some miscommunication somewhere. Darren is an archaeologist who specialty is in biological anthropology/ physical anthropology which is the study of human remains. If you want some extra info on Darren please check out his info page on our website https://nohc.com.au/people/darren-curnoe or his staff page for UNSW https://www.unsw.edu.au/staff/darren-curnoe. All of our staff are appropriately skilled and experienced archaeologists."

No further comments were received. Copies of the correspondence are available in Appendix 1.

4.2 Summary of Aboriginal community consultation

A consultation log, copies of correspondence, and feedback on the draft report from RAPs are attached in Appendix 1 and summarised in Table 4.2-1.

Table 4.2-1 Summary of Aboriginal cultural heritage consultation

Stage	Action	Date commenced	Date completed	Details
1	Notification of project was sent to: - Deniliquin LALC - Edward River Council	31/5/2022	13/6/2022	Seven Aboriginal people and organisations were identified as potential stakeholders.

Stage	Action	Date commenced	Date completed	Details
	- Murray Local Land Services - Heritage NSW - Native Title Services Corporation Ltd - National Native Title Tribunal - Office of the Registrar *Aboriginal Land Rights Act 1983*			
	A newspaper advertisement was placed in *The Guardian*	1/6/2022	17/6/2022	Newspaper printed on 3/6/2022.
	National Native Title Tribunal Register search	31/5/2022	31/5/2022	No registered native title claimants, native title holders, or Indigenous Land Use Agreements were identified within the subject area.
	Registration of interest of Aboriginal stakeholders:	8/6/2022	22/6/2022	Registrations of interest in the project were received from four Aboriginal people and organisations: - Wakool Indigenous Corporation (Gary Pappin) - Yarkuwa Indigenous Knowledge Centre - Barap Wamba - Deniliquin LALC
2	Presentation of information about the project to RAPs	22/8/2022	19/9/2022	The assessment methodology and request for information about cultural significance was sent to RAPs. - No responses were received
3	Gathering information about cultural significance			
	Field investigation	19/6/2022	28/6/2022	Archaeological survey carried out by NOHC and representatives of: - Deniliquin LALC - Wakool Indigenous Corporation (Gary Pappin) - Yarkuwa Indigenous Knowledge Centre - Barrap Wamba
	Community update	14/2/2023	14/2/2023	Update to RAPs that the project is ongoing.
	Community update	15/12/2023	15/12/2023	Update to RAPs that the project is ongoing and additional surveys are expected to take place in Jan/Feb 2024.
	Registration of interest of Aboriginal stakeholders:	5/2/2024	5/2/2024	Registration of interest in the project was received from Dennis Charles, specifically for fieldwork
	Additional field investigation	5/2/2024	8/2/2024	Archaeological survey carried out by NOHC and representatives of: - Deniliquin LALC - Wakool Indigenous Corporation (Gary Pappin) - Yarkuwa Indigenous Knowledge Centre - Barrap Wamba - Dennis Charles

Stage	Action	Date commenced	Date completed	Details
	Presentation of information about the proposed project to Registered Aboriginal Parties (RAPs)	11/06/2024	10/07/2024	The test excavation methodology was sent to RAPs No responses were received
	Registration of interest of Aboriginal stakeholders	5/07/2024	5/07/2024	Registration of interest in the project was received from the Pappin Family Aboriginal Corporation
	Test excavation program	15/07/2024	19/07/2024	Archaeological test excavation program carried out by NOHC and representatives of: - Deniliquin LALC - Wakool Indigenous Corporation (Gary Pappin) - Yarkuwa Indigenous Knowledge Centre - Barrap Wamba - Pappin Family Aboriginal Corporation
4	Review of draft cultural heritage assessment report by RAPs	03/03/2025	31/03/2025	The draft report, accompanied by an invitation to provide comments within 28 days, was provided to each of the RAPs. - Response was received from Wakool Indigenous Corporation

5 ENVIRONMENTAL CONTEXT

A review of the landscape can assist in predicting the ways that Aboriginal people have used the subject area in the past. It establishes a context for the distribution of material traces of past Aboriginal occupation by identifying natural resources and landscape features that may have been focal points for activities and settlement. In addition, identification of site formation and post-depositional processes can assist in determining if Aboriginal objects are likely to be preserved below the ground surface, and if potential archaeological deposits are likely to be relatively intact or disturbed. The environmental context of the project site is summarised below.

5.1.1 Constraints on archaeological observability

In undertaking landscape archaeological surveys, two major constraints operate in allowing for the identification of Aboriginal objects and sites: ground surface visibility (GSV) and ground surface exposure (GSE).

GSV is defined as:

> *…the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like vegetation, plant or leaf litter, loose sand, stony ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals'… (DECCW, 2010a).*

GSE is defined as:

> *…the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals'… (DECCW, 2010a).*

A range of factors would determine the GSV and GSE of a particular project site, and would include landscape variables including:

- topography
- geology
- soil type
- hydrology
- vegetation type, distribution and surface cover
- erosion risk and impacts
- land use.

5.2 General landscape and topography

5.2.1 General landscape

The project site is located within the Riverina Bioregion between the Murrumbidgee River and Murray River fan sub-regions (NSW National Parks and Wildlife Service [NPWS], 2003; see also, Figure 5.3-2). This bioregion is dominated by river channels, floodplains, backplains, swamps, lakes and lunettes (see Figure 5.3-2).

This bioregion also includes outlying remnants of the Murray Darling Depression Bioregion in its western boundary, and the Victorian Midlands Bioregion in the south. The Murray River and Murrumbidgee River and their major tributaries, the Lachlan River and Goulburn River, flow from the highlands in the east, westward across the Riverina plain.

The Riverina Bioregion is dominated by a persistently dry semi-arid climate and characterised by hot summers and cool winters (Stern et al., 2000). Mean annual temperature is 15–18º C with a minimum average monthly temperature of 2.2–4.6º C and maximum average monthly temperature of 30.6–33.7º C (NPWS, 2003).

The project site is contained within the Murrumbidgee Depression Plains landscape of the Riverina landscape types (see Figure 5.3-2). Representative landscapes across the project site are shown in Figure 5.3-4.

5.2.2 Topography

The Riverina Bioregion covers the alluvial fans of the Lachlan River, Murrumbidgee River and Murray River west of the Great Dividing Range and extends down the Murray River (Figure 5.3-3). The region around the project site is dominated by floodplain with overflow lakes. It ranges in altitude from approximately 65 metres to 150 metres above sea level with north–south and east–west gradients.

The project site sits within an area of low-lying elevation ranging from approximately 73 metres to 81 metres above sea level, decreasing from east to west. Patterns of sediment deposition, soils, landscapes and vegetation are controlled by discharge from past and present streams.

5.3 Geology

Much of the geology of the Riverina Bioregion is similar the Darling Riverine Plains Bioregion. The upper catchment landscape is a series of overlapping, low gradient alluvial fans. The lower tract of the river is a floodplain with overflow lakes. Discharge from past and present streams control patterns of sediment deposition, soils, landscapes and vegetation. Alluvial sediments become deeper and older in the western half of the basin, reaching a maximum thickness of around 500 metres. Basement rocks are early Palaeozoic sediments and granites of the Lachlan Fold belt, but almost no outcrops exist in the Riverina.

A simplified geological map of the project site is provided in Figure 5.3-1 with a key to the geological units listed in Table 5.3-1. The project site contains five sedimentary units:

- **alluvial floodplain deposits:** silt, very fine- to medium-grained lithic to quartz-rich sand, clay
- **alluvial channel deposits:** meander-plain facies, unconsolidated grey humic, clayey very fine-grained sand, typically overlying light brown clayey silt
- **aeolian lunette:** red brown to light brown, silty bi-modal quartz sand, sporadically clayey; locally capped by off-white to beige mobile quartz sand; regolithic carbonate accumulations at depth, including rhizolith development
- **source-bordering dunes:** red brown to light brown, poorly sorted to bi-modal, very fine- to medium-grained feldspathic quartz sand
- **claypan and lacustrine deposits:** friable to plastic, finely laminated grey clay, silty clay, humic clay, grey paleosols; locally includes medium- to fine-grained sand.

Table 5.3-1 Key to the NSW geological units shown in Figure 5.3-1

NSW code	Unit name
CZ_af	Alluvial floodplain deposits
Q_acm	Alluvial channel deposits – meander-plain facies
Q_ddl	Aeolian lunette
Q_dds	Source-bordering dunes
Q_l	Claypan and lacustrine deposits

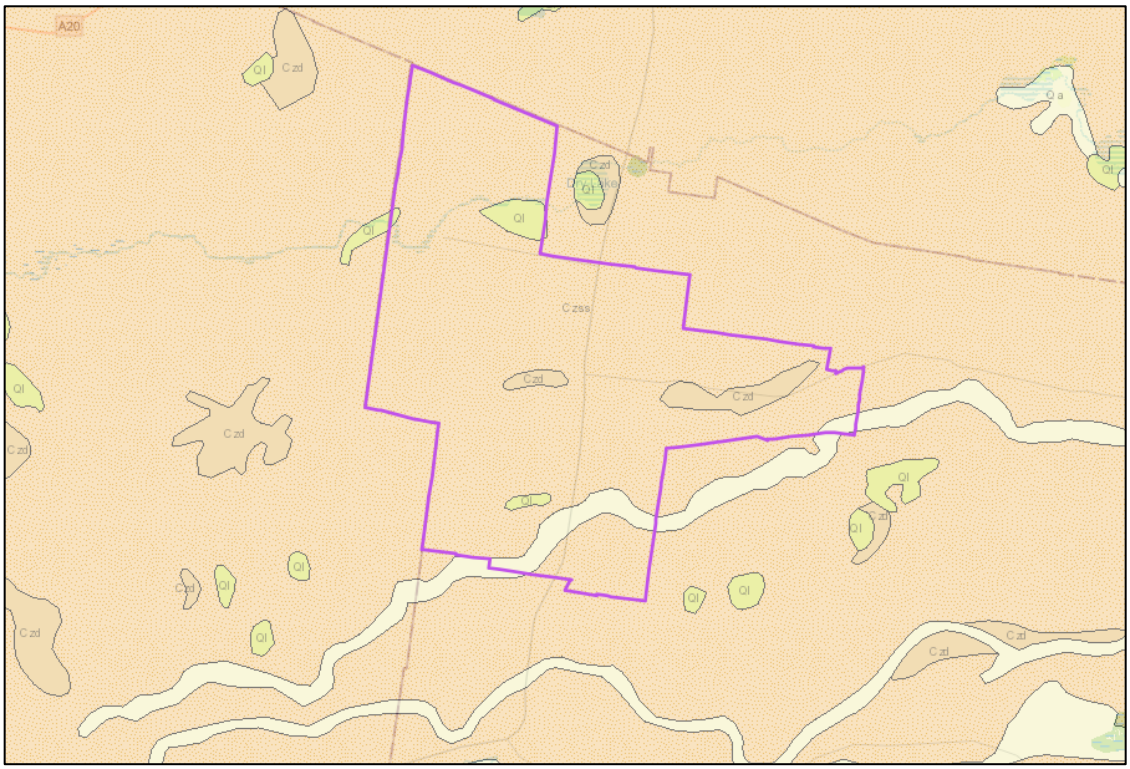

Figure 5.3-1 Simplified geology of the project site (purple outline) and surrounds
(Source: SEED NSW, 2025)

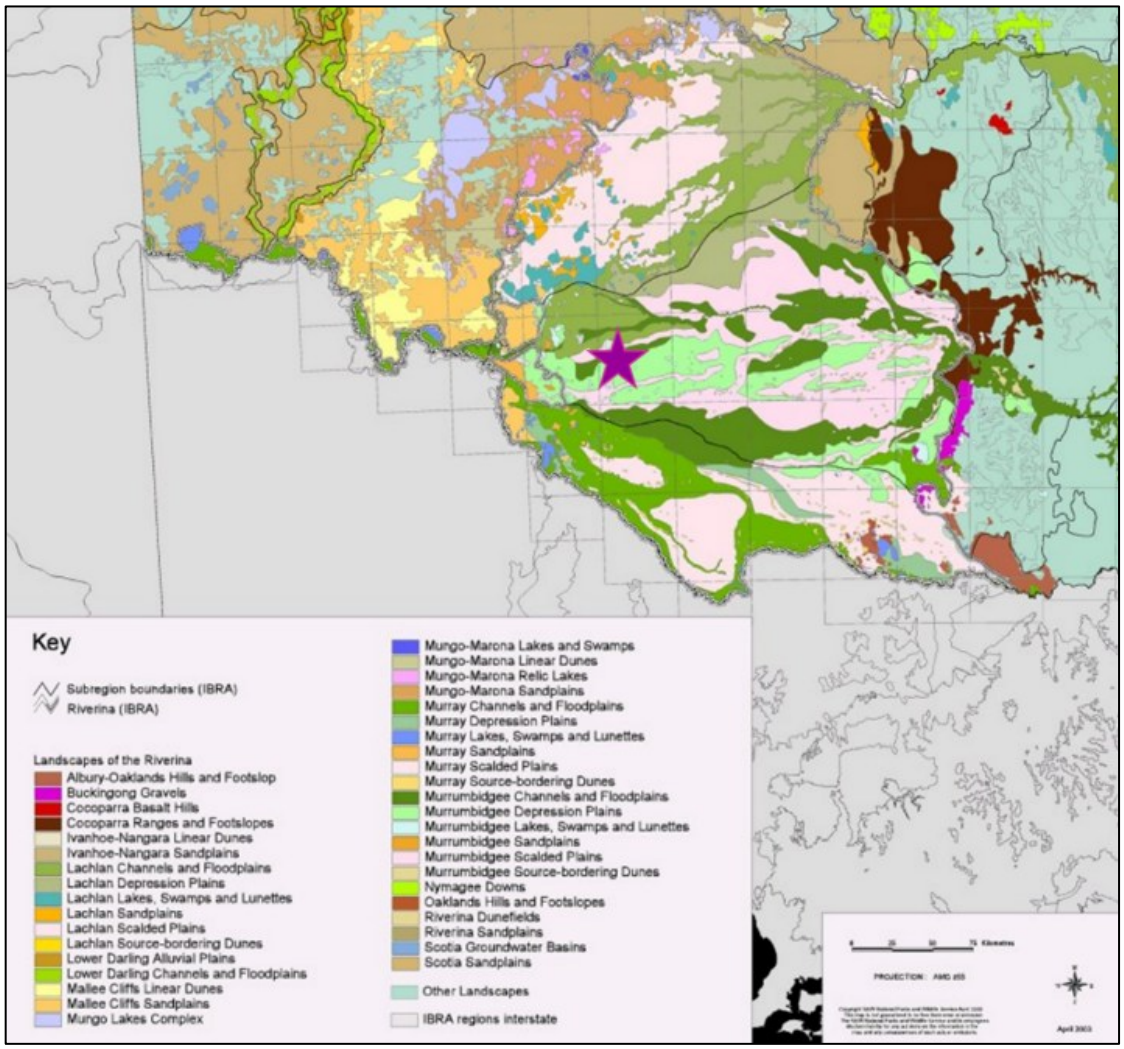

Figure 5.3-2 The Riverine bioregion landscapes indicating the location of the project site (star)
(Source: NPWS, 2003)

Studies of the age of the formation of large palaeo-channels in the region south of the Murrumbidgee River, including Yanco Creek and Gum Creek, have established the age of both fluvial and aeolian sediment in the area back to around 41,000 years ago (Mueller et al., 2018). Most relevant here is the Gum Creek palaeo-channel because the two largest creeks in the project site, Abercrombie Creek and The Forest Creek, flow directly from the Murrumbidgee River via Gum Creek. The sediments within the Gum Creek palaeo-channel document periods of enhanced fluvial activity associated with increased sediment and water discharge at 41,000–29,000 years ago (Mueller et al., 2018). This suggests that some of the fluvial and aeolian sediments within the project site probably also date to this period.

In considering the previously recorded AHIMS sites contained within and adjacent to the project site (see Section 7.1.2), the majority are located only within three of the five geological units:

- aeolian lunette deposits (specifically Dry Lake)
- alluvial floodplain deposits
- source-bordering dunes.

Focusing just on previously recorded AHIMs sites located within the project site, these are found only within the latter two units (see Table 5.3-2). This suggests there might be a relationship between the underlying geology and the presence of a preserved archaeological record, or conversely, factors such as archaeological visibility and exposure. Limitations due to the small number of sites and bias in sampling procedures need to be borne in mind (see Section 7.3.7), however, investigation of this potential relationship may still produce useful insight and is explored below.

Table 5.3-2 Number of AHIMS sites in the project site according to geological unit

Unit name	Number of AHIMS sites
Alluvial floodplain deposits	13
Alluvial channel deposits – meander-plain facies	0
Aeolian lunette	0
Source-bordering dunes	3
Claypan and lacustrine deposits	0
Alluvial floodplain deposits	0

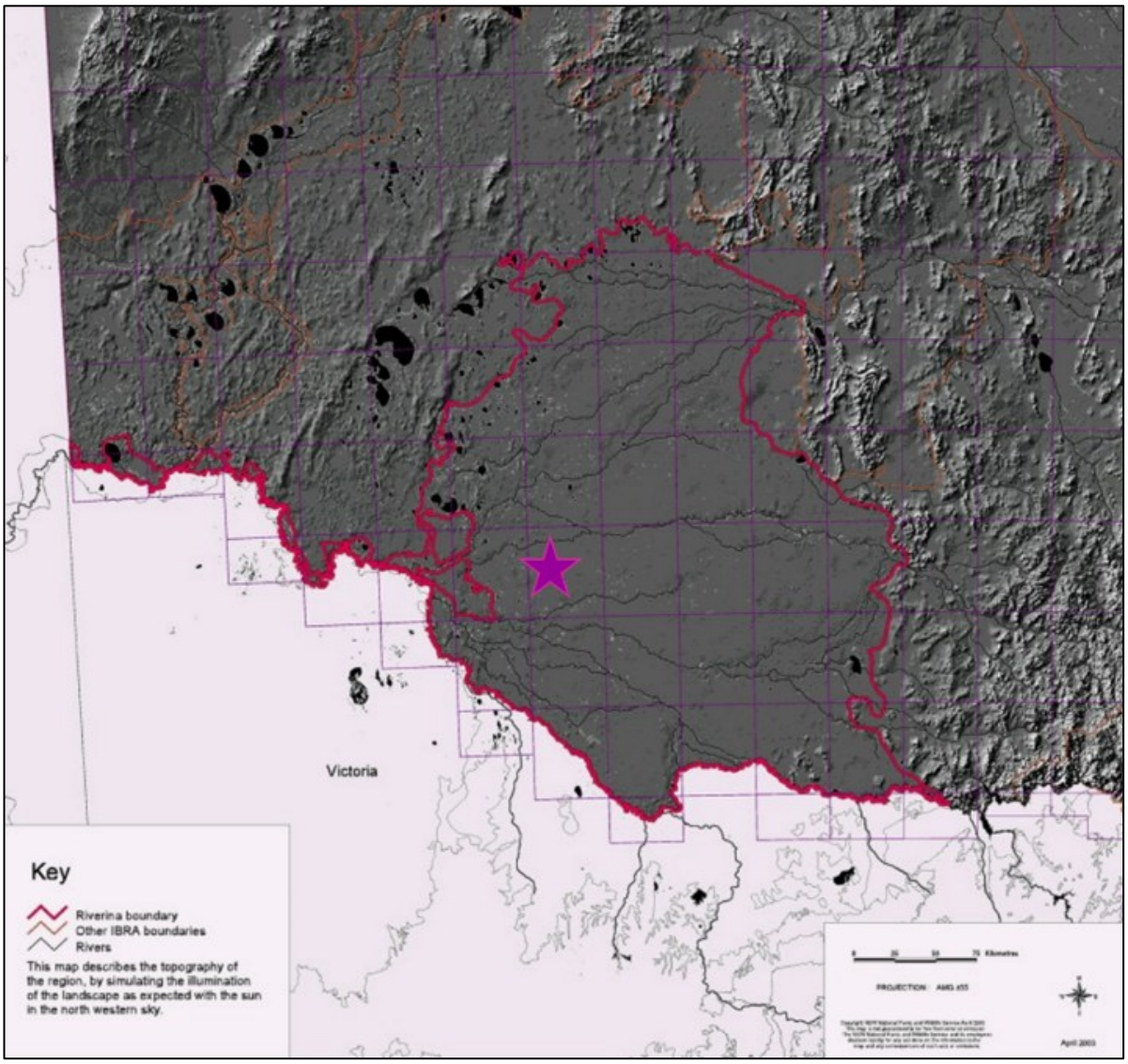

Figure 5.3-3 The Riverine bioregion topography indicating the location of the project site (star)

(Source: NPWS, 2003)

Figure 5.3-4 Images of representative landscapes in the project site

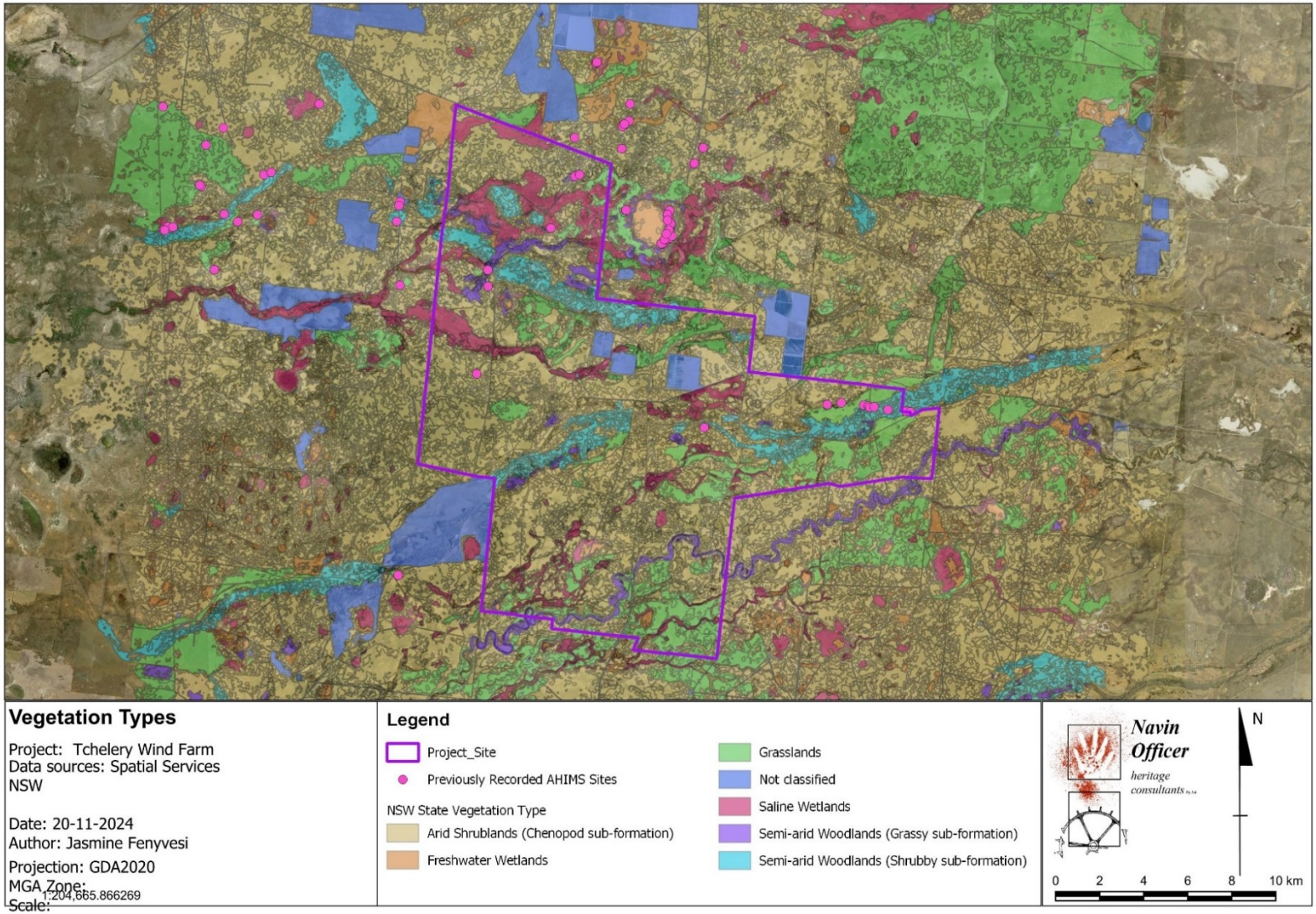

Figure 5.3-5 Vegetation types within in the project site

5.4 Soils

The soils of the project site and adjacent landscape have formed through the weathering of the underlying geological units (see Section 5.3) as well as additions from sediments transported by water or wind and organic matter from decayed plant remains on the surface. In comparing the geology and soils, it becomes clear there is limited association of one with the other suggesting the soils have been subjected to substantial recent processes and inputs during their formation (compare Figure 5.3-5 and Figure 5.4-1).

Three soil types are found in the project site that make up most of the outcropping surface within its boundary: siliceous sands; grey, brown and red clays; and red-brown earths.

5.4.1 Siliceous sands

Siliceous sands are found mostly in the northern part of the project site, especially north of Dry Lake Road. These soils are loose sands resembling dune areas and are sparsely vegetated and highly prone to wind erosion if cleared.

5.4.2 Grey, brown and red clays

There are narrow bands of grey, brown and red clays that cross the project site in an east–west direction, covering most of the area south of Dry Lake Road. These soils have a thin topsoil and can be easily eroded. The grey clays are high in calcium carbonate and provide little native grass cover being mostly covered by salt bush.

5.4.3 Red-brown earths

A band of red-brown earths cross the property on the eastern side of Maude Road. Red brown earth soils have a topsoil of sandy loam to light clay loam (10–50 mm thick) overlying a clay subsoil. These soils tend to be heavily compacted after drying out. Soils of this type are prone to hard setting and over cultivation can result in compaction due to a low clay proportion, the topsoil being reliant on organic matter for structure. Excessive cultivation may also cause a decline in the structure of topsoils of red brown earths, resulting in poor plant growth. Clay subsoils can be sodic and poorly structured.

The red-brown and grey clays in the bioregion support grassland communities that are nationally significant. Calcareous, sandy soils, that tend to be feature of adjacent bioregions are also present in the Riverina and support mallee ecosystems (Semple 1990; Porteners 1993; Eardley 1999).

5.4.4 AHIMS sites and soil type

Previously recorded AHIMS sites within and adjacent to the project site are also indicated on Figure 5.4-1 to establish their location according to soil type. Table 5.4-1 lists the number of AHIMS sites within the project site according to soil types. They are evenly split between grey, brown and red clays (n=8) and siliceous sands (n=8). No sites listed on AHIMS have been recorded in red-brown earths.

Looking beyond the project site (see Figure 5.4-1), this pattern is consistent with the location of sites adjacent to it.

Table 5.4-1 Number of AHIMS sites in the project site according to soil type

Vegetation type	Number of AHIMS sites
Grey, brown and red clays	8
Siliceous sands	8
Red-brown earths	0

Figure 5.4-1 Soil types in the project site and surrounds

5.5 Hydrography

The project site is located within a complex hydrological setting that includes large creeks, natural water bodies, swamps and a large number of artificial irrigation channels. There is, however, a noticeable absence of permanent waterways or water bodies in the project site and surrounds. The hydrology of the area is relevant to understanding the archaeological record of the area for two principal reasons:

1. Heritage NSW (DECCW, 2010a) requires archaeological assessments to assume the presence of water in or within 200 metres of waters of a project site to be indicative of the likely presence of Aboriginal objects

2. water is an important factor in the visibility, exposure and post-depositional movement of archaeological materials in the landscape. Sites close to waterways or water bodies, areas of high rainfall or landscapes with a complex topography, especially where recent anthropogenic impacts have occurred, may have experienced episodes of sedimentary erosion and re-deposition.

The largest creek is Abercrombie Creek in the north of the project site that flows via Gum Creek directly from the Murrumbidgee River in the northeast (see Figure 5.5-1). This seasonal creek flows in periods of extended rainfall and flooding of the Murrumbidgee River.

In the south, The Forest Creek is a large branch of Abercrombie Creek and flows from the Murrumbidgee River via Nyngay Creek in the northeast, near Moggumbill Ridge (see Figure 5.5-1). It is mostly dry but does flow during periods of extended rainfall.

The project site contains a network of artificial irrigation channels and water storage dams in the central south and east of the project site that provide water for stock and irrigated fields.

Previously recorded AHIMS sites within and adjacent to the project site are indicated on Figure 5.5-1 to establish their location relative to major hydrological features. Only two AHIMS sites within the project site are located adjacent to hydrological features, in both cases, Abercrombie Creek.

Outside the project site, the cluster of sites on the eastern shore of Dry Lake is evident, as are a single site near a water body near the western course of Abercrombie Creek and beside a water channel north of Dry Lake (see Figure 5.5-1).

Combining information about the geology and hydrography of the project site, a picture begins to emerge of both the use of the landscape by Aboriginal people and the depositional history of the area:

- the cultural and economic importance of waterways, including creeks and streams, to the Aboriginal people of the Riverine Plains (Macdonald, 2011; see also, Section 7**Error! Reference source not found.**) suggests that Abercrombie Creek and The Forest Creek would have held significance to the Aboriginal inhabitants of the project site

- given also the semi-arid climate including low rainfall and high mean temperature for the project site Aboriginal people would be expected to have placed a premium of areas close to waterways to provide most of their resources

- in accordance with Heritage NSW (DECCW, 2010a), combined with a general understanding of the landscape of the project site, the presence of Aboriginal objects should be anticipated within 200 metres of waters

- the low rainfall, absence of permanent waterbodies and waterways and low topography in the project site imply that water erosion is unlikely to have played a major role in the in the visibility, exposure and post-depositional movement of archaeological materials in this landscape (see also Section 5.7).

Figure 5.5-1 Hydrology of the project site and surrounds

5.6 Vegetation and land use

The project site is located within plains and alluvial fans, being mostly treeless and dominated by saltbush shrubland comprising old man saltbush (*Atriplex nummularia*), bladder saltbush (*Atriplex vesicaria*), cotton bush (*Maireana aphylla*) and native grasslands (*Danthonia* spp and *Stipa* spp) (Eardley 1999). Around creeks, pockets of taller vegetation occur with black box (*Eucalyptus largiflorens*) woodlands dominating with an understorey of salt-tolerant grasses and saltbushes.

Figure 5.7-1 shows the vegetation types in the region using the NSW Government classifications. Eight vegetation formations are found within the project site:

- arid shrublands (Chenopod sub-formation)
- forested wetlands
- freshwater wetlands
- grasslands
- grassy woodlands
- saline wetlands
- semi-arid woodlands (shrubby sub-formation)
- semi-arid woodlands (grassy sub-formation).

The project site is zoned as RU1 Primary Production but with varying land uses (see Figure 5.7-2):

- grazing native vegetation
- grazing modified pastures
- marsh/wetland
- irrigated cropping
- farm buildings/infrastructure.

Overall, 93 per cent of the land contained within the project site is native vegetation used for grazing with the next closest being modified grazing pastures at around three per cent of total land area.

5.6.1 AHIMS sites, vegetation types and land use

Previously recorded AHIMS sites within and adjacent to the project site are also indicated on Figure 5.7-1 to establish their location according to vegetation type (‘formation’). Table 5.6-1 shows sites only within the project site and indicates they are largely confided to semi-arid woodlands (shrubby sub-formation, n=7; grassy sub-formation, n=4) and grasslands (n=3), with a very small number located in saline wetlands and arid shrublands. No sites listed on AHIMS have been recorded in fresh wetlands or grassy woodlands.

Looking beyond the project site, when all previously recorded AHIMS sites within and immediately adjacent to the project site are considered, the types of vegetation containing recorded sites increases. The largest number of AHIMS sites is found largely in saline wetlands (54 per cent). However, this number is dominated by the large cluster of sites on the shores of Dry Lake and is not necessarily representative of the project site. The next largest number of sites is in semi-woodlands (shrubby sub-formation) (17 per cent), followed by grasslands (12 per cent), arid shrublands (seven per cent), semi-arid woodlands (grassy sub-formation) (five per cent) and fresh wetlands (five per cent).

Table 5.6-1 Number of AHIMS sites in the project site according to vegetation type

Vegetation formation	Number of AHIMS sites
Semi-arid woodlands (shrubby sub-formation)	7
Semi-arid woodlands (grassy sub-formation)	4
Grasslands	3
Saline wetlands	1
Arid shrublands	1

5.7 Erosion

Erosion is an important landscape element in considering the distribution of the surface exposure of the archaeological record as it is a major factor in determining visibility and exposure.

The extent of water erosion is controlled by (OEH, 2012:30):

- the slope gradient and slope length, that control the erosive power of water flowing down the slope
- the erodibility of the soil, that can be assessed on the detachability and transportability of the soil
- the amount of vegetation cover on the landscape, as this can intercept raindrop impact and attenuate the effects of rainfall erosivity
- the condition of the soil, whether in a loose, tilled or settled coherent condition: soils in a loose, tilled condition are more easily detached and transported.

Wind can detach and transport soil particles over a range of distances. Three major transport processes occur in wind erosion (OEH, 2012:33):

- **creep:** as the soil particles (>0.5 mm) roll and bump along the unstable surface as result of the impact of other fast-moving particles
- **saltation:** where particles are transported short distances in a series of bounces – particles in the size range 0.1–0.5 mm are detached and transported this way; this is the material that often builds up along fences and other barriers with active wind erosion
- **suspension:** whereby soil particles are suspended in the air and transported large distances (hundreds or thousands of km); this is the material seen in dust storms and particles in the size range.

Across the project site, wind erosion and land use, especially grazing activities, are the main factors determining erosion due to its moderate rainfall (mean ~400 mm/per year), limited relief (topography ranging from 73 metres to 81 metres and absence of permanent waterways and water bodies (Abercrombie Creek and The Forest Creek are seasonal).

Figure 5.7-1 Vegetation type formations in the project site and surrounds

Figure 5.7-2 Land use of the project site and surrounds

A range of measures has been developed for the agricultural sector to quantify land erosion, soil erodibility and the susceptibility of land to water and wind erosion. The NSW Government has published several datasets quantifying erosion, erosion potential and land use and these are available through eSPADE v2.2 and SEED, the NSW Government's central resource for sharing and enabling environmental data.

In Figure 5.7-3, the water and wind erosion hazards for the project site are shown. Water erosion hazards range from very slight to negligible limitations through to moderate limitations across most of the project site but moderate to severe limitations associated with waterways, based on current land-use. In contrast, the wind erosion hazard ranges from severe to very severe imitations based on current land-use. Thus, despite that most of the landscape (~93 per cent) retains native vegetation, the current use of the land for sheep grazing, that has been employed over many decades in the area, have made the landscape very vulnerable to the effects of wind erosion.

Eight of the previously recorded AHIMS sites within the project site, and many in the adjacent region, are located within areas identified as characterised by slight but substantial limitations due to water erosion and very severe land use limitations owing to wind erosion (see Figure 5.7-3).

In terms of understanding the relevance for understanding the archaeological record, the surface visibility and exposure of Aboriginal objects in this part of the semi-arid area of NSW are mostly the result of land use, predominantly grazing, and erosion driven by wind rather than water. Such activities often result in scalds where artefacts are concentrated and hearths are exposed (Fanning et al., 2009). Additionally, in areas where the slope is greater than two degrees, artefacts would be moved short distances on the surface, after exposure from archaeological-bearing sediments, the result of gravity, wind and rainfall. In general, the exposure and erosion of artefacts and their subsequent transportation on the surface results in the loss of both spatial (horizontal) and temporal (vertical) integrity for the archaeological record. This also indicates a relatively high degree of predictability for the visibility and exposure of Aboriginal objects in the project site.

Another way of considering the impact of land-use and erosion on the project site and assessing its potential impact on the archaeological record is through the modelling of erosion based on land cover using the Modelled Hillslope Erosion over NSW dataset (OEH, 2012). Specifically, erosion rates as affected by climate, topography, vegetation, soil cover, soil biomass and land-use using the RUSLE C-Factor (Land Cover Factor) model is provided for the region containing the project site (OEH, 2012). The C-factor reflects the effect of cropping and management practices on erosion rates. It provides an estimate of how land use affects the average annual soil loss and how that soil-loss potential.

Figure 5.7-4 shows how climate, topography, vegetation, soil cover, soil biomass and land-use have interacted to produce higher levels of erosion across a wider area for the project site than would be predicted from wind erosion hazard alone (see Figure 5.7-3). It differs from Figure 5.7-3 in highlighting spatially circumscribed (localised) areas of erosion.

In general, the project site is characterised by mostly moderate-to-high levels of erosion. Given that most of the project site contains native vegetation this erosion is the result of land-use, that has resulted in a loss of vegetation through grazing and soil cover loss driven mostly by wind erosion. All 16 previously recorded AHIMS sites within the project site, and some in the adjacent region, are located within areas modelled as exhibiting greater erosion (see **Figure** 5.7-4).

Another important feature to be noted is that the northeastern region of the Riverine Bioregion, where the project site is located, is characterised by moderate–very high levels of erosion (RUSLE C-Factor) compared with areas within this bioregion to the east, south and northeast. More broadly within NSW, the project site is located within an area of high erosion, as is characteristic of much of the west of the state and contrasts with the eastern highlands and coastal areas where erosion is much lower despite the more complex topography (see Figure 5.7-5).

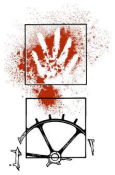

Figure 5.7-3 Wind and water erosion hazard for the project site

Figure 5.7-4 Erosion rates as reflected by the Land Cover Factor (RUSLE C-Factor) for the project site
(Note: Higher RUSLE C-Factor values represent greater erosion)

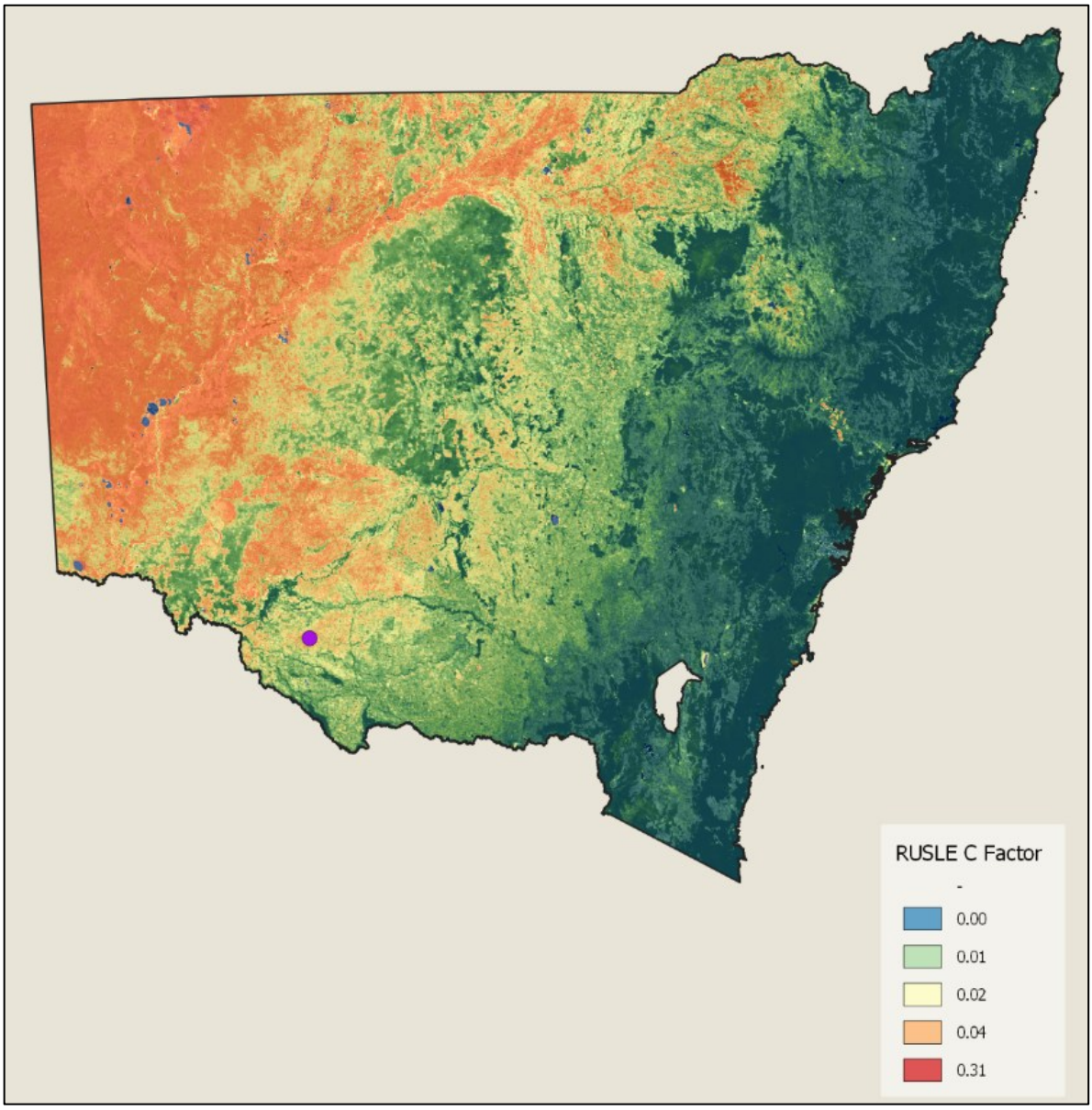

Figure 5.7-5 Erosion rates as reflected by the Land Cover Factor (RUSLE C-Factor) for NSW, project site marked by purple circle

(Note: Higher RUSLE C-Factor values represent greater erosion)
(Source: SEED NSW, 2025)

5.8 Representative landscapes

Seven representative landscapes from diverse vegetation communities across the project site are shown in Figure 5.3-4. A summary of the major features of these landscapes is provided in Table 5.8-1.

While all locations are in the land-use area of grazing land comprising native vegetation, vegetation type ('formation') varies across them and comprises arid shrublands (Cheonpod sub-formation), saline wetlands, and semi-arid woodlands (shrub sub-formation).

Locations 1–5 are located within areas of moderate-high erosion, alluvial channel deposits – meander-plain facies while Locations 6–7 are within source-bordering dunes. Grey, brown and red clays and siliceous soil types are found in both alluvial channel deposits – meander-plain facies and source-bordering dune geological units and support all three vegetation types.

Table 5.8-1 Major features of sampling locations for representative landscapes

Sampling location	Geology	Soil type	Vegetation formation	Amount of erosion*	Land use
1	Alluvial channel deposits – meander-plain facies	Grey, brown and red clays	Arid shrublands (Chenopod sub-formation)	Moderate	Grazing native vegetation
2	Alluvial channel deposits – meander-plain facies	Grey, brown and red clays	Saline wetlands	High	Grazing native vegetation
3	Alluvial channel deposits – meander-plain facies	Siliceous sands	Semi-arid woodlands (shrubby sub-formation)	Moderate	Grazing native vegetation
4	Alluvial channel deposits – meander-plain facies	Grey, brown and red clays	Arid shrublands (Chenopod sub-formation)	High	Grazing native vegetation
5	Alluvial channel deposits – meander-plain facies	Siliceous sands	Saline wetlands	Moderate	Grazing native vegetation
6	Source-bordering dunes	Siliceous sands	Semi-arid woodlands (shrubby sub-formation)	High	Grazing native vegetation
7	Source-bordering dunes	Grey, brown and red clays	Arid shrublands (Chenopod sub-formation)	High	Grazing native vegetation

Note: *RUSLE C-Factor.

6 ABORIGINAL CULTURAL CONTEXT

6.1 Aboriginal culture of the Riverine Plains

Within the Riverine Plains region are three major language groups, the Kulin language group (Mathi Mathi, Wathi Wathi, Nari Nari and Wemba Wemba) that cover the western side of the region, the Wiradjuri that covers the northern portion of the region, and the Murray River language group (Yita Yita, Yota Yota and Pangerang) covering the southern portion of the region (Pardoe and Martin, 2011).

As the Murrumbidgee River moves further west, away from the western slopes of the Wagga Wagga region and towards the wide plains of the Hay and Griffith areas, the landscape becomes increasingly arid with the western flow of the river shifting to an open plain dominated by grasslands and woodlands. Tindale (1974) noted that the boundary between Wiradjuri and Narinari appeared to be the marked change from open woodland and grass plains to a saltbush landscape.

Early observations of Aboriginal culture and economy in the Riverine Plains were made by European explorers such as Oxley (1820), Sturt (1828–29) and Mitchell (1839), pastoralists, and missionaries. These encounters occurred mostly along rivers such as the Murrumbidgee River as they were used as major stock routes including for sections of the journey from Sydney to South Australia. Many of these encounters were with Wiradjuri people, and do not incorporate all groups with ties to the Riverine Plains, but nonetheless these encounters may suggest patterns across the wider region.

As Read (1983) and Bonhomme (1990) have noted, the journals and letters of these explorers generally record a rich cultural life and economic activities tied closely to waterways. They also offered estimates of the Wiradjuri population suggesting they numbered around 3,000 people, although, this estimate must surely have been affected by the impacts of introduced infectious disease that preceded European settlement. Populations were observed to be larger near major watercourses, such as the Murrumbidgee and Darling Rivers, due to the substantial resources they offered.

Mathews (1906:941) observed that Wiradjuri society typically comprised:

> *…a number of sub-tribes, or independent groups, each of which has its recognised hunting grounds in some part of the tribal territory and is known by a name derived from some local feature of its district, or other distinguishing nomenclature. Every sub-tribe is still further divided into smaller groups, consisting, for example, of an old man with his wives, his and their wives, and the families of the latter.*

Because of the limited encounters between Aboriginal people and European settlers in areas away from the rivers, such as the region south of the Murrumbidgee River and west of its confluence with the Murray River (sometimes dubbed the ‘Upper Murray’), little has been recorded about the culture and lifeways of inland communities. Still, some general inferences can be gleaned from the wider literature for the region (ie, Read, 1983; Bonhomme, 1990; Hercus, 1989; Littleton, 1998; Littleton and Allen, 2007; Jurskis, 2009; Pardoe and Martin, 2011):

- communities including family-based territories were strongly tied to watercourses. Inland areas were visited less frequently, as noted by Wills (1860, cited by Hercus, 1989), and more often during winter-spring when rainfall was higher, or floodwaters fed additional waters into creeks. Although, Hercus (1989) noted that some communities further west occupied inland areas throughout the year and relied on tree roots for water during emergency times. Elaborate water storage methods were constructed and used away from the rivers in more inland areas

- burning of the landscape was a key management strategy and shaped the ecology and wider landscape over many millennia. The term ‘Aboriginal ecosystems’ has been applied to the region owing to the pervasive nature of the ecological changes arising long-term from such management practices (Jurskis, 2009)

- major changes in the landscape including the composition and density of native vegetation communities and the introduction of weeds and feral animals occurred after traditional burning practices ceased and European agriculture was introduced. This was only exacerbated by forestry, cropping, grazing and the construction of dams and weirs to control water flows along the major waterways and irrigation channels and dams on agricultural properties

- areas where prior stream channels and modern major river channels intersect contain major concentrations of occupation (Martin, 2008). These concentrations, or nodes of occupation, are typified by large numbers of mounds and perhaps the presence of cemeteries. As Pardoe and Martin (2011:119) have noted:

  …these places may be central locations within tribal areas or they may be places where large numbers of people could be sustained for the kinds of gatherings noted by early ethnographers.

- there is clear evidence for the construction of landscapes across the region largely in the form of earth mounds. Thus, it is worthwhile to think of the area as a cultural landscape that combines the effects of burning and fire management as well as the building of earthen structures

- earth mounds are widespread including in the project site and adjacent landscape that are particularly noteworthy for their round mounds. Martin (2008) has noted that there is a template, or numerous templates, that were recreated across the landscape. Moreover, some mounds are in various stages of being deliberately joined up to become one oval mound. Martin (2008:244) has observed:

  …the Hay Plain people did not have to make mounds with the characteristic roundedness and moundedness, but they desired to make such constructed features for reasons other than purely technological or economic ones. Thus the attributes of roundness and moundedness displayed by the Hay Plain mounds form 'redundant patterns' from a purely technological aspect and it can therefore be inferred that they reflect other cultural processes

- huts may have been constructed around lakes, swamps and higher ridges signalling a more enduring use of place. In some parts of the Riverina, these may even have formed villages built by communities engaged in a more sedentary lifestyle due to the availability of rich resources (e.g. Pardoe and Hutton, 2020). Some earth mounds, including within project site, are likely record instances of the construction huts (Martin, 2008), in addition to other uses such as earth ovens and burial grounds.

- archaeological research in the region has shown an extraordinary range in artefact densities especially in mound sites. This is reflective of a wide range of cultural and economic uses, by different groups using the region over long periods.

- the region containing the project site is also notable because it contains burial that have been located well away from major waterways, lakes and higher ground, a feature noted also by Mitchell (1836; see Martin, 2008). Indeed, Mitchell (1939:70–71) noted a particular characteristic of burials in the region:

  On a corner of the plain, just as we approached the land of reedy hollows, I perceived, at some distance, a large, lonely hut... it was closed on every side, the materials consisting of poles and large sheets of bark, and that it stood in the centre of a plot of bare earth of considerable extent, but enclosed by three small ridges, the surface within the area having been made very level and smooth. I had little doubt, that this was a tomb, ... the floor was covered with a bed of rushes, which had been recently occupied...this bed covered a grave...the rushes within that solitary tomb, were actually the nightly bed of some near relative or friend of the deceased,

(probably a brother), and...the body was thus watched and attended... until no flesh remains on the bones : 'and then he yan (ie goes) away'.

- cemeteries and other burials were a visible element of social behaviour, with corporate groups documenting ownership through the visible evidence of cemeteries as territorial markers. Inland communities were likely to be using multiple burial locations at one time rather than a single location implying different groups were sharing single locations. Indeed, the Upper Murray region contains both the largest number of burials and largest number of sites containing single burials across the Murray-Darling basin
- burial practices and ceremonies were elaborate. As Bonhomme (1990) has described, much attention was paid to the preparation of graves and the burial ground, huts made of woven grass and netting were often built over the bodies of the deceased, sand ridges and fences were built around burials areas, and burial grounds were maintenance of over long periods. Sand dunes near rivers and creeks were favoured interring the deceased

Figure 6.1-1 Mitchell's 1936 sketch of an Aboriginal burial on the Hay Plain

(Source: Reproduced from Martin 2008; original held by the Mitchell Library, Picture File DG-A6)

- the stone artefacts associated with many of the mounds in the region form a distinctive microblade industry characterised by the maximum reduction and production of minute flakes and blades. it has been found that mound sites are completely dominated by the microblade industry, with open sites displaying a utilitarian flake and core industry (Pardoe and Martin, 2011)
- there are apparently no stone material sources in the southwest and west of the Murrumbidgee Province and all raw material was brought in from a distance most probably through trade. The nearest silcrete source is at Swan Hill approximately 130 kilometres to the southwest and quartz may have come from granite outcrops approximately 80 kilometres to the southeast, but cortex characteristics have suggested most of it came from an unknown pebble source probably within the region.

7 ABORIGINAL HERITAGE CONTEXT

7.1 Heritage listings

7.1.1 Listings reviewed and results

A range of archaeological and historical data was reviewed for the project site and its surrounds. This review was used to determine if known Aboriginal and historical sites were located within the area, to facilitate site prediction from documented regional and local site patterns, and to place the area within an archaeological and heritage management context, see Section 3.1.

The following results were obtained from a search of these listings:

Aboriginal Heritage Information Management System (AHIMS)	An AHIMS search returned 80 sites for the area containing the project site and surrounds, 16 of these are located within the project site (see Section 7.1.2)
World Heritage List	The project site does not contain any items listed on the World Heritage List
National Heritage List	The project site does not contain any items listed on the National Heritage List
Commonwealth Heritage List	The project site does not contain any items listed on the Commonwealth Heritage List
NSW State Heritage Register	The project site does not contain any items listed on the NSW State Heritage Register
Conargo Local Environmental Plan 2013	The project site does not contain any heritage items, conservation areas or archaeological sites listed in the Conargo Local Environmental Plan 2013
Former Register of the National Estate	The project site does not contain any items listed on the Former Register of the National Estate
National Trust of Australia (NSW)	The project site does not contain any items listed by the National Trust of Australia (NSW)

7.1.2 Aboriginal Heritage Information Management System search results

The AHIMS database contains records of the Aboriginal sites (Aboriginal objects and places) that have been reported in NSW. An extensive search of the AHIMS database was carried out on 17 April 2023 (Client Service ID: 773509). The search covered a 50 by 30 kilometre area (approx. 127,184 hectare (ha)) centred on the project site, defined by the following co-ordinates:

Lat, Long From: -35.0057, 143.9988

Lat, Long To: - 34.724, 144.4932

A total of 80 sites were found to be recorded in the search area, with many comprised of complex site types made up of multiple features; 48 of the sites contain artefacts, 33 contain earth mounds, 31 contain hearths, 26 contain burials, two contain modified trees, two contain PADs, one contains shell, one contains non-human bone and organic material, one contains art, and one contains an Aboriginal Resource and Gathering site. Of these sites, 16 are located within the project site, see Table 7.1-1. The search results are attached in Appendix 2.

Updated extensive searches of the AHIMS database were carried out on 17 January 2025 (Client Service ID: 966523 and 966543) for the project site (Lat, Long From : -34.85339, 144.14899 - Lat, Long To : -34.74198, 144.28949 and Lat, Long From : -34.9782, 144.13068 - Lat, Long To : -

34.84028, 144.36724). No additional sites, other than those recorded during the current assessment, were located by the updated searches.

Table 7.1-1 AHIMS sites located within the project site

Site ID	Site name	Site features
48-4-0002	Tchelery Station Moulamein	Earth mound, shell, artefacts, charcoal
48-4-0008	Tchelery Mound 1-3	Earth mound, hearths
55-6-0014	Tchelery Mounds 1-3	Burials
48-4-0014	Tchelery/Abercrombie Creek	Burials, artefacts, hearths, burnt animal bone
48-4-0015	Tchelery #4	Burials, artefacts
48-4-0193	Tchelery Mound 1 Complex	Aboriginal resource and gathering (swamp), earth mound
48-4-0527	PEC-E-G1	Artefact
48-4-0528	PEC-E-07	Artefact
48-4-0529	PEC-E-08	Artefact
48-4-0530	PEC-E-09	Artefact
48-4-0531	PEC-E-10	Artefact, Hearth
48-4-0532	PEC-E-11	Artefact
48-4-0533	PEC-E-12	Artefact
48-4-0534	PEC-E-13	Artefact, Hearth
48-4-0535	PEC-E-14	Artefact, Hearth
48-4-0536	PEC-E-15	Artefact

Figure 7.1-1 Previously recorded AHIMS sites located within and around the project site

7.2 Previous archaeological research

7.2.1 History of research

Most of the research carried out in the region containing the project site during the 20th Century focused on Aboriginal burials. Table 7.2-1 lists burial sites in this area – the Western Riverina being the region bounded in the north by the Murrumbidgee River, the Murray River in the south, and the confluence of these two rivers in the west. The geological and climatic conditions of this area have facilitated the long-term preservation of human skeletal remains and this has resulted in a geographic bias in terms of sample representation.

From 1929 until 1950, George Murray Black excavated the skeletons of around 1,800 Aboriginal people buried at various locations around the Western Riverina region without community consent. The so-called Murray Black Collection was divided between the Australian Institute of Anatomy (Canberra) and the Department of Anatomy of the University of Melbourne. Later these human remains were returned to the local communities and reburied on country.

The Murray Black Collection became a major source of research for biological anthropologists concerned with understanding the origins, lifestyle, demographics, disease, and culture of Aboriginal people (eg, Ray, 1959; Giles, 1974; Green, 1982; Brown, 1989; Pardoe, 1994; Webb, 1995).

Table 7.2-1 Known burial sites within the western triangle of the NSW Riverina

Name (location)	Site details (no. of burials)	Important references
Murray Black Collection – including Coobool Creek (south of Moulamein)	Burial site (>70)	Brown (1989)
Dry Lake (dry lake, Tchelery)	Burial sites (>22)	Bonhomme (1990), Littleton (1998)
Tchelery	Burial sites (>21)	Littleton (1998)
Jeraly (dry lake, east of Keri Keri)	Burial sites (>76)	Bonhomme (1990), Littleton (1999)
Keri East	Burial sites, open sites/artefacts (>60)	Littleton (1998)
Togimbie (dry lake, east of Maude)	Burial site (>114), midden	Bonhomme (1990), Littleton (1998), Pardoe & Martin (2011)
Woolamie (Budgee Creek, east of Maude)	Burial site (12)	Bonhomme (1990), Pardoe & Martin (2011)
Torrie Plain (Prior Stream, west of Maude)	Burial Site	Bonhomme (1990)
Nap Nap (dry lake, west of Maude)	Burial site (>23), mounds, open sites/artefacts, ovens/hearth, tree scars	Bonhomme (1990), Pardoe & Martin (2011)
Nimmie Creek (west of Maude)	Burial site	Bonhomme (1990)
Tulla Station & Chowar (Niemur River, south of Moulamein)	Burial site	Black (1936) cited by Robertson (2007)

At least 10 other burial sites have been recorded and/or excavated in the Western Riverina including close to or within the project site, see Table 7.2-1. Some of them were recorded by the NPWS (e.g. Bonhomme, 1990), the Hay LALC in collaboration with NPWS (e.g. Littleton, 1999), and others investigated in collaborations between various LALCs and anthropologists (e.g. Pardoe and Martin, 2011).

The neglect of other aspects of Aboriginal history in the Western Riverina, such as artefactual evidence, ceremonial sites, dreaming sites and evidence for the use of landscape and resources is

noteworthy. This situation only began to be addressed from 1993 onwards when the Hay LALC began surveying the region on weekends for sites, and soon after, Steve Meredith and Harvey Johnston of NPWS began surveying the Hay Plains for archaeological localities (as described by Pardoe and Martin, 2011). Martin (2006) undertook her PhD research at the Tchelery Mound Complex 1 that is located within the project site.

7.2.2 Greater Murrumbidgee Province

An important study of archaeological sites across the Murrumbidgee Province (including the project site) was carried out by Pardoe and Martin (2011). They employed a non-random sampling procedure that targeted areas with little archaeological data and predicted to provide evidence of Aboriginal habitation. Altogether, they studied 918 archaeological sites to understand the nature and distribution of Aboriginal sites, employing existing and new field data, and developed a GIS model that predicted the Murrumbidgee Province contained around 92,000 localities in total.

Several of the site types used in their analysis resulted in the double counting of sites. As a result, several of Pardoe and Martin's (2011) site type categories were combined here that resulted in a final list of seven categories analysed (out of an original 16).

The results reflect to a large extent biases in the surface visibility and exposure of the archaeological record, including in certain environments. For example, 26 per cent of sites recorded by Pardoe and Martin (2011) contained scarred trees and these would have been restricted largely to river and creek margins. Similarly, earth mounds (24 per cent), burials and middens tended to be restricted to sandy sediments near a river or lake margins or dunes. The 'other' category combines a single soak, a myth site, and a bora ring site, while all the historic sites they recorded were combined here into a single type.

Open sites – that include artefact scatters, isolated artefacts, hearths, and ovens – is the most relevant site category for understanding the archaeological context for the project site given that it comprises open (grass/saltbush), largely tree less, environments away from water courses. More than one-third (35 per cent) of the sites located by Pardoe and Martin (2011) in their field survey were open sites.

The current project site was not included in the field survey of Pardoe and Martin (2011) because research had previously been carried out in its vicinity (e.g. Johnston and Littleton, 1993). The project site, however, was included within their predictive GIS modelling.

7.3 Previously recorded sites

7.3.1 Dry Lake, Tchelery

The first archaeological sites to be recorded at the project site were burials, being locations described in 1993 by the Hay LALC and NPWS (Johnston and Littleton, 1993), see Figure 7.3-1 and Figure 7.3-6, continuing the long tradition of focusing on burials in the Western Riverina region.

The recorded Dry Lake sites are:

- **Dry Lake East:** an artefact scatter and a possible tool manufacturing workshop on the eastern side of Dry Lake, not located within the project site (Pardoe cited by Johnston and Littleton, 1993)
- **northeast area of Dry Lake:** earth mound complex, not located within the project site (Pardoe cited by Johnston and Littleton, 1993)
- **Tchelery Mound 1-3:** earth mounds 2 km northwest of Dry Lake contained burials and hearths, located within the project site (AHIMS ID 48-4-0008 and ID 55-6-0014)
- **Dry Lake West:** just west of the shore of dry lake and comprising eight earth mounds of varying size (smallest = 11.5 m x 7.5 m; largest = 80 m x 70 m), a hearth scatter and shell deposits, with at least 12 burials recorded in them, not located within the project site, and
- **Dry Lake 10:** located southeast of dry lake are two earth mounds contained three burials as well as several hearths (heat retainers) and 64 surface artefacts made of quartz, silcrete, quartzite and chert, not located within the project site.

A further 23 sites have been recorded around Dry Lake and parts of the land owned by the Tchelery Pastoral Company since 1993. Except for Tchelery 1-3 (AHIMS ID 48-4-0008), these other Dry Lake sites are located outside the project site about 2 km northwest of Dry Lake, see Figure 7.3-1 and Figure 7.3-6.

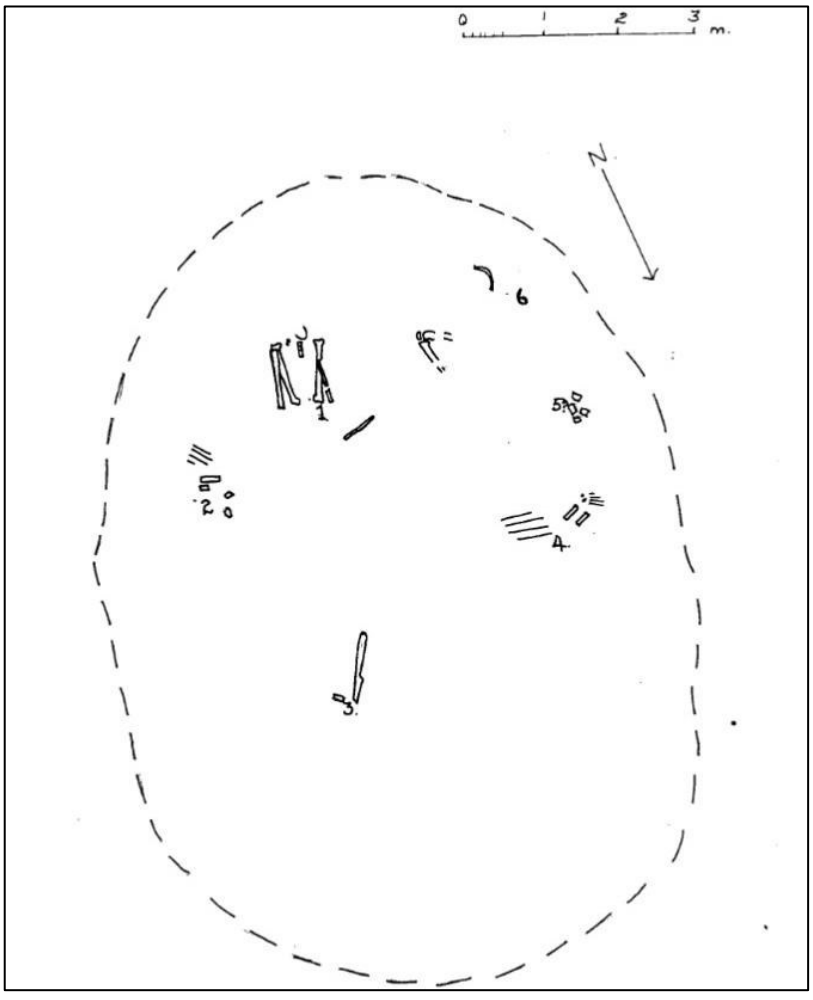

Figure 7.3-1 Sketch plan of Dry Lake West Mound 4 indicating human skeletal remains from a burial exposed on the surface

(Source: Johnston and Littleton, 1993)

7.3.2 Abercrombie Creek

Three sites have been recorded near Abercrombie Creek within the vicinity of the Tchelery Homestead. All three sites are located within the project site:

- **Tchelery Station Moulamein (48-4-0002):** is an earth mound located approximately 250 m west of the Tchelery Homestead containing a large midden (~91 m x 46 m) with mussel shells, ash, charcoal and artefacts, see Figure 7.3-6

- **Tchelery/Abercrombie Creek (48-4-0014):** located three earth mounds containing at least three burials recorded by the Hay LALC and recorded by Littleton (NPWS) in 1994 (see Figure 7.3-2). Mound 1 (20 m x 20 m) contained cremated human bone fragments and a burial, hearths, burnt animal bone and artefacts. Mound 2 (30 m x 45 m) human remains, river mussel shells and artefacts. Mound 3 (20 m x 15 m) contained hearth remains, see Figure 7.3-6

- **Tchelery #4 (48-2-0015):** eight burials located within a scald (eroded surface) recorded by the Hay LALC and recorded by Littleton (NPWS) in 1995, see Figure 7.3-6.

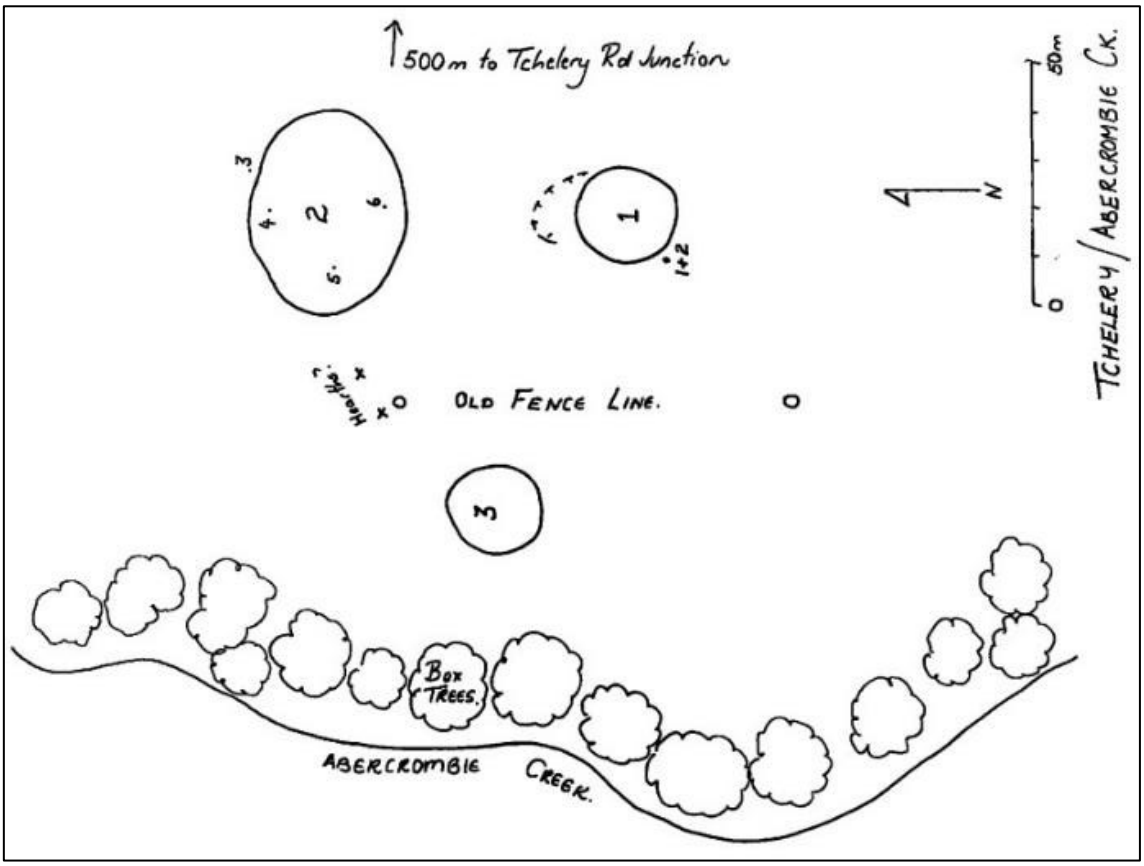

Figure 7.3-2 Plan of site 48-4-0014 as provided in the AHIMS site card

(Note: 1–3 are earth mounds each containing burials; mounds 1 and 2 contain numbered burials)
(Source: Johnston and Littleton, 1993)

7.3.3 Tchelery Mound Complex 1

The Tchelery Mound Complex 1 is a site complex located in the north of the project site that was investigated by Martin (2006) as part of her PhD research, see Figure 7.3-3. The site is located about 5.5 km northeast of the Tchelery Homestead and two kilometres northwest of Dry Lake, close to Tchelery Mound 1-3, see Figure 7.3-6.

Martin recorded a lunette that contained seven distinct activity areas in a location measuring 80 metres by 130 metres, see Figure 7.3-3. The adjoining swamp west of the lunette was identified and recoded as a resource and gathering site, see Table 7.1-1 AHIMS sites located within the and Figure 7.3-3. Her excavation of the lunette is important because it represents the only research excavation carried out within the Tchelery property. She excavated four 1 metre x 2 metre pits perpendicular to the long axis of the lunette with the trench positioned to sample the full depth of the mound (~1.6 metres), see Figure 7.3-4.

The stratigraphic description for Martin's (2006) excavation pit is provided in 7.3-1. It is interesting to note that the entire sequence of sediments comprises archaeologically rich cultural layers and contained the following materials (after Martin, 2006).\:

- **oven and hearths features:** each layer over F1–F11 contained evidence for hearth features, including ovens with baked clay heat retainers and ash or hearths with charcoal rich layers over baked clay lenses. Some included definite oven pits while the other excavated material corresponded more to partly a consolidated heat retainer and ash raked out of an oven

- **hut floor:** the basal layer of the mound comprised a clearly defined junction with the A2 horizon of the underlying yellow-orange clayey sands, its surface between the mound and the underlying soil was uneven and shallow with relatively small hearths dug in the soil and infilled with a dark charcoal rich material. The junction in Square D displayed a compacted, flat and 'polished' floor with one very definite post hole and one possible post-hole and a small shallow basin hearth indicating it had been used as a hut floor before the deposition of mound material had begun

- **activity areas:** some pit areas contained fragmented bone from of one species and size of animal and were deposited in a loose cluster. Such clusters included a concentration of larger than average pieces of leg bone from a large animal, probably kangaroo tibia. These areas may represent an activity area or places where material has been 'tidied up' and dumped

- **mound material:** fine silty-sandy material with varying amounts of ash, charcoal, fragmented faunal remains (mostly carbonised), stone and bone artefacts including bone points, baked clay heat retainers and baked clay casts. The sediment, especially from the lower layers, was waxy in texture, suggesting fats and waxes from the cooking of food

- **stone artefacts:** a distinctive bipolar microblade technology found on the mounds of the Hay Plain Southwest (Martin, 1996) was found from the surface of the mound to the basal spit. A sample of artefacts from Square D was analysed and found to be characterised by very small bipolar flakes, with low numbers of geometric backed blades, notched tools, thumbnails, and retouched flakes. Small fragments of grindstone were also found, some with a sheen or use-polish suggesting grass seed or similar silica rich plant materials had ground on them

- **faunal remains:** aquatic fauna including mussel, fish (eg, Murray Cod and Golden Perch), yabby, turtle and small to large water birds. Non-aquatic fauna samples included emu eggshell, large kangaroo, bettong, hare wallaby, both short and long nosed bandicoot, bilby, wombat, echidna, brush tail possum, rodents, and reptiles (goanna, shingle back, snake)

- **floral remains:** plant evidence was mostly provided by charcoal and impressions of leaves and roots on baked clay heat retainers. What appears to be impressions of Typha leaf, or large leaves with parallel ribbing, are particularly common on the Tchelery mound heat retainers. Large pieces of charcoal belonging to a carbohydrate storage organ 11 mm in

diameter with *Bolboschoenus medianus* or similar species, and specimens of charcoal possessed a structure consistent to *Typha* rhizome/stem.

Figure 7.3-3 Map indicating the location and site details of Tchelery Mound Complex 1
(Source: Martin, 2006)

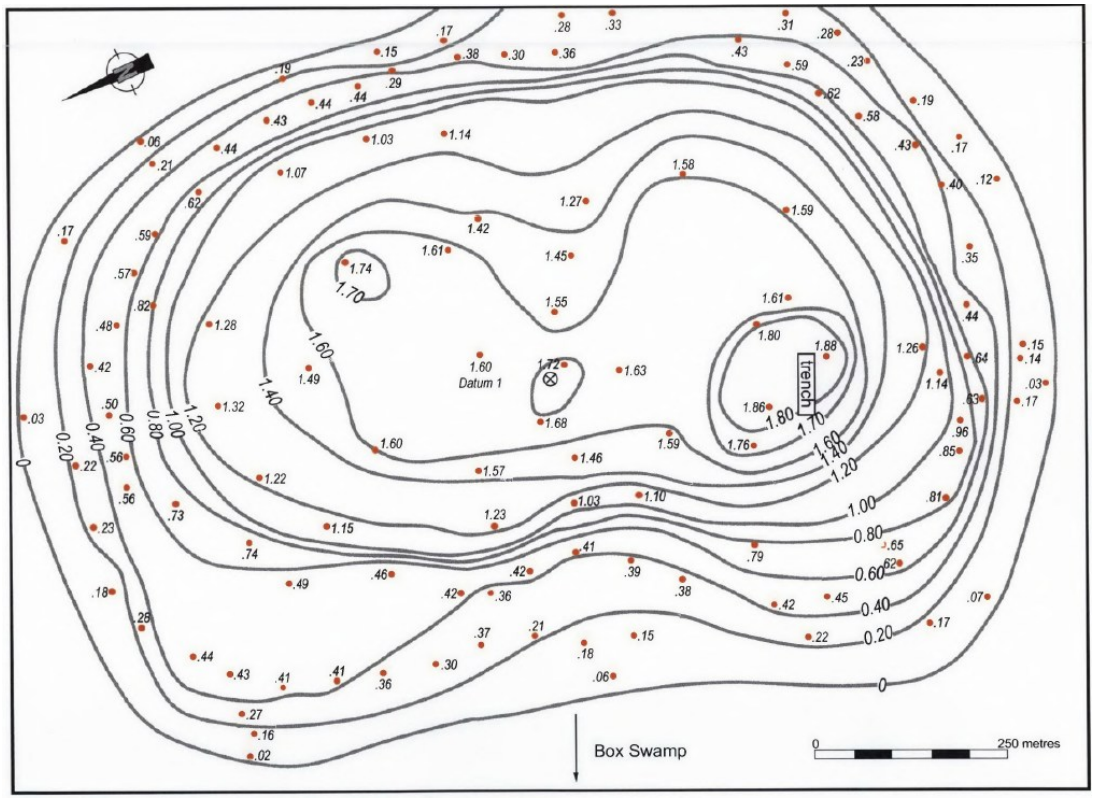

Figure 7.3-4 Contour map of the Tchelery Mound Complex 1 indicating the location of the excavations
(Source: Martin, 2006)

7.3-1 Martin's stratigraphic description for the excavation pit in the Tchelery Mound Complex 1

Feature	*Spit*	*Depth*	*Description*
F1	C:10 – C:13	50-68 cm	Semi-circular, hardened dark soil plus heat retainers, mussel shell, no charcoal
F2	D:14	65-73 cm	Charcoal rich, oval, 23cm x 44 cm
F3	D:17 -20	85-100 cm	Black greasy compact material with grey heat retainer rich very compact material around outside, circular, charcoal
F4	D:19	96cm	Dark ashy area
F5	C:19-20	94-98cm	40 cm diam, large pieces mussel + burnt bone, black waxy material, grey ash
F6a	C:20	100-105 cm	Circular feature, 50cmdiam, black ashy area w. little heat retainer, burnt bone +shell
F6b	A:23	115-120 cm	Small patch of charcoal stained sediment + cluster of heat retainers, burnt bone and shell
F7	C:22	110-114 cm	Small compact area of charcoal, clustered blackened heat retainers, bone, 50 cm diam
F8	D:26 – D:28	125-140 cm	Cluster of in-situ heat retainers surrounded by grey-black ashy compact material with degraded heat retainers, baked clay base
F9	D:27	130-138 cm	Very compact circular black sediment feature, whitish stain on hard baked material, 38 cm diam
F10	D:26-D:28	125-140 cm	Circular baked clay lens, orange colour, with hard very black layer &charcoal beneath,
F11	D:29 - D:30	145-155 cm	Basin shaped pit in hard basement, infilled with hard charcoal rich black material

(Source: Martin, 2006: 143.)

During excavations of the Tchelery Mound Complex 1, Martin collected bone and charcoal samples for radiocarbon dating, see Table 7.3-2. These were calibrated by NOHC for the purposes of the present study, see Table 7.3-2. An age-depth profile for calibrated radiocarbon dates is also provided in Figure 7.3-5.

The entire excavated profile dated from 4466–4250 calibrated years before present (95.4 per cent Confidence Interval or CI) at depths of 5–10 cm to 5403–4448 calibrated years before present (95.4 per cent CI) at 140–150 cm, see Table 7.3-2. As can been seen in Figure 7.3-5, dates from the upper 100 cm are out of sequence – i.e. they are seemingly too young or too old for their stratigraphic position – indicating there has been disturbance of the site that resulted in charcoal fragments moving vertically within the sediments. This is a common situation is archaeological sites, and in the case of the Tchelery 1 Mound complex, Martin (2006) did describe disturbance in the mound from rabbits, suggesting bioturbation to be a factor. Deflation and scalding are common in the landscape around the project site suggesting that erosion may also be a factor in disturbance.

A radiocarbon date on charcoal from the base of the excavation pit suggests that the hut floor described by Martin (2006), and subsequently build-up of the earth mound, is dated 5403–4448 calibrated years before present (95.4 per cent CI). This makes the Tchelery 1 Mound complex among the oldest dated earth mounds and likely evidence for a hut in Australia (Brockwell, 2006; Jones et al., 2022).

Table 7.3-2 Radiocarbon dates from samples during excavations of Tchelery Mound Complex 1

Waikato sample no.	Material	Depth (cm)	Uncalibrated date (BP)	Calibrated date (cal BP)*
Wk 17491	Bone apatite AMS	5–10	3947±39	4466–4250
Wk 4095	Charcoal	65–70	3730±240	4752–3493
Wk 4096	Charcoal AMS	80–85	3721±75	4337–3849
Wk 4097	Charcoal	85–95	3990±230	5224–3833
Wk 4098	Charcoal	105–110	3570±100	4113–3581
Wk 4100	Charcoal	125–135	3760±210	4754–3582
Wk 4099	Charcoal	135–140	4010±171	4936–3980
Wk 4101	Charcoal	140–150	4340±160	5403–4448

Note: BP = Before Present. *Calibrated to calendar ages by the author using OxCal v4.4.4 (Bronk Ramsey, 2021).

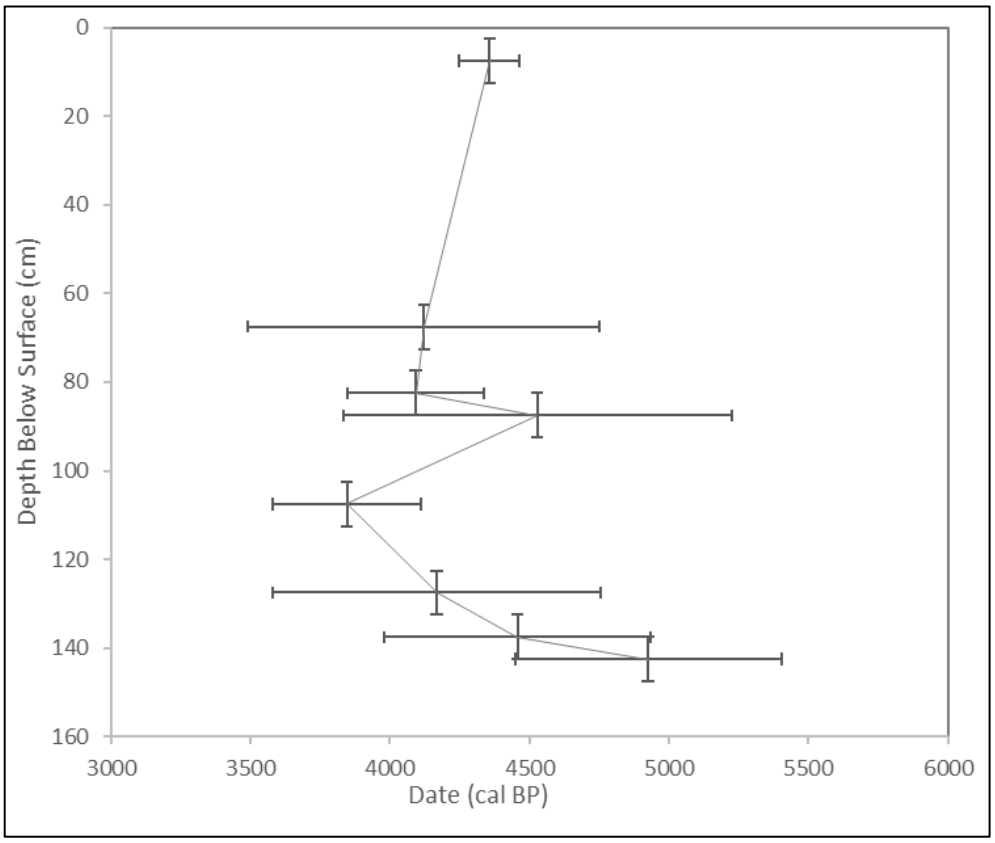

Figure 7.3-5 Age-depth profile of calibrated radiocarbon dates from Tchelery Mound Complex 1

(Note: x-error bars are the 95.4 per cent confidence interval for OxCal calibrated ages; y-error bars are depth of the spit from which the sample was collected.)

Figure 7.3-6 Location of recorded archaeological sites in the north of the project sites showing the sites recorded by the Hay LALC and NPWS (Johnston and Littleton, 1993) and sites recorded after 1993 as listed on AHIMS

7.3.4 EnergyConnect (NSW – Eastern Section)

EnergyConnect (NSW – Eastern Section) is a major infrastructure project involving the construction of power lines by Transgrid from the South Australian border to Wagga Wagga in NSW. A section of the power line and corridor/easement passes through the project site parallel to the existing 220 kV power line.

Figure 7.3-7 shows the alignment of EnergyConnect (NSW – Eastern Section) power line (currently under construction) through the project site and the location of AHIMS sites recorded as part of the EIS for this project. All sites were recorded by NOHC.

A description of these sites and a summary of the archaeological features recorded at all of them is provided in Table 7.3-3. These sites mostly comprise isolated artefacts followed by small artefact scatters as well as two sites containing hearths/heat retainers, see Table 7.3-4.

Table 7.3-3 AHIMS sites within the project site associated with EnergyConnect (NSW – Eastern Section)

AHIMS site name	AHIMS ID	Details
PEC-E-07	48-4-0528	Isolated heavily weathered grey fine grain silcrete flake
PEC-E-08 / PEC-E-G1	48-4-0529/ 48-4-0527	Isolated tuff flake with cortex
PEC-E-09	48-4-0530	Isolated heavily weathered grey quartzite/silcrete complete retouched flake
PEC-E-10	48-4-0531	Three scattered heat retainer heaths and an artefact scatter consisting of two flakes
PEC-E-11	48-4-0532	Two flakes comprising quartzite and silcrete
PEC-E-12	48-4-0533	Artefact scatter of silcrete flakes
PEC-E-13	48-4-0534	Isolated silcrete flake
PEC-E-14	48-4-0535	Hearth, artefact core and flake
PEC-E-15	48-4-0536	Isolated silcrete core

Table 7.3-4 Summary of EnergyConnect (NSW – Eastern Section) AHIMS sites within the project site

Archaeological feature	Number of AHIMS sites
Isolated artefact	5
Artefact scatter	4
Hearth	2

Figure 7.3-7 Existing power line and AHIMS sites associated with EnergyConnect (NSW – Eastern Section) that would run parallel to this line/easement

7.3.5 Analysis of AHIMS sites – within and around the project site

A summary of AHIMS sites within and around the project site is provided in Table 7.3-5. Across the 80 sites recorded, 48 locations contain surface artefacts (isolated finds or artefact scatters), 31 contain earth mounds, 25 include hearths, 24 sites contain burials, two are PADs, one is an Aboriginal Resource and Gathering site (swamp) and one contains shell.

The most common site type is surface artefacts (isolated or scatters) (34 per cent), followed by earth mounds (24 per cent), hearths (19 per cent), burials (18 per cent) and other features mounds (5 per cent) including PADs, scarred trees, an Aboriginal resource and gathering site, an art site, and one site containing archaeological shell.

Table 7.3-5 Number of AHIMS sites within and around the project site with particular features

Site feature	Number of AHIMS sites*
Artefact	48
Earth mound	31
Hearth, ovens and retainers	25
Burial	24
Potential archaeological deposit	2
Scarred tree	2
Aboriginal resource and gathering	1
Art	1
Shell	1

Note: *Many AHIMS sites contain multiple features (eg, burial, hearth, earth mound and artefacts).

Note: 'Other' includes PADs, scarred trees, Aboriginal resource and gathering, art and shell sites.

7.3.6 Analysis of AHIMS sites – project site

A summary of AHIMS sites within the project site is provided in Table 7.3-6. Of the 16 sites recorded, 10 locations contain surface artefacts (isolated finds or artefact scatters), four with hearths, three sites contain burials, three earth mounds, one is an Aboriginal Resource and Gathering site and one contains shell.

The most common archaeological feature in the project site is surface artefacts (isolated or scatters) (45 per cent), followed by hearths (18 per cent), burials (14 per cent), earth mounds (14 per cent), a site containing archaeological shell (five per cent) and an Aboriginal resource and gathering site (four per cent).

Table 7.3-6 Number of AHIMS sites within the project site containing particular archaeological features

Site type	Number of AHIMS sites*
Artefact	10
Hearth	4
Burial	3
Earth mound	3
Aboriginal resource and gathering	1
Shell	1

Note: *Many AHIMS sites contain multiple features (eg, burial, hearth, earth mound and artefacts)

7.3.7 Are sites within the project site representative?

An important issue in examining the archaeological record in the project site, as reflected in AHIMS records, is whether it is likely to be representative of the heritage record of the broader region. An issue like this does, however, raise a set of quite complicated questions to address.

The discovery of archaeological sites is rarely, if ever, a random process as most sites have been discovered as a result systematic survey associated with some kind of development project or an obvious natural feature such as a body of water or lake. Moreover, the number of AHIMS sites is small with just 16 localities sites representing the entire project site of approximately 28,751 hectares.

Figure 7.3-8 compares per cent presence data for six types of archaeological features from across the Murrumbidgee Province (n=222) (data from Pardoe and Martin, 2011), AHIMS records for the broader Tchelery area (n=80) and AHIMS records for the project site (n=16).

Some important differences among them include:

- a greater preponderance of artefact sites and burials in the project site and Tchelery area compared overall with the Murrumbidgee Province
- there are comparatively fewer sites with earth mounds and hearths/ovens in the project site and Tchelery area
- an absence of scar trees in the project site, and generally far fewer of them in the Tchelery area, compared with the broader Murrumbidgee Province.

Many of these differences can be explained by the sheer diversity of environments within the Murrumbidgee Province that includes the Murrumbidgee River and many extant lakes and palaeo-lakes. For example, most scar trees in this southwestern region of NSW are found along major water courses like the Murrumbidgee River and Murray River. Additionally, the greater proportion of earth mounds in the Murrumbidgee Province and wider Tchelery area is explicable by the smaller number of lakes (extant or palaeo) present.

To further assess whether differences between the Murrumbidgee Province data, Tchelery area and project site exist in terms of site types, a Kruskal-Wallis Test was performed to determine if the median difference were statistically significant. Despite differences evident, particularly between scarred tree and artefact sites, median wider were found to be non-significant.

Furthermore, the median difference in the main types of archaeological features between the project site and broader Tchelery area a Mann-Whitney U-test showed the median difference to be non-significant.

Although comparisons are limited by sample size, there is no evidence that the sample of archaeological sites in the project site provided by AHIMS is unrepresentative of the archaeological record of the broader area around the project site, at least in terms of the kinds of archaeological features or site types recorded. The same picture emerges when comparing the project site to Murrumbidgee Province more broadly, taking into the landscape differences.

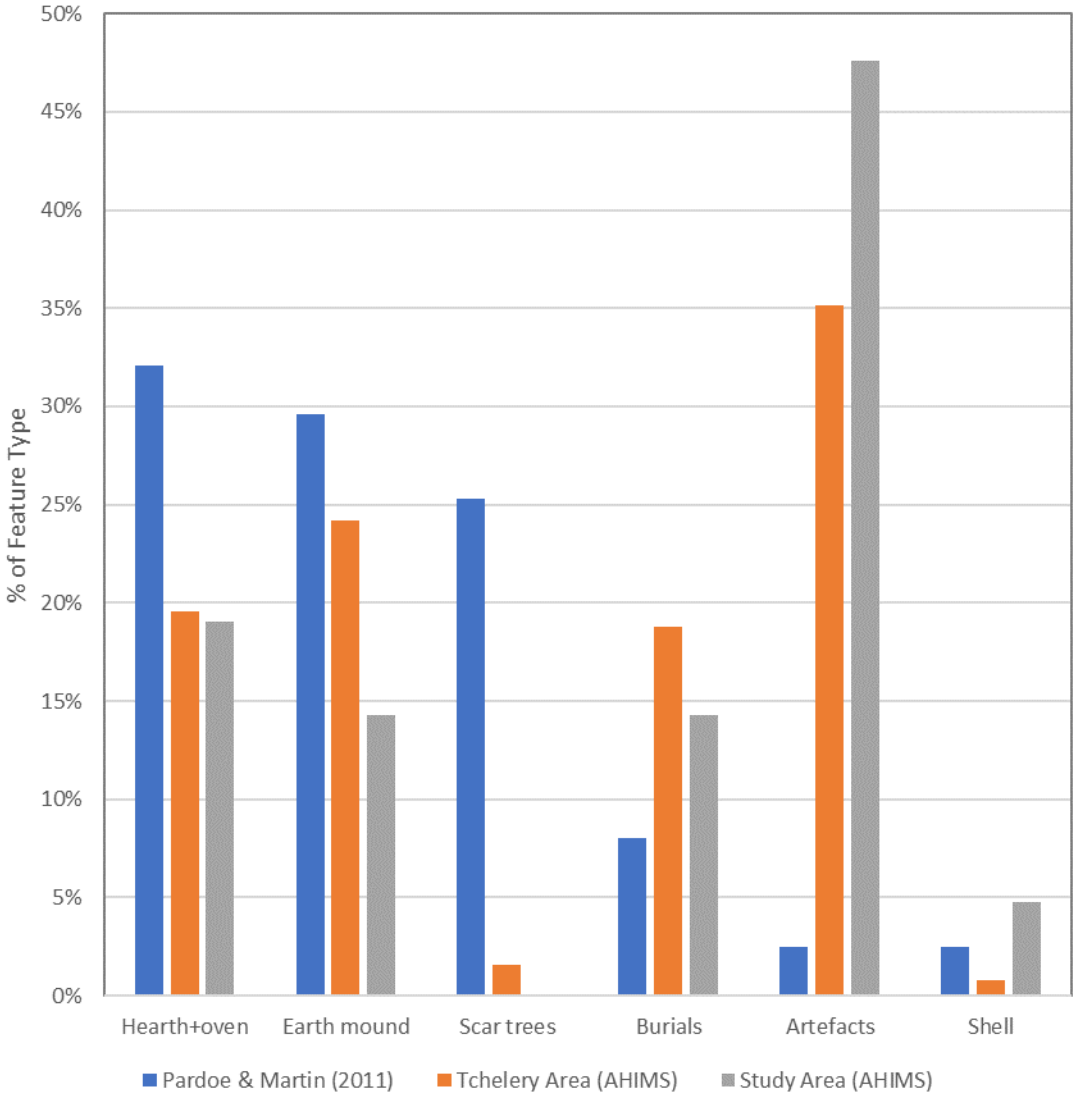

Figure 7.3-8 Comparison of archaeological features present at sites as a percentage of the total for the wider Murrumbidgee Province (Pardoe & Martin, 2011) and AHIMS sites for the Tchelery area and study area

7.4 Predictive Model

Based on the results and analytical conclusions of previous archaeological records and surveys in similar landscape contexts it is possible to predict the types and topographic contexts of sites that may occur in the project site. From this existing body of work, the following set of broad site location criteria have been summarised for the project.

The occurrence and survival of archaeological sites is dependent on many factors including micro-topography and the degree of land surface disturbance. It should also be noted that for practical reasons, archaeological surveys tend to focus on environments identified as archaeologically sensitive based on previous research and aided by effective ground visibility. As a result, predictive site location models can tend to reflect previous survey bias and to become self-perpetuating.

Artefact scatters

Open artefact scatters are likely to be the most common site type encountered. They may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting or gathering activities, domestic camps, or the manufacture and maintenance of stone tools. The spatial extent and density of artefacts represented in these scatters can vary dramatically. Within the general region of the project site, artefact scatters tend to be dominated by assemblages of rock types such as silcrete, sandstone, quartz, quartzite and volcanic.

Previous survey results suggest that artefact scatters are most likely to occur in well drained elevated contexts within riparian zones, flood plains and adjacent to water sources. Level or gently sloping surfaces are typical site locations, with few sites recorded from moderate to high gradient contexts. Within the project site, potential site locations include elevated banks, terraces and sand bodies associated with streamlines, flood channels, paleochannels, water holes, lagoons and wetland basins. Larger and denser sites are more likely to occur in association with stable sedimentary contexts adjacent to (past or present) permanent water sources, and major tributaries.

Isolated

Isolated finds are artefacts that occur without any associated evidence for prehistoric activity or occupation. They are defined as single artefacts located more than 60 metres from any other artefact. Isolated finds can occur anywhere in the landscape and may represent the random loss or deliberate discard of artefacts, or the remains of dispersed artefact scatters.

Hearths

In archaeology, a hearth is a firepit or other fireplace feature. Hearths are common within the project site and are often made of fired clay balls and sometimes reflect multiple use. Hearths typically occur close to water such as streams, creeks and lakes or eroding out of dunes.

Burials

Burials within the region are generally found either in mound sites, or in elevated natural topographies consisting of soft, easily dug, sediments, such as aeolian sands or unconsolidated alluvial silts. They may occur in isolation or in groups and may also be association with occupation site debris. Burials are generally only visible where there has been some disturbance of subsurface sediments or where some erosional process has exposed them.

Within the project site, burials may occur in sand bodies, in mound sites and on elevated fine sediment topographies on floodplains. It should be noted that the incidence of some isolated burials cannot be accurately predicted beyond the broad parameters of deposits with deep, fine sediments.

Freshwater middens

Freshwater middens are defined as a concentration of artefactual debris that includes a substantial percentage of freshwater shell (predominantly mussel shell *Velesunio sp*. or *Alathyria sp*.) that may also contain animal bone and other botanicals. They are usually the result of interim or base camp activity and are normally situated within riparian zones characterised by relatively permanent water.

Within the project site freshwater middens may be associated with creeks, rivers, and prior stream channels. Midden material may be buried by overlying silt deposits.

Modified trees

These sites may occur almost anywhere mature native trees have been retained, including fluvial corridors, larger stands of vegetation in greenfield sections, and isolated shade trees on grazing land. The identification of scars as Aboriginal in origin can often remain problematical. Most of the current project site has been cleared of native vegetation. The potential for scarred trees to survive within the project site is low to moderate.

Other site types

More fragile/rare sites such as ceremonial bora rings, stone arrangements, habitation structures, and carved trees may also be present in the project site. Based on the cleared status of most of the project site, and the agricultural practices that have occurred since white settlement (ploughing and levelling, trampling by stock, crop cultivation, construction of drainage canals, fences, roads and access tracks), the potential for these more fragile/rare sites to have survived to the present day is considered low.

The site types that are most likely to occur in the project site are artefact scatters, isolated finds, hearths, and burials. Other site types that may occur in the project site are mound sites, freshwater middens, and scarred trees. The most archaeologically sensitive topographic contexts in the project site are lunettes, sand bodies and sand sheets within open plain contexts, and elevated ground adjacent to water sources.

8 ARCHAEOLOGICAL INVESTIGATIONS

8.1 Personnel

Initial field survey within the project site was carried out by NOHC staff and RAPs during the period 19–28 June 2023. The participants involved are set out in Table 8.1-1.

Table 8.1-1 Field participants, June 2023

Name	Organisation
Ms Jasmine Fenyvesi (Senior Archaeologist and Senior Heritage Advisor)	NOHC
Assoc. Prof. Darren Curnoe (Senior Archaeologist and Senior Heritage Advisor)	NOHC
Mr Christian Keyes (Archaeologist and Heritage Advisor)	NOHC
Mr Lachlan Sharp (Archaeologist and Heritage Advisor)	NOHC
Mr Anthony Jones	Deniliquin LALC
Mr Yarramundi Pappin	Wakool Indigenous Corporation
Mr Tyron Ross Gordon	Yarkuwa Indigenous Knowledge Centre
Mr Owen Johnson	Barrap Wemba
Ms Tracey Hamilton	Yarkuwa Indigenous Knowledge Centre
Ms Liticia Ross	Yarkuwa Indigenous Knowledge Centre

The team was divided into two smaller teams with each survey sub-team led by a senior archaeologist from NOHC. The project site was divided into survey zones and each sub-team assigned a zone for surveying the proposed WTG locations and associated infrastructure within that area, see Figure 8.1-1. Following the initial field surveys and identification of new sites, as well as extensive research into the landscape context of the project site, an archaeological sensitivity model was developed, see Section 8.4.1.1, and the project site was divided into areas of low, moderate and high archaeological potential.

Following design changes, further assessment within the project site was required. Given many of the changes were in close proximity to the original design, the proposed impact areas were assessed against the sensitivity model, a desktop aerial assessment was carried out for the proposed impacts in the low and moderate sensitivity areas, and further field survey was recommended in the areas of high sensitivity.

Further field surveys were carried out by NOHC staff and RAPs during the period 5–8 February 2024, see Figure 8.1-2. The participants involved are set out in Table 8.1-2

Table 8.1-2 Field participants, February 2024

Name	Organisation
Ms Jasmine Fenyvesi (Senior Archaeologist and Senior Heritage Advisor)	NOHC
Ms Ellaine Dickens (Archaeologist and Heritage Advisor)	NOHC
Mr Anthony Jones	Deniliquin LALC
Mr Gary Pappin	Wakool Indigenous Corporation
Mr Tyron Ross Gordon	Yarkuwa Indigenous Knowledge Centre
Mr William Taylor	Deniliquin LALC / Barrap Wamba

Following further design changes additional assessment within the project site was required. A number of these changes were located in areas not yet subject to field assessment and so survey was recommended for all areas not previously surveyed, irrespective of their predicted sensitivity, see Figure 8.1-3. A program of test excavation was also carried out during this round of works within TWF PAD12 in areas that had potential to be impacted by the project, see Figure 8.5-3

Test excavation and field survey was carried out by NOHC staff and RAPs during the period 15–19 July 2024. The participants involved are set out in Table 8.1-3.

Table 8.1-3 Field participants, July 2024

Name	Organisation
Ms Jasmine Fenyvesi (Senior Archaeologist and Senior Heritage Advisor)	NOHC
Mr Ben Sybert (Senior Archaeologist and Senior Heritage Advisor)	NOHC
Ms Ellaine Dickens (Archaeologist and Heritage Advisor)	NOHC
Mr Lachlan Sharp (Archaeologist and Heritage Advisor)	NOHC
Mr Anthony Jones	Deniliquin LALC
Mr Gary Pappin	Wakool Indigenous Corporation
Mr Yarramundi Pappin	Wakool Indigenous Corporation
Ms Tracey Hamilton	Yarkuwa Indigenous Knowledge Centre
Mr Tyron Ross Gordon	Yarkuwa Indigenous Knowledge Centre
Mr Joseph Pappin	Pappin Family Aboriginal Corporation

A map detailing all field survey completed within the project site for the project is shown below in Figure 8.1-4.

Following the survey in July 2024 the BESS and substation area was relocated, they were placed in a low sensitivity area to avoid impact to Aboriginal sites. It was deemed unnecessary to conduct additional survey for these items.

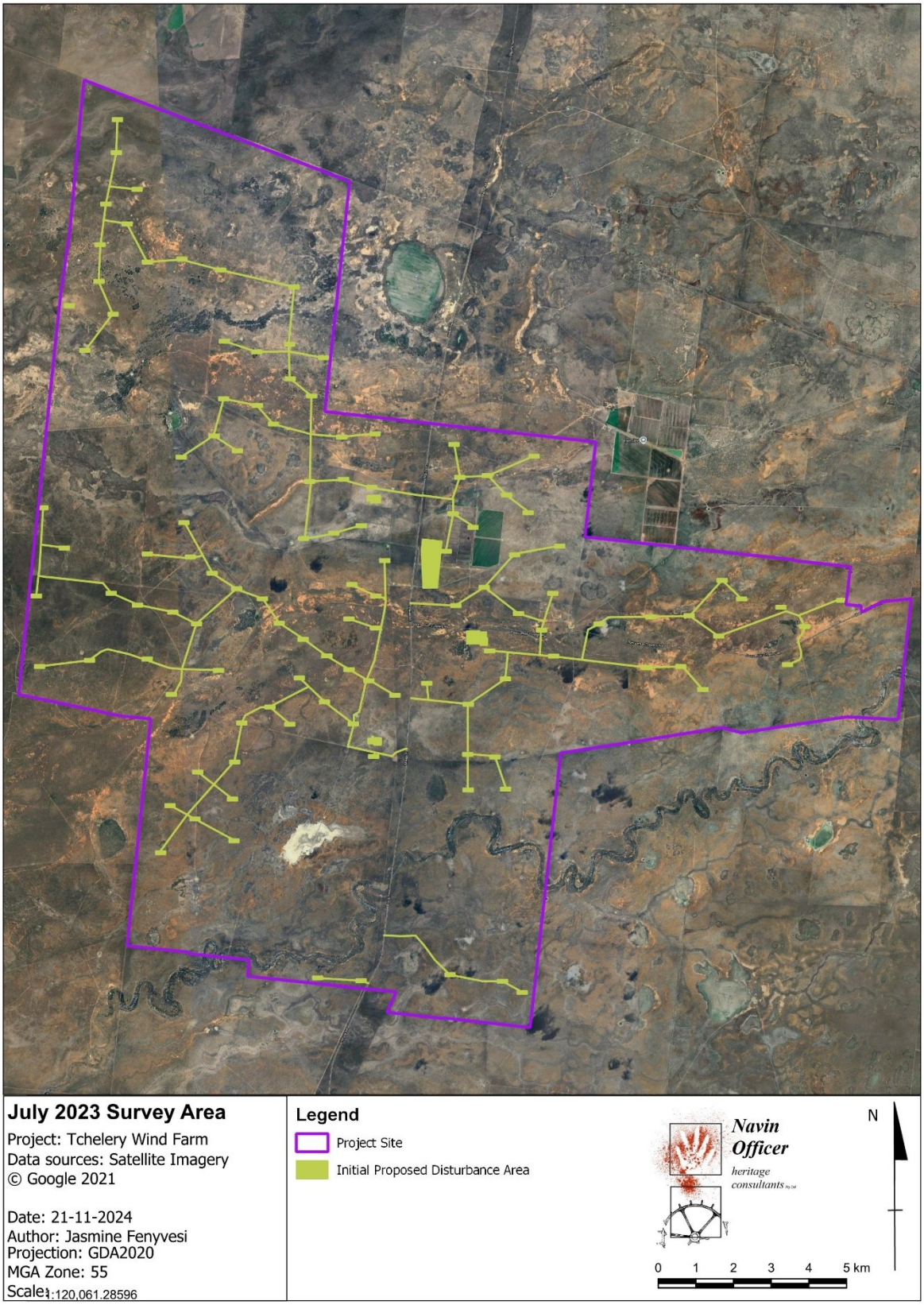

Figure 8.1-1 Initial survey areas in green (July 2023)

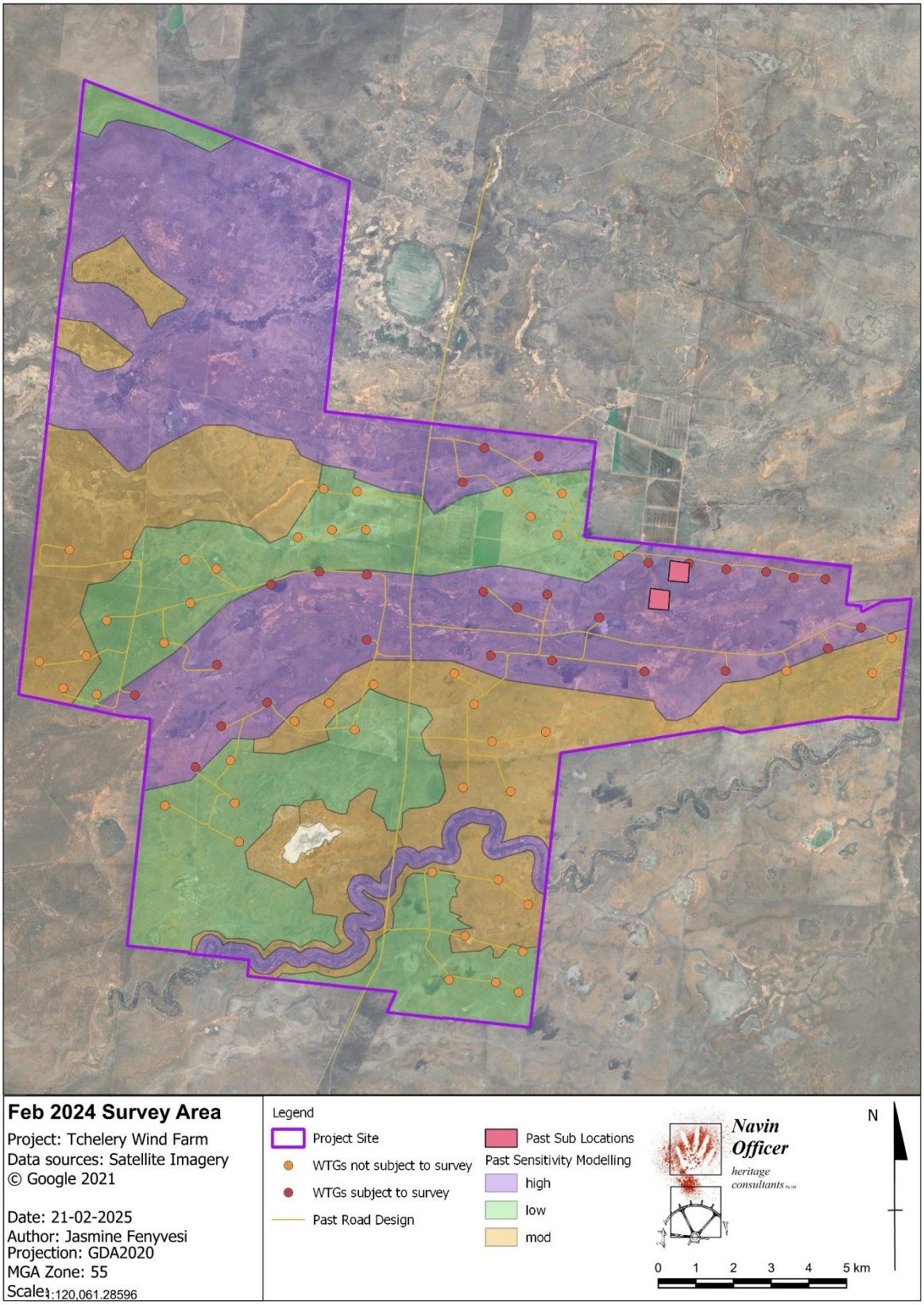

Figure 8.1-2 Second survey areas (February 2024), with earlier version of sensitivity modelling

(note: only access tracks to the WTGs subject to survey were inspected)

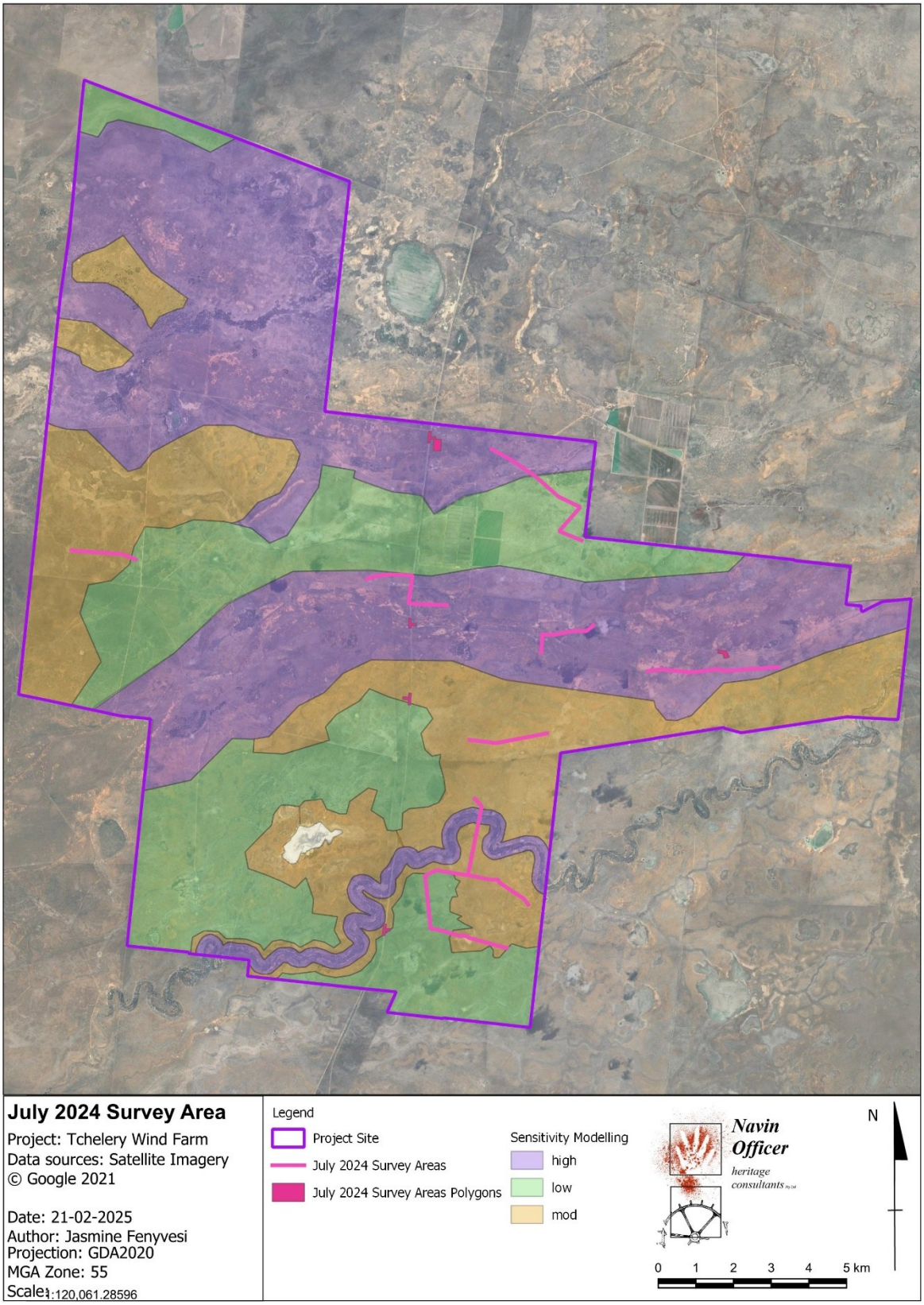

Figure 8.1-3 Third survey areas (July 2024)

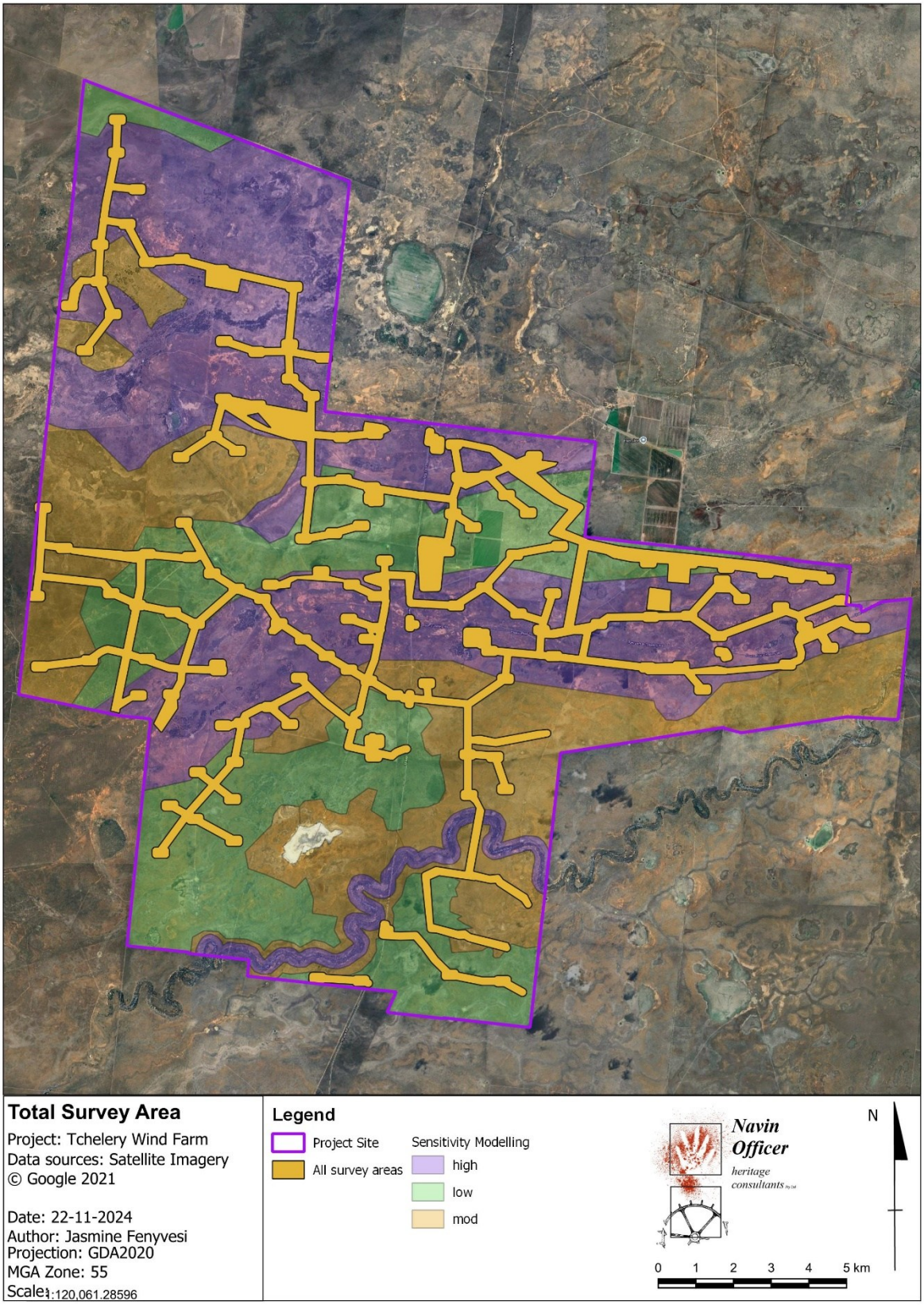

Figure 8.1-4 All survey completed

8.2 Archaeological survey

8.3 New sites and PADs

8.3.1 Overview

A total of 73 new Aboriginal sites, including 12 areas of PADs, have been recorded in the project site (see Table 8.3-1) across the field surveys in 2023 and 2024. See Appendix 3 for full descriptions of all sites. Figure 8.3-1 and Figure 8.3-2 depict all sites recorded for this assessment.

Table 8.3-1 Summary of Aboriginal sites recorded during fieldwork

Site name	AHIMS #	Site features
TWF Site01	48-4-0571	Hearth
TWF Site02	48-4-0572	Artefact scatter
TWF Site03	48-4-0573	Hearth with artefacts
TWF Site04	48-4-0829	Hearth with artefacts
TWF Site05	48-4-0574	Artefact scatter
TWF Site06	48-4-0575	Isolated artefact
TWF Site07	48-4-0576	Artefact scatter
TWF Site08	48-4-0577	Isolated artefact
TWF Site09	48-4-0578	Isolated artefact
TWF Site10	48-4-0579	Isolated artefact
TWF Site11	48-4-0580	Isolated artefact
TWF Site12	48-4-0581	Isolated artefact
TWF Site13	48-4-0582	Isolated artefact
TWF Site14	48-4-0583	Isolated artefact
TWF Site15	48-4-0584	Isolated artefact
TWF Site16	48-4-0585	Isolated artefact
TWF Site17	48-4-0586	Isolated artefact
TWF Site18	48-4-0587	Isolated artefact
TWF Site19	48-4-0588	Isolated artefact
TWF Site20	48-4-0589	Artefact scatter
TWF Site21	48-4-0590	Artefact scatter
TWF Site22	48-4-0591	Artefact scatter
TWF Site23	48-4-0592	Artefact scatter
TWF Site24	48-4-0593	Hearth with artefacts
TWF Site25	48-4-0594	Artefact scatter
TWF Site26	48-4-0595	Artefact scatter
TWF Site27	48-4-0596	Artefact scatter
TWF Site28	48-4-0597	Artefact scatter
TWF Site29	48-4-0598	Artefact scatter
TWF Site30	48-4-0599	Hearth with artefact
TWF Site31	48-4-0600	Hearth
TWF Site32	48-4-0601	Artefact scatter
TWF Site33	48-4-0602	Isolated artefact

Site name	AHIMS #	Site features
TWF Site34	48-4-0620	Isolated artefact
TWF Site35	48-4-0621	Isolated artefact
TWF Site36	48-4-0622	Isolated artefact
TWF Site37	48-4-0623	Isolated artefact
TWF Site38	48-4-0624	Artefact scatter
TWF Site39	48-4-0625	Artefact scatter
TWF Site40	48-4-0626	Artefact scatter
TWF Site41	48-4-0627	Isolated artefact
TWF Site42	48-4-0628	Isolated artefact
TWF Site43	48-4-0629	Hearth with artefacts
TWF Site44	48-4-0603	Hearth
TWF Site45	48-4-0604	Hearths
TWF Site46	48-4-0605	Isolated artefact
TWF Site47	48-4-0606	Isolated artefact
TWF Site48	48-4-0607	Artefact scatter
TWF Site49	48-4-0830	Artefact scatter
TWF Site50	48-4-0831	Isolated artefact
TWF Site51	48-4-0832	Artefact scatter
TWF Site52	48-4-0833	Artefact scatter
TWF Site53	48-4-0834	Isolated artefact
TWF Site54	48-4-0835	Hearth with artefacts
TWF Site55	48-4-0836	Artefact scatter
TWF Site56	48-4-0837	Artefact scatter
TWF Site57	48-4-0838	Artefact scatter
TWF Site58	48-4-0839	Artefact scatter
TWF Site59	48-4-0840	Isolated artefact
TWF Site60	48-4-0841	Hearth with artefact
TWF Site61	48-4-0842	Artefact scatter
TWFPAD01	48-4-0608	PAD with surface artefacts
TWFPAD02	48-4-0609	PAD with hearths and surface artefacts
TWFPAD03	48-4-0610	PAD with hearths and surface artefacts
TWFPAD04	48-4-0611	PAD with surface artefacts
TWFPAD05	48-4-0612	PAD with surface artefacts
TWFPAD06	48-4-0613	PAD with hearths and surface artefacts
TWFPAD07	48-4-0614	PAD with hearths and surface artefacts
TWFPAD08	48-4-0615	PAD with hearths and surface artefact
TWFPAD09	48-4-0616	PAD with hearths and surface artefact
TWFPAD10	48-4-0617	PAD with surface artefacts
TWFPAD11	48-4-0618	PAD with hearths and surface artefacts
TWFPAD12	48-4-0619	PAD with hearths and surface artefacts

Figure 8.3-1 Aboriginal sites and PADs recorded during the current assessment

Figure 8.3-2 All Aboriginal sites and PADs within the project site

8.4 Site distribution and archaeological richness

8.4.1 Sensitivity analysis

Landscape sensitivity analysis aimed to clarify any associations that may exist between major landscape variables and the occurrence of Aboriginal sites within the project site. In this study, analyses were implemented by incorporating AHIMS sites in and around the project site and the sites recorded during fieldwork (i.e. associated with all WTG locations and associated infrastructure). Sensitivity models allow for the development and testing of statements about the nature and distribution of evidence of Aboriginal land use in the region project site. Heritage NSW requires sensitivity analyses to:

- integrate the distribution of known sites, summarised or modelled using the landscape descriptions
- indicate the patterning of material traces from known social and behavioural characteristics evidenced in the ethnohistorical review
- indicate the distribution of natural resources, and the probable land-use strategies employed by Aboriginal people in the specific landscape context
- highlight the spatial and temporal relationships of sites
- show what sorts of material traces are predicted to be present, and in what densities
- allow inferences about past Aboriginal occupation of the landscape based on the evidence collected and presented.

Here, two methods were used to develop sensitivity models: 1) GIS modelling, and 2) principal components analysis.

8.4.1.1 GIS landform archaeological sensitivity model

NOHC has designed a landform archaeological sensitivity model in order to predict potential areas of cultural and archaeological sites. The landform archaeological sensitivity model was developed following the initial field survey and has been refined during the following field assessments in order to achieve a weighted, multi-criteria analysis of the potential landform archaeological sensitivity of the project footprint. The model is built on the combination of several criteria including topography, previously recorded AHIMS sites data, hydrology, and soil type. The results predict three areas of high archaeological sensitivity in the centre and north of the project site as well as a buffered alignment of The Forest Creek (Figure 8.4-1).

Each of these criteria were treated equally in respect to the overall impact on determining landform sensitivity. Land clearing for grazing was not factored into the model because land clearing methods vary widely in terms of their potential to disturb Aboriginal archaeological sites and without detailed information on the methods of clearing, a precautionary view has been taken and have assumed that Aboriginal archaeological deposits would remain intact. The model uses three broad categories as defined below:

- **low sensitivity**: areas that are low sensitivity are generally categorised as low-lying landforms, with a tendency to be water logged and swampy, they do not meet any of the criteria utilised for moderate and high sensitivity areas. They also include areas where the landform has been extensively disturbed for farming practises such as manufactured irrigated fields. There is a very low chance of finding archaeological material in this zone
- **moderate sensitivity**: areas that are moderate sensitivity are classified in the model as occurring within 350 metres of a major water source, areas of relative height and dryness in comparison to low-lying and waterlogged adjacent areas. There is a low-to-moderate chance of finding archaeological material in this zone
- **high sensitivity**: areas that are high sensitivity are classified in the model as areas that occur within the siliceous sands soil type, easily accessible areas that are within 200 metres of a major

water source, areas containing clay pan exposures and areas of high relative topography in relation to the surrounding area. There is a high chance of finding archaeological material in this zone.

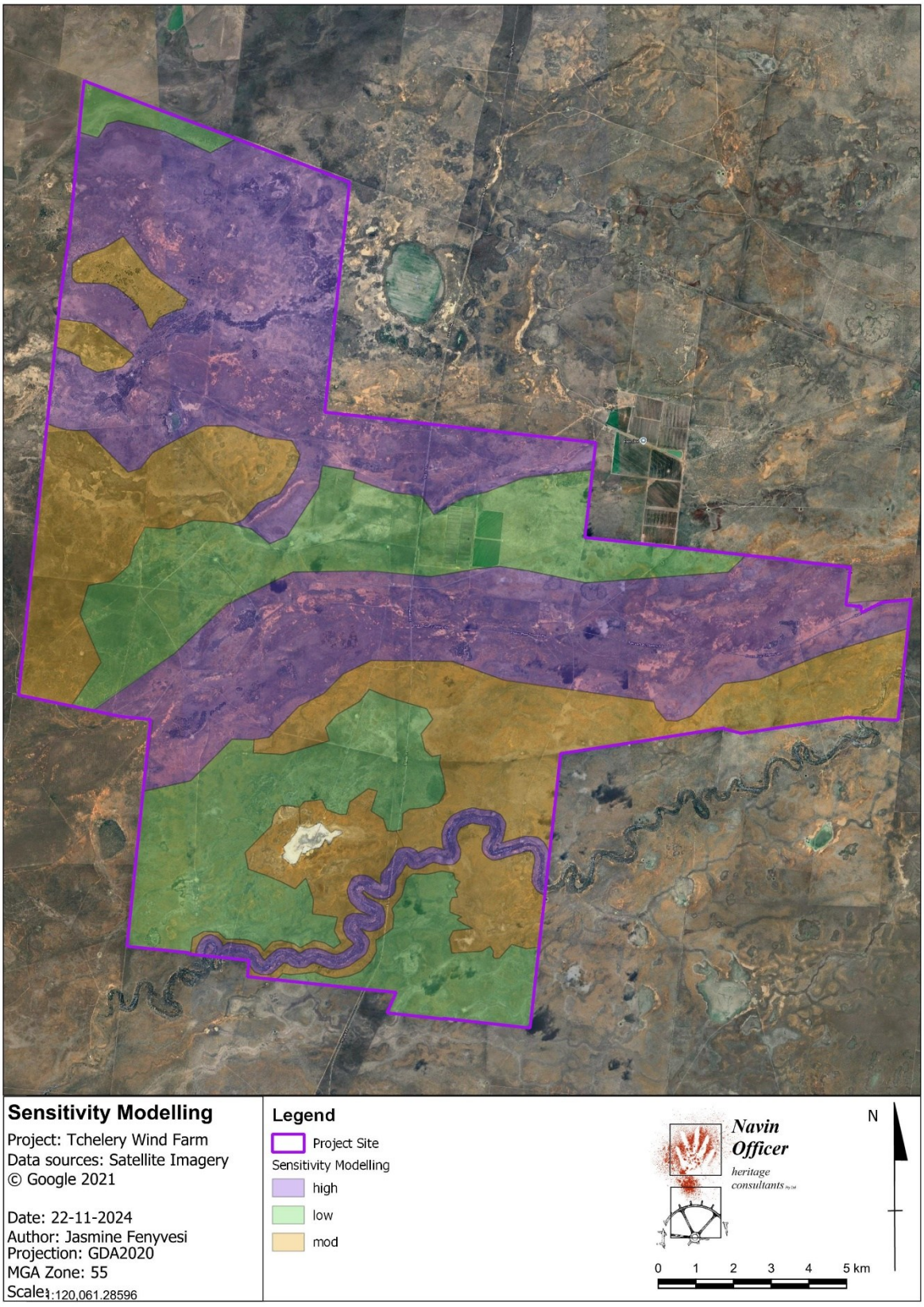

Figure 8.4-1 Results of GIS sensitivity modelling

8.4.1.2 Principal Components Analysis – method and results

8.4.1.2.1 All Aboriginal sites

Principal component analysis (PCA) was carried out to assess in greater detail the relationships between site location, site type, and landscape using the following variables: geology, soil type, land use, and vegetation type. Erosion was not included because it was found to be strongly correlated with soil type (Pearson correlation: $r^2 = 0.872$; where >0.7 equals strong correlation). PCA transforms complex data into components that capture sources of variation, allowing for the quantitative interpretation of large datasets that would otherwise be difficult to understand. As the included variables are nominal, they were dummy coded for each site (i.e. 0,1,2…). A total of 154 sites were included, combining all AHIMS sites for the region surrounding and within the project site and all sites recorded during fieldwork.

The results of PCA using a variance-covariance matrix are summarised in Table 8.4-1 and Table 8.4-2. The first principal component (PC1) accounted for 84.9 per cent of the total variance (dispersion) with vegetation type the only strongly loading variable (0.99351). PC2 accounted for only 7.1 per cent of total variance with soil type the highest loading variable (0.96346). Thus, the results are relatively clear-cut in showing that among the four variables included in the analysis, vegetation type explains most of the variance in the location of the sites in the landscape followed by soil type.

Object plots of PC1 versus PC2 compiled using PCA object scores highlight the general tendencies in the data in terms of the distribution of archaeological sites in the landscape. Overall, it can be concluded that Aboriginal objects and sites can be expected to be found within many landscape types within the project site. They are, however, more frequent in areas containing certain vegetation types and to a lesser extent, certain soil types. Conversely, Aboriginal objects and sites are less common and contain lower diversity (fewer types of sites) in areas with rarer vegetation types associated with certain landscapes (such as palaeo-lakes and large pans) and soil types.

Table 8.4-1 Results of PCA

Principal components	Eigenvalue*	Per cent variance
1	10.6103	84.974
2	0.881647	7.0608
3	0.618598	4.9541
4	0.375969	3.011

Note: *Eigenvalue meaning magnitude of variance.

Table 8.4-2 Variables loadings for individual principal components (PC)

	PC 1*	PC 2*	PC 3*	PC 4*
Geology	0.020732	-0.24685	**0.9379**	0.24285
Soil type	0.11135	**0.96346**	0.23931	0.045609
Vegetation type	**0.99351**	-0.10265	-0.049029	0.00019051
Land use	-0.010632	0.016538	-0.24631	**0.96899**

Note: *Highest loading variables for each PC are in bold.

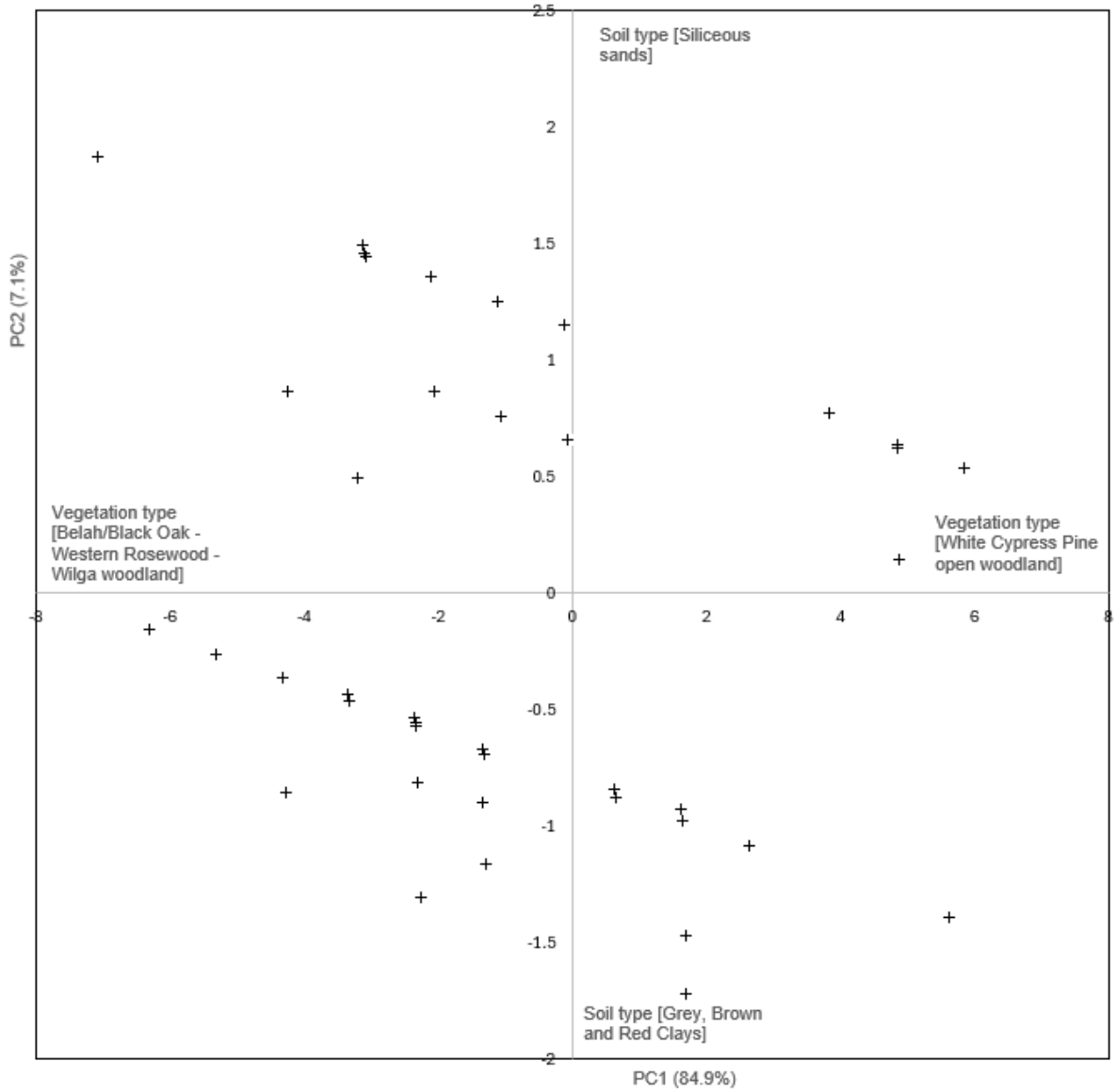

Figure 8.4-2 Biplot of object scores from PCA demonstrating the distribution of all AHIMS sites and sites recoded during field survey

8.4.1.2.2 Isolated artefacts and scatters

A total of 50 open artefact occurrences (un-associated with hearths/PADs etc.) were recorded during the field program. A total of 78 per cent of sites were found within two broad vegetation classifications; semi-arid woodlands, shrubby formation (coloured blue in map), and Riverine plain grasslands (coloured green in map).

Figure 8.4-4A biplot of PC1 versus PC2 object scores shows artefacts are found within a broad range of vegetation types and are more common in areas of grey, brown and red clays and White Cypress Pine open woodland, as well as areas of siliceous sands and Belah/Black Oak, Western Rosewood, Wilga woodland (see Figure 8.4-3, and

Figure 8.4-4).

The most common vegetation type for artefact occurrences is White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone. Artefacts recorded during the field program were recorded in eight out of 12 vegetation types (not including 'not classified' vegetation type). More specifically, 48 per cent of artefact sites were located in just two vegetation types, with 64 per cent being recorded in just three (see Table 8.4-3).

Figure 8.4-4 shows the location of all artefact sites in the project site recorded during fieldwork. Interestingly, the areas of high sensitivity indicated by GIS sensitivity modelling match well with vegetation type implying a clear association with landscape features such as soil type and topography.

Table 8.4-3 Number of artefact sites (isolated artefact and scatters) by vegetation type

Vegetation type	Map key colour	Number of sites
Belah/Black Oak – Western Rosewood – Wilga woodland of central NSW including the Cobar Peneplain Bioregion	Blue	**1**
Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	Brown	**8**
Cotton Bush open shrubland of the semi-arid (warm) zone	Blue	**10**
Curly Windmill Grass – speargrass – wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Green	**7**
Cypress Pine woodland of source-bordering dunes mainly on the Murray and Murrumbidgee River floodplains	Blue	**2**
Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW	Pink	**2**
Forb-rich Speargrass – Windmill Grass – White Top grassland of the Riverina Bioregion	Green	**5**
White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Blue	**14**
Not classified	Dark blue	**1**

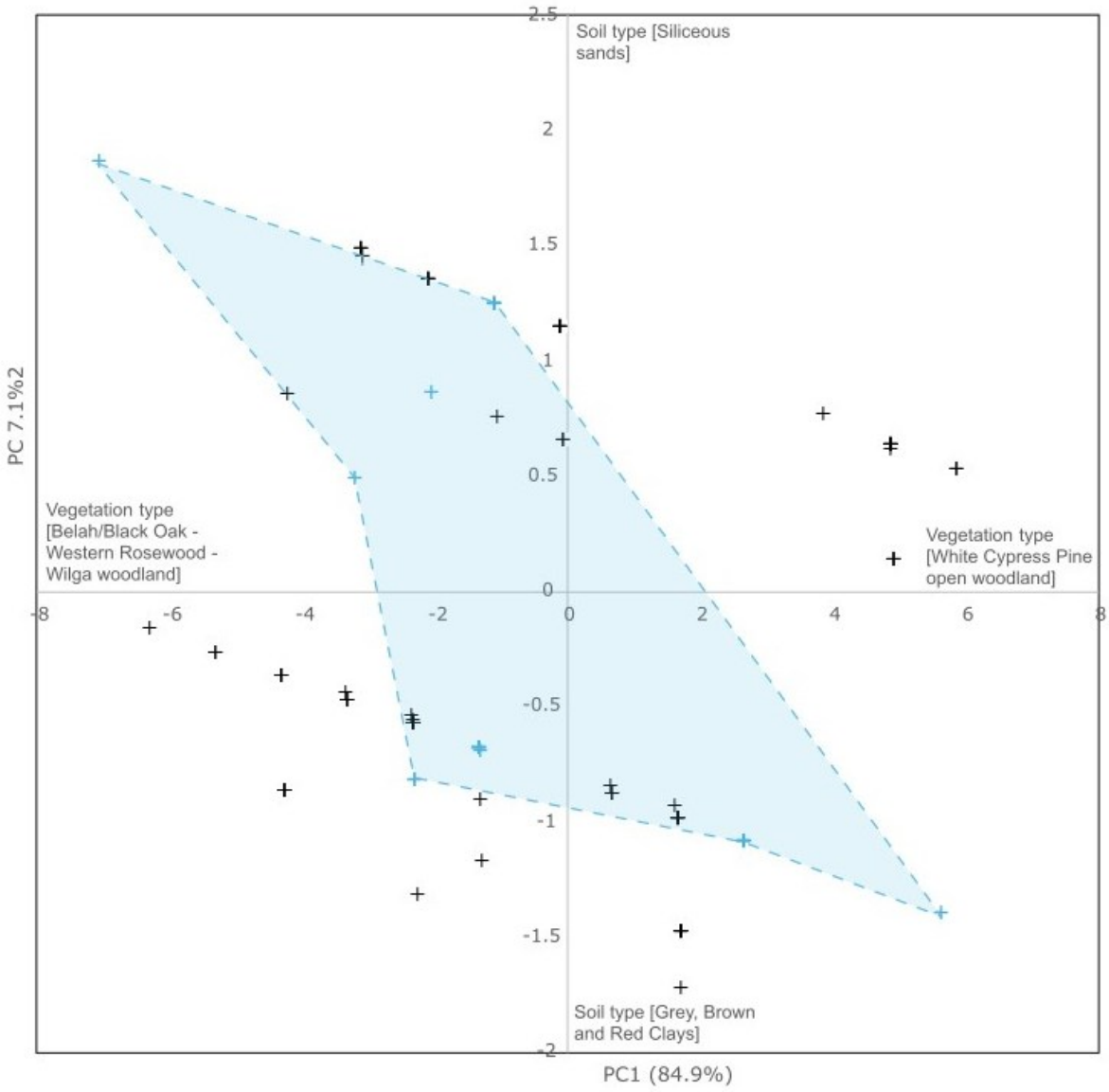

Figure 8.4-3 Biplot of object scores from PCA highlighting the distribution of artefacts (blue crosses)

(Note: boundaries are convex hulls)

Figure 8.4-4 Association between artefact locations and vegetation type

8.4.1.2.3 Hearths

Hearths recorded during fieldwork were observed in six vegetation types (see Table 8.4-4 and Figure 8.4-5). The vegetation types with the most hearth occurrences coincided with the most numerous vegetation types for artefact occurrences.

Of all 73 Aboriginal sites recorded during fieldwork, 33 per cent were found in the White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone type, 19 per cent in the Cotton Bush open shrubland of the semi-arid (warm) zone, and 12 per cent in both the Curly Windmill Grass/speargrass/ wallaby grass grassland and the Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone. These four vegetation types contain 76 per cent of all sites within the project site.

PCA biplot of all object scores shows that hearths are found across the most common vegetation and soil types but are slightly more likely to be present in landscapes with silicious sandy soils (Figure 8.4-5).

Figure 8.4-6 shows the location of all hearth sites in the project site recorded during fieldwork. The blue areas show the distribution White Cypress Pine open woodland (Semi-Arid Woodland Formation, Shrubby sub-formation). Interestingly, the areas of high sensitivity indicated by GIS sensitivity modelling, match well with vegetation type implying a clear association with landscape features such as soil type and topography.

Table 8.4-4 Number of hearths recorded during the field program by vegetation type

Vegetation type	Map key colour	Number of sites
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Purple	**1**
Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	Brown	**1**
Cotton Bush open shrubland of the semi-arid (warm) zone	Blue	**3**
Curly Windmill Grass – speargrass – wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Green	**2**
Cypress Pine woodland of source-bordering dunes mainly on the Murray and Murrumbidgee River floodplains	Blue	**3**
White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Blue	**9**

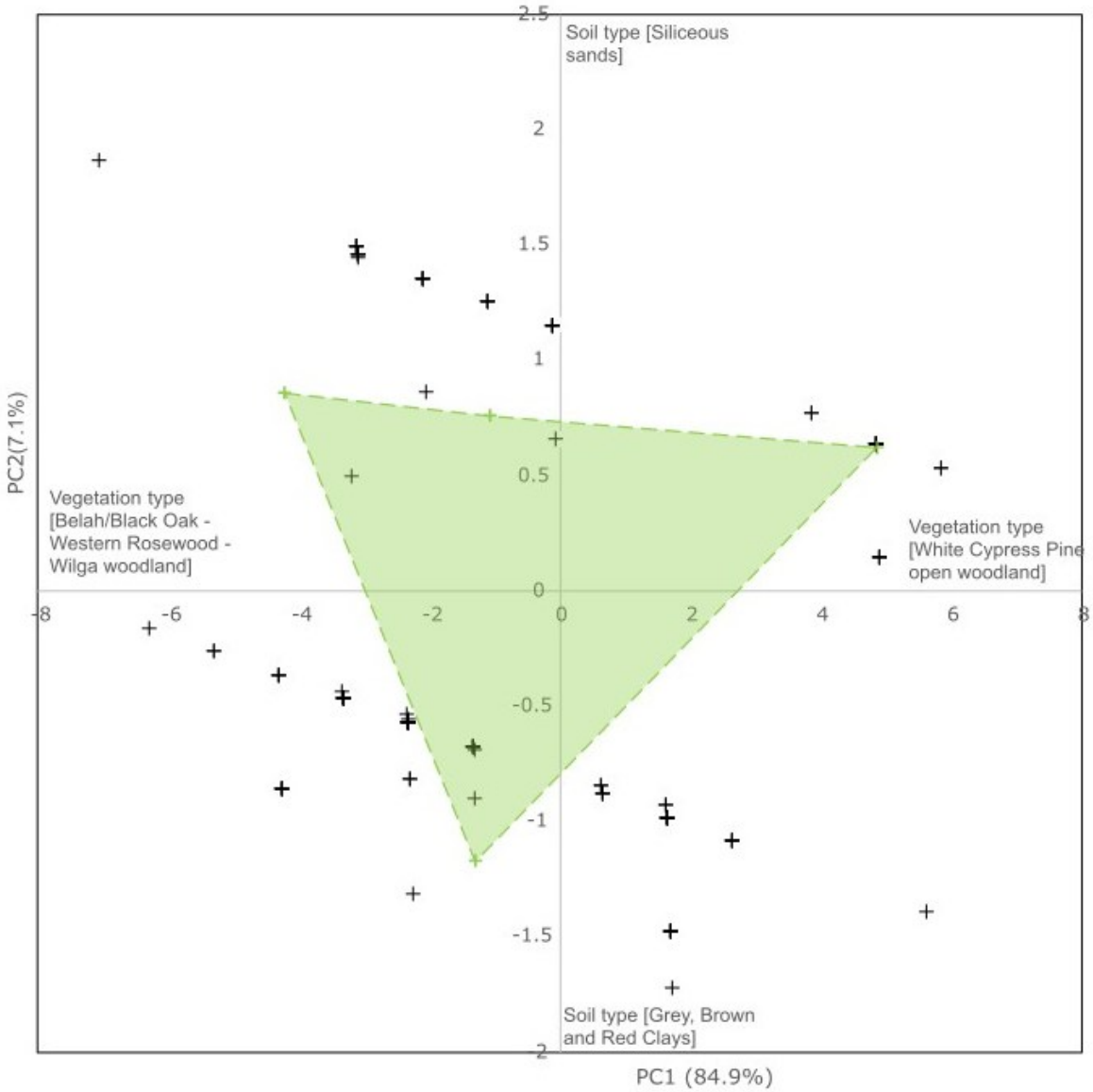

Figure 8.4-5 Biplot of object scores from PCA highlighting the distribution of hearths (green crosses)

(Note: boundaries are convex hulls)

Figure 8.4-6 Association between hearth locations and vegetation type

8.4.1.2.4 Earth mounds and burials

Although earth mounds and burials were not recorded during field survey, these types of sites are present in the project site and broader region (see Section 7) and have potential to be encountered in impact areas as unexpected finds.

A PCA biplot of object scores shows that earth mounds are characterised by a broad distribution across vegetation and soil types, however, are more present in the White Cypress Pine open woodland vegetation type and are markedly more present in areas containing the grey, brown and red clays soil type.

Earth mounds have been recorded in a range of vegetation types, with the majority having been found in the following (see Table 8.4-5):

- disturbed annual saltbush fore land on clay plains and inundation zones mainly of south-western NSW
- Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
- Cotton Bush open shrubland of the semi-arid (warm) zone.

Burials not associated with earth mounds are relatively common within the region and in the north of the project site (as noted in Section 7). Burials are found seemingly within many vegetation types but within few soil types (Figure 8.4-8). Most burials have been found in the following vegetation types (see Table 8.4-5):

- Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion
- disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW
- Cotton Bush open shrubland of the semi-arid (warm) zone.

The major differences in vegetation types between artefact and hearth locations, on the one hand, and burials and earth mounds, on the other, implies that the latter types of Aboriginal sites are unlikely to be found in most of the study excepting possibly of its northwestern most extremity.

Table 8.4-5 Number of earth mounds by vegetation type

Vegetation type	Number of sites
Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**1**
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**6**
Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	**1**
Cotton Bush open shrubland of the semi-arid (warm) zone	**5**
Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	**3**
Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW	**14**
Nitre Goosefoot shrubland wetland on clays of the inland floodplains	**1**
Not classified	**2**

Table 8.4-6 Number of burials by vegetation type

Vegetation type	Number of sites
Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	**1**
Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**2**
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	**1**
Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	**6**
Cotton Bush open shrubland of the semi-arid (warm) zone	**3**
Curly Windmill Grass – speargrass – wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	**1**
Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	**2**
Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW	**4**
Nitre Goosefoot shrubland wetland on clays of the inland floodplains	**1**
White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	**1**
Not classified	**2**

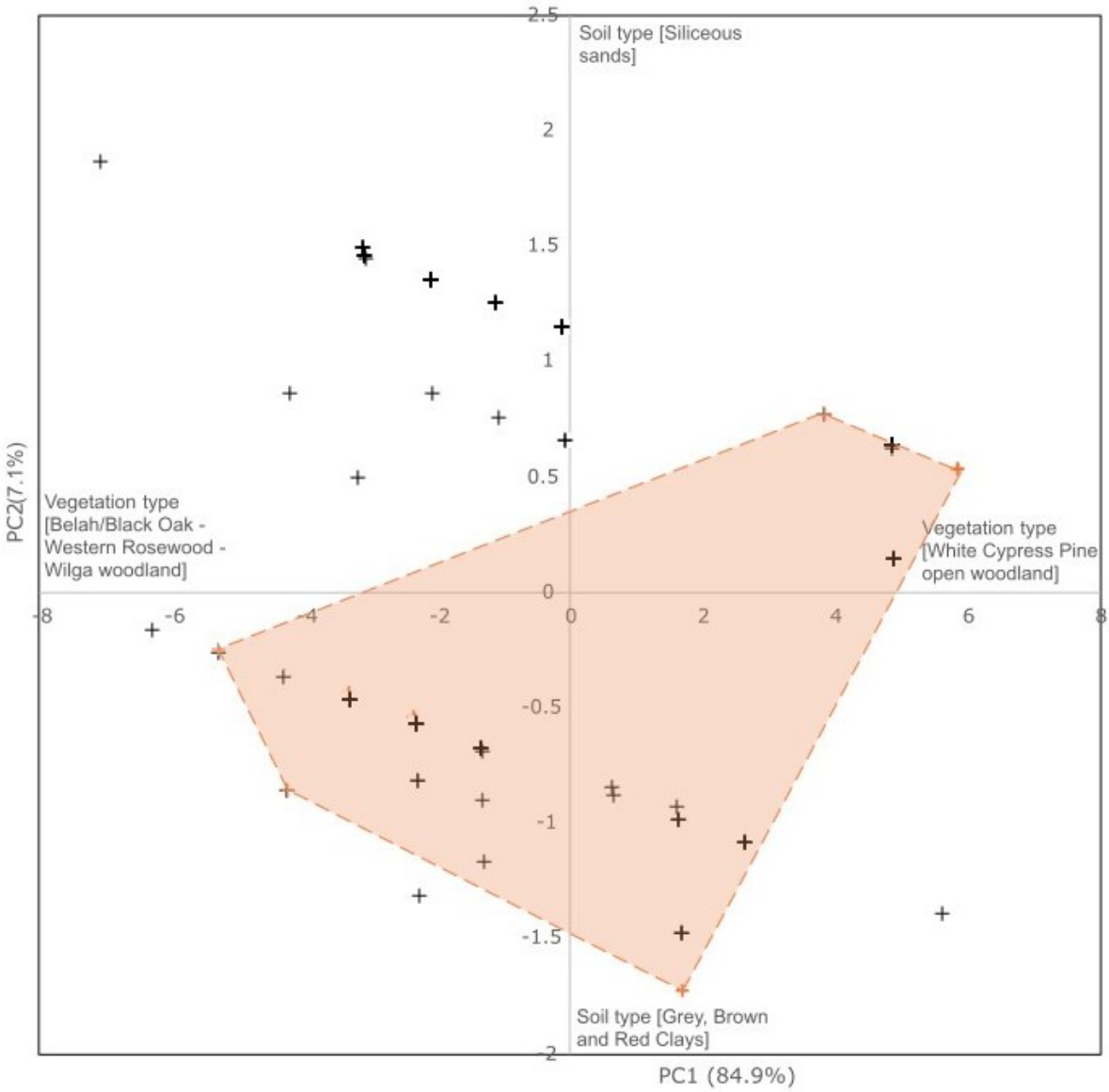

Figure 8.4-7 Biplot of object scores from PCA highlighting the distribution of earth mounds (orange crosses)

(Note: boundaries are convex hulls)

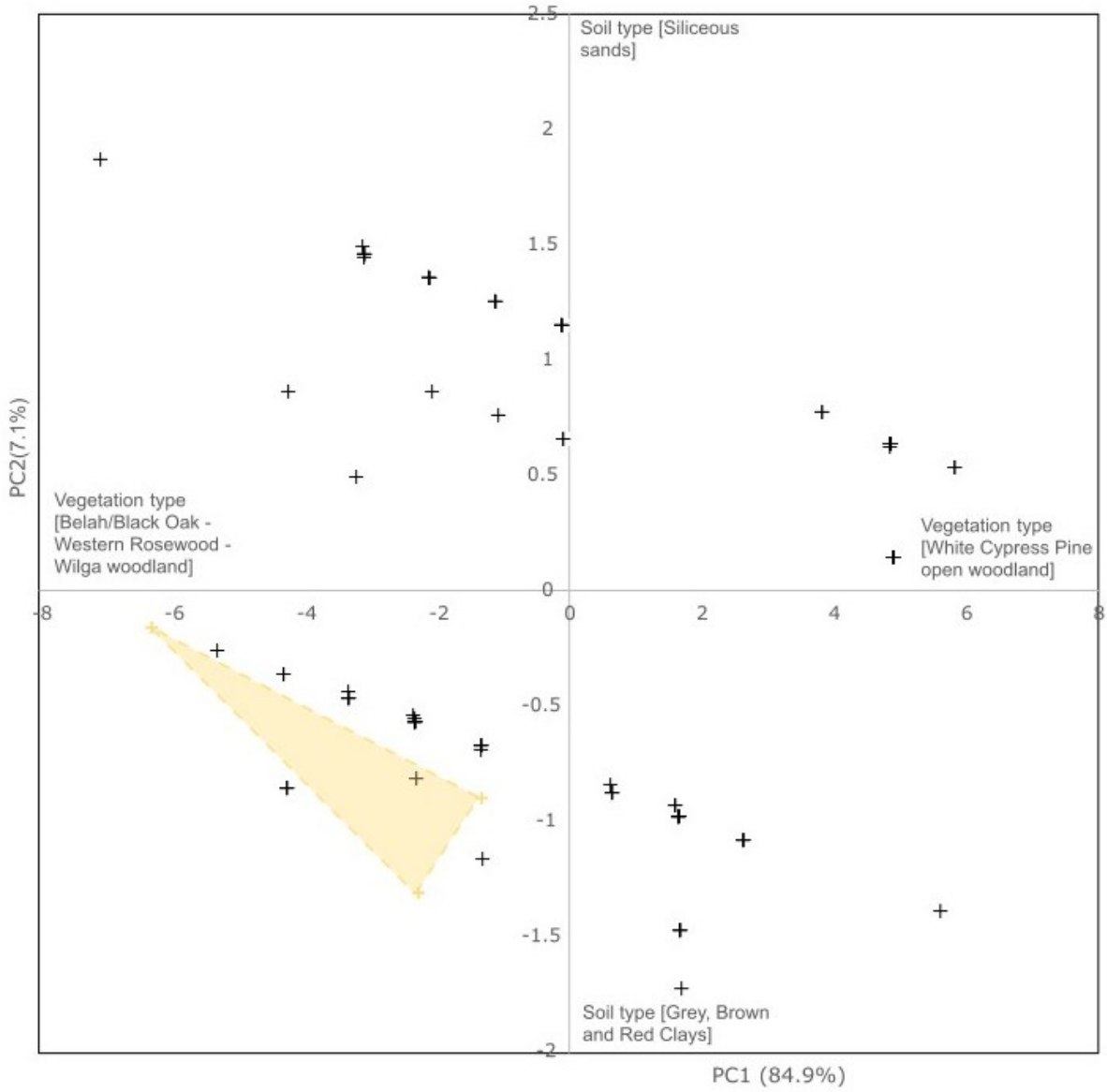

Figure 8.4-8 Biplot of object scores from PCA highlighting the distribution of burials not associated with earth mounds (yellow crosses)

(Note: boundaries are convex hulls)

8.4.1.2.5 Scarred trees

Finally, although no scarred trees have been recorded in the project site, they do occur in the broader Riverina region (Pardoe and Martin, 2011). Two scarred trees have been found in areas adjacent to the project site and are located within a narrow range of vegetation types and in areas with siliceous sandy soils (see Figure 8.4-9).

Scarred trees have been recorded in the following vegetation types:

- White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone
- Cypress Pine woodland of source-bordering dunes mainly on the Murray and Murrumbidgee River floodplains.

The first of these is the most common vegetation type for artefacts and hearths in the project site and the second is the second most common type for hearths. On this basis it would be expected that scarred trees might be present in the project site. These vegetation communities generally contain few trees in the project site, likely the result of previous land clearing and tree removal activities.

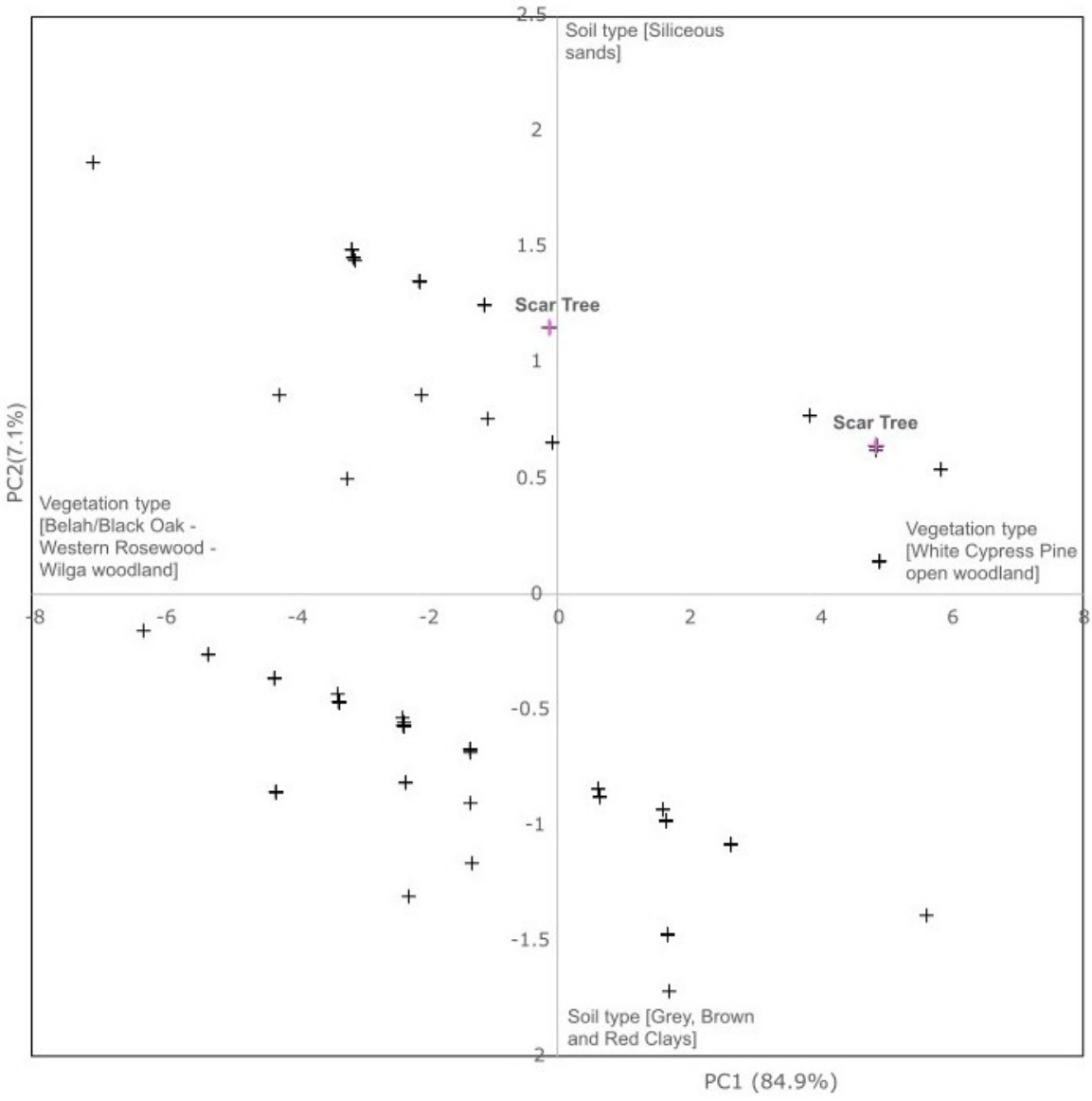

Figure 8.4-9 Biplot of object scores from PCA highlighting the distribution of scarred trees (purple crosses)

8.4.2 Site obtrusiveness

The effectiveness of archaeological field survey is largely determined by the obtrusiveness of sites. That is, if Aboriginal objects are present in the landscape their obtrusiveness would be the result of two factors: Ground Surface Visibility (GSV) and Ground Surface Exposure (GSE) (see Section 4.1.2).

GSV and GSE are determined by a complex set of interacting variables. Individual variables have been analysed in this report within the context of the landscape of the project site and the distribution of AHIMS sites (see Section 5). However, they need to be analysed in further detail in terms of their impact on both site obtrusiveness, distribution and areal density.

Erosion is determined by interactions among local topography including slope and aspect, geology, soil type, wind erosion, water erosion, bioturbation (insects, native and grazing mammals), vegetation (type and distribution) and land use to produce an erosional scald exposing a site or PAD.

Two variables of obtrusiveness were estimated during the surveys (see also Section 5.1.1):

- a percentage estimate of the total area of ground inspected that contained useable exposures of bare ground (GSV as a per cent of total sampled ground cover)

- a percentage estimate of the average levels of ground surface visibility within those exposures (GSE as a per cent of total sampled ground cover). This is a net estimate and accounts for all impacting visual and physical variables including the archaeological potential of the sediment or rock exposed.

For example, artefacts made from locally occurring rock such as quartz may be more difficult to detect under usual field survey conditions than rock types that are foreign to the area. The impact of natural gravels on artefact detection was considered in the visibility variables estimates outlined above.

The project site is 28,769.8 hectares. The disturbance footprint for the project is 624.9 hectares making up 2.17 per cent of the project site. The total area covered by all surveys across the current study was 5,090.6 hectare making up 17.69 per cent of the project site. Survey activities were focused on areas of disturbance as well as opportunistic survey where landscape features indicated the presence of Aboriginal sites.

Table 8.4-7 provides landscape information and estimated GSV and GSE for all Aboriginal sites recorded in the current assessment.

In terms of landscape variables in relation to the new site recordings, the following trends were observed:

- **soils:** 49 of 73 sites were located within siliceous sands soil type; 23 sites were located within the grey, brown and red clays soil types, and one site was located within the red-brown earth soil type

- **vegetation type (formation):** sites were located within three of the eight vegetation types in the project site. 34 sites were located within semi-arid woodlands (Shrubby sub-formation), 28 were located within arid shrublands (Chenopod sub-formation), 14 within grasslands, two within saline wetlands, and one within semi-arid woodlands (Grassy sub-formation)

- **Land use:** 70 of the sites were located within grazing native vegetation areas, three were located within grazing modified pastures and the remaining one was located within Marsh/wetland.

Similarly, 45 of the 73 sites are located within a clay pan/erosion scald frequently associated with a clay pan.

Overall, it seems reasonable to conclude that for the survey of Aboriginal objects to be effective in these areas a combined moderate–high amount of visibility – or a moderate–high reduction in vegetation cover – and a large degree of sub-surface exposure (i.e. extensive erosion) is required.

Table 8.4-8 summarises estimates for the degree that survey units within the project site were examined and also indicates the ground surface exposure incidence and average ground visibility present in each case. Figure 8.4-10 depicts the survey units recorded for the field survey. Taking into account survey coverage, archaeologically useable exposures, and visibility variables, the effective survey coverage (ESC) was 20 per cent of the total surveyed area. The ESC attempts to provide an estimate of the proportion of the project site that provided a net 100 per cent level of ground surface visibility to archaeological surveyors.

Table 8.4-7 Landscape variables, ground surface visibility and exposure for recorded sites within the project site

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWF Site01	Clay pan – open plain	12 m x 7 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid woodlands (Shrubby sub-formation)	Grazing native vegetation	70	90
TWF Site02	Clay pan – open plain	5 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	90	95
TWF Site03	Clay pan – open plain	8 m x 7 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	85	95
TWF Site04	Clay pan – open plain	3 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	90	85
TWF Site05	Clay pan – open plain	1 m x 2 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	90	95
TWF Site06	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	50	50
TWF Site07	Clay pan – open plain	1 m x 2 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	90	85
TWF Site08	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	50	70
TWF Site09	Erosion scald/ slight rise – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	30	95
TWF Site10	Grassland – open plain	1 m x 1 m	Claypan and lacustrine deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	80	80
TWF Site11	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	60	80
TWF Site12	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	30	50
TWF Site13	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	80	95
TWF Site14	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWF Site15	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	10	30
TWF Site16	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing modified pastures	80	80
TWF Site17	Sandy clay pan/ edge of rise – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Saline Wetlands	Grazing native vegetation	95	90
TWF Site18	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Saline Wetlands	Grazing native vegetation	50	40
TWF Site19	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	75	70
TWF Site20	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	85	90
TWF Site21	Clay pan – open plain	50 m x 30 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	95	95
TWF Site22	Scrub – open plain	10 m x 2 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	30	40
TWF Site23	Clay pan – open plain	52 x 57 m	Claypan and lacustrine deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	75	95
TWF Site24	Small dune – open plain	13 m x 3 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	80	80
TWF Site25	Clay pan – open plain	2 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	60	95
TWF Site26	Scrub – open plain	10 m x 5 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	70	70
TWF Site27	Clay pan – open plain	2 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	100
TWF Site28	Small dune – open plain	32 m x 20 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	60	90

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWF Site29	Clay pan – open plain	15 m x 10 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing modified pastures	95	100
TWF Site30	Clay pan – open plain	50 m x 60 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWF Site31	Clay pan – open plain	80 m x 50 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing modified pastures	90	95
TWF Site32	Clay pan – open plain	110 m x 30 m	Alluvial floodplain deposits	Siliceous sands	Grasslands	Grazing native vegetation	95	100
TWF Site33	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Grasslands	Grazing native vegetation	40	70
TWF Site34	Clay pan/ scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Grasslands	Grazing native vegetation	90	90
TWF Site35	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	60	70
TWF Site36	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	15	50
TWF Site37	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	80	80
TWF Site38	Scrub – open plain	10 m x 10 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	80	85
TWF Site39	Clay pan/ scrub – open plain	30 m x 30 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	80	95
TWF Site40	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	50	70
TWF Site41	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	60	70
TWF Site42	Grassland – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	50	90

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWF Site43	Clay pan/ grassland – open plain	50 m x 20 m	Source-bordering dunes	Siliceous sands	Grasslands	Grazing native vegetation	75	90
TWF Site44	Clay pan – open plain	6 m x 3 m	Source-bordering dunes	grey, brown and red clays	Grasslands	Grazing native vegetation	90	95
TWF Site45	Clay pan – open plain	5 m x 2 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWF Site46	Clay pan – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	100	100
TWF Site47	Clay pan – open plain	1 m x 1 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	100	100
TWF Site48	Clay pan – open plain	1 m x 1 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	100
TWF Site49	Clay pan – open plain	2 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	80	90
TWF Site50	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	15	50
TWF Site51	Clay pan – open plain	32 m x 8 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	60	90
TWF Site52	Scrub – open plain	12 m x 2 m	Alluvial floodplain deposits	grey, brown and red clays	Grasslands	Grazing native vegetation	30	75
TWF Site53	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	grey, brown and red clays	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	60	90
TWF Site54	Clay pan – open plain	13 m x 4 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	80	90
TWF Site55	Scrub – open plain	30 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	60	80
TWF Site56	Scrub – open plain	2 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	70	80
TWF Site57	Clay pan – open plain	100 m x 30 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	85	90

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWF Site58	Clay pan – open plain	30 m x 2 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)/ Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	80	90
TWF Site59	Scrub – open plain	1 m x 1 m	Alluvial floodplain deposits	Siliceous sands	Grasslands	Grazing native vegetation	70	80
TWF Site60	stream channel – open plain	20 m x 37 m	Alluvial channel deposits	Red-brown earths	Semi-arid Woodlands (Grassy sub-formation)	Marsh/wetland	70	80
TWF Site61	Clay pan – open plain	30 m x 30 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	95	90
TWFPAD01	Mounded dune	1600 m x 500 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWFPAD02	Mounded dune	670 m x 550 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWFPAD03	Clay pan – open plain	440 m x 330 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)/ Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	80	95
TWFPAD04	Clay pan – open plain	400 m x 170 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation)	Grazing native vegetation	90	95
TWFPAD05	Clay pan – open plain	600 m x 290 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWFPAD06	Clay pan – open plain	500 m x 200 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	50	80
TWFPAD07	Clay pan – open plain	420 m x 230 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	70	90
TWFPAD08	Clay pan – open plain	220 m x 140 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	70	95
TWFPAD09	Clay pan/ scrub – open plain	160 m x 130 m	Alluvial floodplain deposits	Siliceous sands	Arid Shrublands (Chenopod sub-formation) / Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	70	80

Site name	Landform	Site dimensions	Geology	Soil type	Vegetation formation	Land use	Visibility per cent	Exposure per cent
TWFPAD10	Clay pan – open plain	185 m x 55 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	90	95
TWFPAD11	Clay pan – open plain	740 m x 120 m	Alluvial floodplain deposits	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	80	95
TWFPAD12	Clay pan – open plain	580 m x 160 m	Source-bordering dunes	Siliceous sands	Semi-arid Woodlands (Shrubby sub-formation)	Grazing native vegetation	95	95

Table 8.4-8 Survey coverage across the survey areas

Survey unit	Sensitivity	Landforms	Survey unit area (square metre)	Exposure per cent	Visibility per cent	Effective coverage area (square metre) survey unit area x visibility per cent x exposure per cent)	Effective coverage per cent (effective coverage area/survey unit area x 100)
1	High	Plain and undulating sandplain	16,519,767	30	80	3,964,744.08	24
2	Moderate	Plain	3,464,227	30	70	727,487.67	21
3	Moderate	Plain	3,243,936	25	60	486,590.4	15
4	Low	Marsh/wetlands and plain	2,001,231	20	60	240,147.72	12
5	Low	Plain	10,143,754	20	70	1,420,125.56	14
6	Low	Plain	491,569	20	70	68,819.66	14
7	High	Plain	112,792	50	80	45,116.8	40
8	Low	Plain	3,047,732	25	70	533,353.1	17.5
9	High	Plain, undulating sandplain, and marsh/wetlands	9,790,068	30	80	2,349,616.32	24
10	Moderate	Plain	248,425	40	70	69,559	28
11	Moderate	Plain	333,909	30	70	70,120.89	21
12	Moderate	Plain and marsh/wetlands	1,393,942	25	70	243,939.85	17.5
Total			**50,906,564**			**10,219,621.05**	**20**

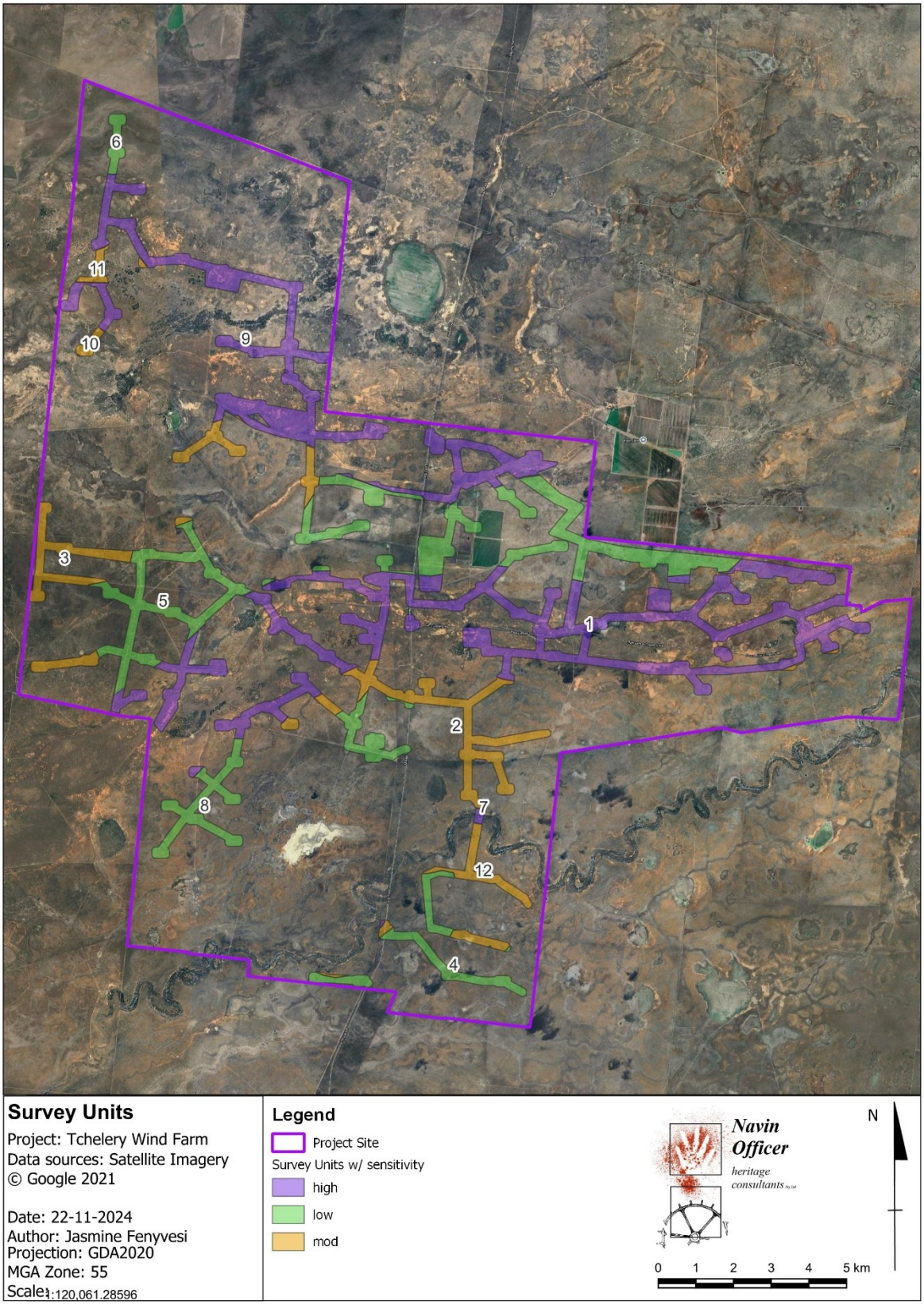

Figure 8.4-10 Survey units across project site

8.4.3 Archaeological richness

8.4.3.1 Site type

A summary of archaeological sites in the project site, combining AHIMS sites and those recorded during fieldwork, is provided in Table 8.4-9. Overall, isolated artefacts and artefact scatters are the most common site feature/site type and represent 71 per cent of total sites. The next most common site type is hearths that comprise 21 per cent of the total. These findings are broadly consistent with the situation for AHIMS site within wider Tchelery area (see Section 7.3). Thus, the project site is not unusual in this regard.

Table 8.4-9 Archaeological sites within the project site with particular features (AHIMS and NOHC field survey combined)

Site feature	Number of sites*
Artefact (isolated and scatters)	69
Hearth, ovens and retainers	20
Earth mound	3
Burial	3
Aboriginal resource and gathering	1
Shell	1
Total	**97**

Note: *Some sites contain multiple features (e.g. burial, hearth, earth mound and artefacts or hearth and artefacts)

8.4.3.2 Project site areal density

The overall areal density for the project site using combined AHIMS and field survey data is one site per 3.2 square kilometres. This contrasts strongly with the predicted number of sites for the region of 46–50 sites per hectares, or 4,600-5,000 sites per square kilometres, estimated using predictive GIS modelling by Pardoe and Martin (2011).

There are, however, major limitations with their approach (as acknowledged by them) such as the exclusion of vegetation type, a key variable in our results (see Section 8.4.1.2). Thus, the estimates of Pardoe and Martin (2011) are likely to have greatly overestimated areal density, as suggested by our field survey results.

In terms of the geomorphology, it is well understood that Aboriginal sites tend to be more common in proximity to water. The survey and modelling work of Pardoe and Martin (2011) confirms that this general principle applies also in the Murrumbidgee Province. Their data show that about 50 per cent of sites are located within 1,000 metres of major water channels such as the Murrumbidgee River and minor channel such as creeks, with around 50 per cent located within 3,500 metres of lakes.

Within the project site, the average distance between an artefact site and a creek is 3,528 metres, between a hearth and a creek 3,664 metres and the average distance for all sites combined and a creek is 3,561 metres (Table **8.4-10**).

It is important to note there are differences in sampling strategy between the present investigation and Pardoe and Martin (2011). In the present study, survey areas were determined by the location of proposed WTG sites and associated infrastructure, whereas Pardoe and Martin (2011) focused on geographic areas within the Murrumbidgee Province where little data existed for the presence of archaeological sites. These differences are important as neither study represents a random sample and the smallest distance to water for a WTG site is approximately 400 metres, with the majority being around 3,000 metres to 4,000 metres from the nearest creek. The proposed locations of WTGs are well away from water courses and thus beyond areas expected to be characterised by high areal richness.

Table 8.4-10 Distance from minor water channels of sites recorded during fieldwork

Site type	Distance from water (m)
Artefact sites (n=53)	3528±1663*
Hearths (n=17)	3664±1979
All sites (n=70)	3561±1731

Note: *Mean difference between artefact sites and hearths is not significant.

8.5 Subsurface testing program

8.5.1 Summary

The results of the subsurface testing program are as follows:

- one area of PAD was tested during the current works program, TWF PAD12
- a total of 14 test pits were excavated across two transects
- no archaeological material was located from subsurface testing.

8.5.2 Excavation procedure

Two transects were excavated at TWF PAD12. Transects were positioned to follow the alignment of the proposed underground cables within a 50 metres buffer. Transect 1 was located on the western side of the PAD running along a northwest to southeast axis. Transect 2 was located on the eastern side of the PAD running on a west to east axis (see Figure 8.5-3).

Transect 1 was 60 metres in length and contained five pits. Transect 2 was 160 metres in length and contained nine test pits. All pits were spaced at 20 metre, except at Transect 1 Pit 5 where spacing was reduced to 15 metres in order to test the intersection between the raised vegetated area and the clay pan.

Test pits were excavated in 50 cm by 50 cm units to make up a 1 m by 1 m test pit. Quadrants were labelled A-D and excavated in a clockwise rotation starting in the northwest quadrant (A). Within Transect 2 Pits 1 and 2, only quadrant A was dug as the sediment was a heavily plastic clay that was considered to have no archaeological potential and as such was not considered necessary to explore further.

8.5.3 Soils, disturbance and features

The ground surface of the clay pan across Transect 1 displayed evidence of disturbance in the form of land clearance and previous agricultural activity, including grading. It is also clear that the area has been subject to soil erosion. Charcoal staining and flecks were noted to be widespread in Transect 1 Pits 3–5, indicating that a fire event, such as a bush or grass fire, had taken place at this location in the past.

The soil profile of Transect 1 was largely consistent. Pits 1–3 contained a very similar profile with Pit 1 having a slightly higher moisture content due to vegetation coverage on the surface. Pit 4 was located on a vegetated rise and as such contained a deeper sediment profile. The A horizon was made up of an orange-brown moderately compact silty sand. Pit 5 was located on the intersection between the vegetated rise and the clay pan and sloped upwards towards the northwest. The A horizon consisted of an orange-brown moderately compact sandy loam. The B-Horizon is consistent across the Transect, consisting of a compact, dry orange-brown silty clay with no gravels. Though the pit depth varied across the transect, the B-horizon was reached at the same point as areas where the A-horizon was deeper are associated with a build-up of sediment.

The soil profile of Transect 2 was largely consistent with some slight variations, mainly due to depth of deposit and vegetation. Pits 1 and 2 were located on the same elevation as the claypan to the

north of the pits; however as the surface was vegetated it held more moisture, resulting in the clay sediment displaying a moist plasticine texture as opposed to Pit 7, located on the clay pan, that was made up of dry clay that broke into smaller clay nodules when excavated. Calcrete nodules were located in Pits 5 and 7, located on the edge of the claypan and within the clay pan. Pits 3, 6, 8, and 9 were all located on vegetated rises and as such contained deeper profiles than the other pits in the transect. The A horizon largely consistent of an orange-brown sandy loam with no gravels, and the B-horizon consisted of a compact, dry orange brown silty clay with no gravels. Pit 5 was located on the intersection between a vegetated rise and the clay pan and sloped upwards towards the east.

Examples of common soil profiles across the transects are shown in Figure 8.5-1 and Figure 8.5-2. For detailed pit descriptions see Appendix 4 – Test Pit Descriptions.

Figure 8.5-1 Example soil profiles from Transect 1 (left: T1 Pit 3, right: T1 Pit 4)

Figure 8.5-2 Example soil profiles from Transect 2 (left: T2 Pit 5, right: T2 Pit 8)

8.5.4 Results

No archaeological material was located from subsurface testing. Testing across the clay pan exposure areas demonstrated shallow soils with no archaeological potential.

A number of surface artefacts and clay heat retainers associated with hearths were identified in the area during the archaeological test excavation.

While much of the area investigated displays extensive evidence of ground disturbance, the presence of cultural material on the surface suggests that intact archaeological deposits may still be present in the area, but these have been removed by reworking of the land and erosion. It is considered likely that any remaining subsurface cultural deposit would be in the more northerly portion of the PAD where there is depth of deposit and less modification of the ground surface.

The area of PAD associated with site TWF PAD12 has been reduced to reflect the results of the testing, see Figure 8.5-4. The original site boundary is retained to reflect the distribution of surface sites within the site.

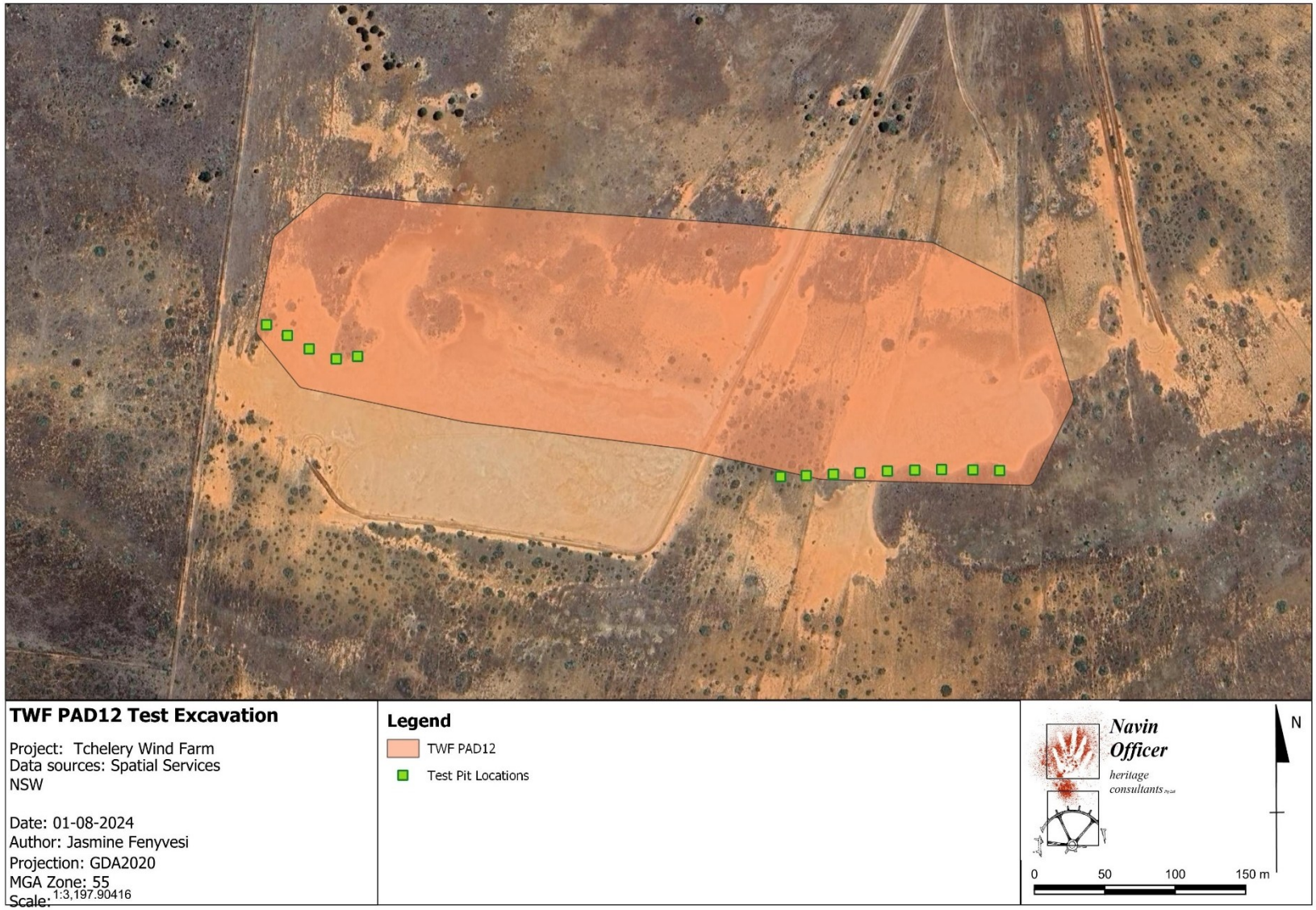

Figure 8.5-3 Test excavation layout at TWF PAD12

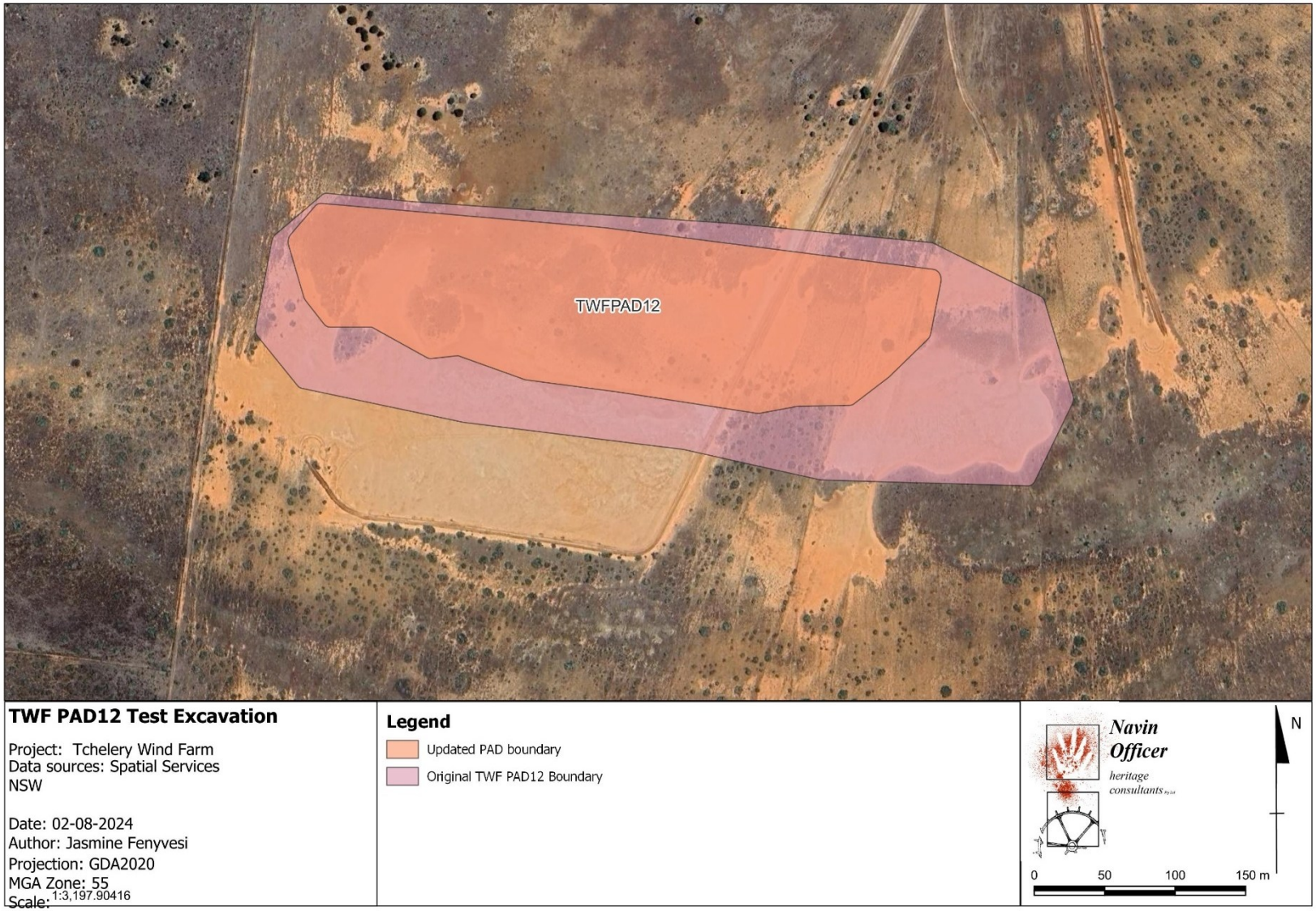

Figure 8.5-4 Updated PAD boundary following testing program

9 SIGNIFICANCE ASSESSMENT

9.1 Assessment criteria

The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance defines cultural significance as 'aesthetic, historic, scientific, social, or spiritual value for past, present, or future generations' (Australia ICOMOS, 2013a).

Assessing the Aboriginal cultural significance of a place involves identifying the range of values that are present and assessing them against relevant criteria, in order to define why a place is important and inform future planning and management. Table 9.1-1 provides definitions of these values and outlines the criteria for assessment.

Table 9.1-1 Criteria used to assess the cultural significance of a place

Definition of value	Assessment criteria (after OEH, 2011:10)
Historic value refers to the associations of a place with a historically important person, event, phase, or activity in an Aboriginal community (OEH, 2011:9).	Is the subject area important to the cultural or natural history of the local area and/or region and/or state?
Scientific (or archaeological) value refers to the information content of a place and its ability to reveal more about an aspect of the past through examination or investigation of the place, including the use of archaeological techniques (Australia ICOMOS, 2013b). Sites may meet this criterion because they: contain intact archaeological deposits, have potential to answer research questions on past human behaviour, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, are well preserved, or form part of a larger site complex or cultural landscape.	Does the subject area have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?
Aesthetic value refers to refers to the sensory and perceptual experience of a place—that is, how we respond to visual and non-visual aspects such as sounds, smells and other factors having a strong impact on human thoughts, feelings, and attitudes. Aesthetic qualities may include the concept of beauty and formal aesthetic ideals (Australia ICOMOS, 2013b:3).	Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?
Social (or cultural) value refers to the spiritual, traditional, historical, or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural value is how people express their connection with a place and the meaning that place has for them (OEH, 2011:8). Spiritual value is included in the definition of social value and refers to the intangible values and meanings embodied in or evoked by a place which give it importance in the spiritual identity, or the traditional knowledge, art, and practices of Aboriginal people (Australia ICOMOS, 2013b:4).	Does the subject area have a strong or special association with a particular community or cultural group for social, cultural, or spiritual reasons?

The *Aboriginal cultural heritage consultation requirements for proponents 2010* note that 'Aboriginal people are the primary determinants of the cultural significance of their heritage' (DECCW, 2010b:iii). The significance of a place can be the result of a number of factors including continuity of tradition, occupation, or action; historical association; custodianship or concern for the protection and maintenance of places; and the value of sites as tangible and meaningful links with the lifestyle and values of ancestors. Aboriginal cultural significance may or may not parallel the archaeological significance of a site.

In assessing the significance of a site, it is also important to take into consideration it's integrity i.e., it's wholeness or intactness. This includes considering the nature and history of negative impacts or positive management measures that a site has been subject to. In other words, while a site may have once been assessed as significant its significance may have reduced if the site has been subject to irreparable damage and loss of attributes.

The following assessment of significance is made with reference to the criteria outlined above.

9.2 Cultural heritage values identified

9.2.1 Historic value

No information has been provided by Aboriginal stakeholders to suggest the project site is historically important in terms of persons, events, phases or activities in the Aboriginal community. This is not to say that the project site does not have such significance, simply that no evidence has been forthcoming. If evidence of historically significant information relevant to the project site becomes available, it would be discussed with relevant Aboriginal stakeholders.

9.2.2 Scientific (archaeological) value

Archaeological sites recorded during the archaeological survey have been placed into the following assessment categories:

- low scientific significance
- moderate (local) scientific significance
- moderate to high (local) scientific significance.

No sites have been assessed to have national scientific significance.

Low scientific significance has been attributed to all surface sites that have been identified as either highly disturbed (relative to the surrounding landscape) or, have been assessed as having low or low to moderate subsurface archaeological potential (Table 9.2-1). These sites have low numbers of artefacts and little potential to provide data that would substantially add to our understanding of Aboriginal occupation and land use in the local area, beyond the information they have already provided through being discovered and recorded during this study.

Moderate (local) scientific significance has been attributed to all surface sites that are associated with areas of moderate-to-high or high potential for subsurface archaeological deposits (Table 9.2-1) and rarer site types. Any subsurface deposits at these sites are predicted to contain a higher number of artefacts compared to the other sites in the project site and, therefore, have potential to provide a large enough sample to enable analyses of assemblage compositions that could be used to derive statements on the technological systems being employed by Aboriginal groups living in this region.

Moderate to high (local) scientific significance has been attributed to sites that are associated with areas of moderate-to-high or high potential for subsurface archaeological deposits (Table 9.2-1) and have include range of site features such as hearths, scarred trees, and artefacts in the one site area in significant numbers. The subsurface deposits at these sites are predicted to contain a higher number of artefacts compared to the other sites in the project site and, therefore, have potential to provide a large enough sample to enable analyses of assemblage compositions that could be used to derive statements on the technological systems being employed by Aboriginal groups living in this region.

Table 9.2-1 Scientific significance of sites recorded

Site number	Summary description	Characteristics relevant to significance assessment	Significance
TWF Site02	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site05	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site06	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low

Site number	Summary description	Characteristics relevant to significance assessment	Significance
TWF Site07	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site08	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site09	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site10	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site11	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site12	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site13	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site14	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site15	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site16	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site17	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site18	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site19	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site20	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site22	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site25	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site26	Artefact scatter (3)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site27	Artefact scatter (4)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site28	Artefact Scatter (5)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site29	Artefact Scatter (5)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site33	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site34	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site35	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site36	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site37	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site38	Artefact Scatter (6)	Low artefact numbers and no assessed archaeological potential	Low

Site number	Summary description	Characteristics relevant to significance assessment	Significance
TWF Site39	Artefact Scatter (9)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site40	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site41	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site42	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site46	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site47	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site48	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site49	Artefact scatter (3)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site50	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site51	Artefact scatter (5)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site52	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site53	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site55	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site56	Artefact scatter (2)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site57	Artefact Scatter (9)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site58	Artefact scatter (3)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site59	Isolated Find	Low artefact numbers and no assessed archaeological potential	Low
TWF Site61	Artefact Scatter (6)	Low artefact numbers and no assessed archaeological potential	Low
TWF Site01	Hearth	Hearth	Moderate
TWF Site03	Artefact Scatter (3), Hearth	Artefacts, and hearth	Moderate
TWF Site04	Artefact Scatter (8), Hearth	Artefacts, and hearth	Moderate
TWF Site21	Artefact Scatter (12)	Moderately high artefact numbers	Moderate
TWF Site23	Artefact Scatter (10)	Moderately high artefact numbers	Moderate
TWF Site24	Artefact Scatter (2), Hearth	Artefacts, and hearth	Moderate
TWF Site30	Isolated find, Hearth	Artefacts, and hearth	Moderate
TWF Site31	Hearth	Hearth	Moderate
TWF Site32	Artefact Scatter (11)	Moderately high artefact numbers	Moderate
TWF Site54	Artefact Scatter (10), Hearth	Moderately high artefact numbers	Moderate

Site number	Summary description	Characteristics relevant to significance assessment	Significance
TWF Site60	Isolated find, Hearth	Artefact, and hearth	Moderate
TWFPAD01	Artefact Scatter (5), PAD	Surface artefacts and associated PAD	Moderate
TWFPAD02	Artefact Scatter (39), Hearth (3), PAD	Moderately high artefact numbers, multiple hearths, and associated PAD	Moderate
TWFPAD03	Artefact Scatter (20), Hearth (2), PAD	Moderately high artefact numbers, multiple hearths, and associated PAD	Moderate
TWFPAD04	Artefact Scatter (14), PAD	Moderately high artefact numbers and associated PAD	Moderate
TWFPAD05	Artefact Scatter (17), PAD	Moderately high artefact numbers and associated PAD	Moderate
TWFPAD06	Artefact Scatter (17), Hearth (4), PAD	Moderately high artefact numbers, multiple hearths, and associated PAD	Moderate
TWFPAD07	Artefact Scatter (6), Hearth (2), PAD	Surface artefacts, multiple hearths, and associated PAD	Moderate
TWFPAD08	Isolated find, Hearth (3), PAD	Surface artefact, multiple hearths, and associated PAD	Moderate
TWFPAD09	Isolated find, Hearth (2), PAD	Surface artefact, multiple hearths, and associated PAD	Moderate
TWFPAD10	Artefact Scatter (14), PAD	Moderately high artefact numbers and associated PAD	Moderate
TWFPAD12	Artefact Scatter (11), Hearth (2), PAD	Moderately high artefact numbers, hearths, and associated PAD	Moderate
TWFPAD11	PAD with hearths (25+) and surface artefacts (8)	High number of hearths, a range of site features and associated PAD	moderate to high

9.2.3 Aesthetic value

As noted in the OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in New South Wales* (OEH, 2011), aesthetic value is often closely associated with social values. Culturally significant places outside the project site, such as Lake Victoria (385 kilometres east of the project site), are of high aesthetic value to the local Aboriginal community and expectations are that any development in the area would be sympathetic to such vistas.

To date, RAPs have not identified any cultural landscape values/aesthetic values in the project area.

9.2.4 Social (or cultural) value

Aboriginal people alone can determine the Aboriginal cultural significance of a place. The following is the result of the ongoing consultation that has occurred as part of this assessment.

All archaeological objects and sites have cultural value for present-day Aboriginal people, as they were created by ancestral Aboriginal people and provide tangible evidence of past occupation of the landscape. All sites have cultural significance to present-day Aboriginal groups as manifestations of their ancestors past occupation of the landscape.

Some objects and places might have cultural value that were not communicated to NOHC. This could be the case for objects or places that are associated with information that is culturally restricted.

10 THE PROJECT

10.1 Potential impact types

A number of archaeological sites identified have the potential to be harmed by the project. The nature of potential impacts to all archaeological sites is detailed in Section 11.

The key components of the project are described in Section 1.1 The described project components may impact heritage in the following ways:

- total direct harm or disturbance to all surface and/or subsurface features at an item. This would generally result a total loss of heritage value at a site. An example of a direct impact for the project is the installation of WTGs or excavation of the underground power line

- partial direct harm or disturbance, where direct impacts would occur to only some of the surface and/or subsurface features at an item. Partial direct harm generally results in partial loss of value at a site. An example of a partial direct harm would be where part of a site is impacted due to the installation of an access track or power line infrastructure

- potential indirect harm or disturbance (total or partial), where direct impacts are occurring adjacent to sites, or where vegetation clearance/maintenance requires the use of heavy machinery to be active near sites. Such impacts would likely be inadvertent.

For the purposes of this assessment the following impacts are presumed.

- The following activities are expected to have direct impacts in the construction footprint:
    - excavation and boring as part of WTG structure installation
    - excavation and boring as part of underground power line installation
    - excavation as part of overhead power line installation
    - surface impacts from tower pads and laydown areas
    - surface impacts associated with brake and winch equipment for line stringing
    - proposed substation construction
    - construction compounds and workforce accommodation camps
    - new access track constructions
    - surface impacts associated access track construction/upgrade.
- Indirect impacts could come from the following activities:
    - vegetation clearance
    - disturbance from surface water drainage
    - workers driving over sites without authorisation.

These direct and indirect components may cause the following impacts to archaeological sites:

- **disturbance and damage to archaeological material through excavations** - excavations result in the movement and mixing of artefacts and archaeological deposits, and damage to artefacts through breakage. The impact of excavation is experienced by artefacts on the ground surface and in subsurface deposits throughout the depth of the excavation

- **disturbance and damage to archaeological material through vehicle movements** – the movement of vehicles across archaeological sites results in the movement and mixing of artefacts, and damage to artefacts through breakage – severe damage can destroy artefacts, in that it makes them unidentifiable and therefore archaeologically undetectable. This impact can be experienced by artefacts on the surface, and by subsurface artefacts if vehicle movement scuffs up subsurface deposits sufficiently to uncover buried artefacts

- **erosion of sediments from areas of disturbed ground** – the project involves activities that would degrade or remove groundcover vegetation, and that would break up areas of ground and consequently make sediments more friable. These processes make areas of ground more prone to erosion. Vulnerability to erosion is heightened on sloped areas where surface water runoff occurs during rainfall. Erosion impacts archaeological sites by stripping away sediments that hold artefacts, consequently removing the potentially informative context of these artefacts; and by moving the artefacts themselves, that can result in artefacts from separate archaeological contexts being mixed together, and can also result in damage to artefacts as they collide with rocks and other objects (Wildesen, 1982). As a process impacting sites, accelerated erosion could occur during the construction phase and could also occur as an ongoing impact after the construction works have finished. Disturbed ground takes time to recover and revegetate, during that time it is prone to erosion.

11 AVOIDING AND MINIMISING HARM

11.1 Aboriginal heritage impact assessment

The project has aimed to avoid all heritage items as a first principle, where this is not possible, design has prioritised the avoidance/minimisation of impacts and harm at locations of moderate and above scientific significance, as well as moderate and high archaeological potential. Initial survey of the property investigated a potential 120 WTG locations, as to provide options for harm minimisation by understanding the risks associated with each WTG location. Over the course of the assessment process this number has been reduced and refined to avoid areas of archaeological and ecological significance. The number of WTGs to be constructed is up to 74.

The placement of some facilities associated with the WTGs has also been modified to reduce impacts to Aboriginal sites, and areas of higher archaeological sensitivity. Initial design for the project had a workforce accommodation camp, batching plant, laydown areas, substation and site compound in areas of high archaeological sensitivity that contained PADs and surface sites. These have been moved to avoid impact to PADs, with preference for areas of low and moderate sensitivity. One site (TWF Site49) is anticipated to impacted by the construction of a workforce accommodation camp.

All areas of PAD have been avoided by the project, as well as all sites of high and moderate-to-high significance. Of the 28 sites of moderate significance, one would be subject to direct impact and one would be subject to partial direct impacts, three may be subject to potential indirect impact if not properly mitigated, and 23 would be avoided by the project. Of the 54 sites of low archaeological significance, 12 would be subject to direct impact and two would be subject to partial direct impacts, four may be subject to potential indirect impact if not properly mitigated, and 36 would be avoided by the project. This totals 16 sites to be directly or partially impacted by the project, and seven sites in proximity to the project with potential to be impacted if not properly managed.

Of the 89 Aboriginal sites (previously and newly identified), and PADs within the project site, 65 would not be impacted at all by the project. Seven sites are at risk of indirect harm if not properly managed as they are within 20 metres of works areas. Following the management recommendations as outlined in Section 11.2, a total of 73 sites would be avoided by the project.

The number of sites affected, based on the above type of impact, are shown in Figure 11.1-1 to Figure 11.1-7 and summarised in Table 11.1-1. This table includes all sites including previously recorded sites and new sites within the project site.

Indirect impacts, depending on the site type, site context, and its archaeological and cultural significance, may not result in a loss of heritage value. Indirect impacts may occur to areas beyond the indicative disturbance area, however, the impact would be dependent on several factors, including spatial extent of the site, depth of deposits, and the works being conducted adjacent to these areas. Construction planning and management for the project would eliminate or reduce the potential indirect impacts that could potentially result in a loss of heritage values due to physical disturbance (including physical disturbance from surface water drainage or other mechanism).

Figure 11.1-1 Proposed project impacts

Figure 11.1-2 Detailed proposed project impacts – north, east of Maude Road

Figure 11.1-3 Detailed proposed project impacts – central east

Figure 11.1-4 Detailed proposed project impacts – northeast corner

Figure 11.1-5 Detailed proposed project impacts – central

Figure 11.1-6 Detailed proposed project impacts – Forest Creek

Figure 11.1-7 Detailed proposed project impacts –southwest

Table 11.1-1 Summary of impacts to Aboriginal sites

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWF Site01	Hearth	Moderate	All sites have cultural value	Over 2,400 m from works areas	No impact	No loss
TWF Site02	Artefact scatter	Low	All sites have cultural value	Over 7,400 m from works areas	No impact	No loss
TWF Site03	Hearth with artefacts	Moderate	All sites have cultural value	Over 7,400 m from works areas	No impact	No loss
TWF Site04	Hearth with artefacts	Moderate	All sites have cultural value	Over 45 m from works areas	No impact	No loss
TWF Site05	Artefact scatter	Low	All sites have cultural value	Over 500 m from works areas	No impact	No loss
TWF Site06	Isolated artefact	Low	All sites have cultural value	20 m from works areas	Potential indirect	Total loss if not mitigated appropriately
TWF Site07	Artefact scatter	Low	All sites have cultural value	Over 120 m from works areas	No impact	No loss
TWF Site08	Isolated artefact	Low	All sites have cultural value	Within access track adjacent to Wind Turbine 5	Direct	Total loss
TWF Site09	Isolated artefact	Low	All sites have cultural value	Over 600 m from works areas	No impact	No loss
TWF Site10	Isolated artefact	Low	All sites have cultural value	Over 3,700 m from works areas	No impact	No loss
TWF Site11	Isolated artefact	Low	All sites have cultural value	Over 2,200 m from works areas	No impact	No loss
TWF Site12	Isolated artefact	Low	All sites have cultural value	Over 1,300 m from works areas	No impact	No loss
TWF Site13	Isolated artefact	Low	All sites have cultural value	Over 1,300 m from works areas	No impact	No loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWF Site14	Isolated artefact	Low	All sites have cultural value	Over 1,300 m from works areas	No impact	No loss
TWF Site15	Isolated artefact	Low	All sites have cultural value	Over 1,300 m from works areas	No impact	No loss
TWF Site16	Isolated artefact	Low	All sites have cultural value	Over 340 m from works areas	No impact	No loss
TWF Site17	Isolated artefact	Low	All sites have cultural value	Over 8,000 m from works areas	No impact	No loss
TWF Site18	Isolated artefact	Low	All sites have cultural value	Over 8,500 m from works areas	No impact	No loss
TWF Site19	Isolated artefact	Low	All sites have cultural value	Within works area for Wind Turbine 57	Direct	Total loss
TWF Site20	Artefact scatter	Low	All sites have cultural value	Over 9,700 m from works areas	No impact	No loss
TWF Site21	Artefact scatter	Moderate	All sites have cultural value	Over 1,200 m from works areas	No impact	No loss
TWF Site22	Artefact scatter	Low	All sites have cultural value	Over 2,000 m from works areas	No impact	No loss
TWF Site23	Artefact scatter	Moderate	All sites have cultural value	Over 3,700 m from works areas	No impact	No loss
TWF Site24	Hearth with artefacts	Moderate	All sites have cultural value	Over 3,200 m from works areas	No impact	No loss
TWF Site25	Artefact scatter	Low	All sites have cultural value	Over 3,400 m from works areas	No impact	No loss
TWF Site26	Artefact scatter	Low	All sites have cultural value	Over 1,500 m from works areas	No impact	No loss
TWF Site27	Artefact scatter	Low	All sites have cultural value	Over 1,400 m from works areas	No impact	No loss
TWF Site28	Artefact scatter	Low	All sites have cultural value	Over 6,900 m from works areas	No impact	No loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWF Site29	Artefact scatter	Low	All sites have cultural value	Over 600 m from works areas	No impact	No loss
TWF Site30	Hearth with artefact	Moderate	All sites have cultural value	Over 1,300 m from works areas	No impact	No loss
TWF Site31	Hearth	Moderate	All sites have cultural value	3 m from underground power line works area and access road to Wind Turbine 52	Potential indirect	Total loss if not mitigated appropriately
TWF Site32	Artefact scatter	Moderate	All sites have cultural value	Over 40 m from works areas	No impact	No loss
TWF Site33	Isolated artefact	Low	All sites have cultural value	Within works area for underground power line works area and access road to Wind Turbine 33	Direct	Total loss
TWF Site34	Isolated artefact	Low	All sites have cultural value	Within works area for underground power line works area and access road to Wind Turbine 33	Direct	Total loss
TWF Site35	Isolated artefact	Low	All sites have cultural value	Within works area for Wind Turbine 5	Direct	Total loss
TWF Site36	Isolated artefact	Low	All sites have cultural value	Within access track works area adjacent to Wind Turbine 1	Direct	Total loss
TWF Site37	Isolated artefact	Low	All sites have cultural value	Within works area for Wind Turbine 2	Direct	Total loss
TWF Site38	Artefact scatter	Low	All sites have cultural value	Over 200 m from works areas	No impact	No loss
TWF Site39	Artefact scatter	Low	All sites have cultural value	Over 200 m from works areas	No impact	No loss
TWF Site40	Artefact scatter	Low	All sites have cultural value	Over 800 m from works areas	No impact	No loss
TWF Site41	Isolated artefact	Low	All sites have cultural value	Over 1,000 m from works areas	No impact	No loss
TWF Site42	Isolated artefact	Low	All sites have cultural value	Over 1,200 m from works areas	No impact	No loss
TWF Site43	Hearth with artefacts	Moderate	All sites have cultural value	Within Wind Turbine 19 works area	Direct	Total loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWF Site44	Hearth	Moderate	All sites have cultural value	Over 75 m from works areas	No impact	No loss
TWF Site45	Hearths	Moderate	All sites have cultural value	4 m from works areas	Potential indirect	Total loss if not mitigated appropriately
TWF Site46	Isolated artefact	Low	All sites have cultural value	6 m from works areas	Potential indirect	Total loss if not mitigated appropriately
TWF Site47	Isolated artefact	Low	All sites have cultural value	Over 40 m from works areas	No impact	No loss
TWF Site48	Artefact scatter	Low	All sites have cultural value	Over 45 m from works areas	No impact	No loss
TWF Site49	Artefact scatter	Low	All sites have cultural value	Within works area for Workforce Accommodation Camp	Direct	Total loss
TWF Site50	Isolated artefact	Low	All sites have cultural value	Over 50 m from works areas	No impact	No loss
TWF Site51	Artefact scatter	Low	All sites have cultural value	Over 30 m from works areas	No impact	No loss
TWF Site52	Artefact scatter	Low	All sites have cultural value	Within works area adjacent to underground power line	Direct	Total loss
TWF Site53	Isolated artefact	Low	All sites have cultural value	12 m from works areas	Potential indirect	Total loss if not mitigated appropriately
TWF Site54	Hearth with artefacts	Moderate	All sites have cultural value	Within works area adjacent to overhead power line	Partial direct	Partial loss
TWF Site55	Artefact scatter	Low	All sites have cultural value	Within works area adjacent to overhead power line	Partial direct	Partial loss
TWF Site56	Artefact scatter	Low	All sites have cultural value	Within intersection widening works area	Direct	Total loss
TWF Site57	Artefact scatter	Low	All sites have cultural value	Within intersection widening works area	Direct	Partial loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWF Site58	Artefact scatter	Low	All sites have cultural value	Within intersection widening works area	Direct	Partial loss
TWF Site59	Isolated artefact	Low	All sites have cultural value	8 m from works areas	Potential indirect	No loss
TWF Site60	Hearth with isolated artefact	Moderate	All sites have cultural value	Within 1 m of works areas for overhead power line	Potential indirect	Total loss if not mitigated appropriately
TWF Site61	Artefact scatter	Low	All sites have cultural value	Within works area for overhead power line	Partial direct	Partial loss
TWFPAD01	PAD with surface artefacts	Moderate	All sites have cultural value	Over 6,500 m from works areas	No impact	No loss
TWFPAD02	PAD with hearths and surface artefacts	Moderate	All sites have cultural value	Over 5,500 m from works areas	No impact	No loss
TWFPAD03	PAD with hearths and surface artefacts	Moderate	All sites have cultural value	Over 450 m from works areas	No impact	No loss
TWFPAD04	PAD with surface artefacts	Moderate	All sites have cultural value	Over 1,000 m from works areas	No impact	No loss
TWFPAD05	PAD with surface artefacts	Moderate	All sites have cultural value	Over 20 m from works areas	No impact	No loss
TWFPAD06	PAD with hearths and surface artefacts	Moderate	All sites have cultural value	Over 2,500 m from works areas	No impact	No loss
TWFPAD07	PAD with hearths and surface artefacts	Moderate	All sites have cultural value	Over 2,000 m from works areas	No impact	No loss
TWFPAD08	PAD with hearths and surface artefact	Moderate	All sites have cultural value	Over 25 m from works areas	No impact	No loss
TWFPAD09	PAD with hearths and surface artefact	Moderate	All sites have cultural value	Over 80 m from works areas	No impact	No loss
TWFPAD10	PAD with surface artefacts	Moderate	All sites have cultural value	Over 1,000 m from works areas	No impact	No loss
TWFPAD11	PAD with hearths and surface artefacts	Moderate to high	All sites have cultural value	Over 850 m from works areas	No impact	No loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
TWFPAD12	PAD with hearths and surface artefacts	Moderate	All sites have cultural value	Over 50 m from works areas	No impact	No loss
Tchelery Station Moulamein	Earth mound, shell, artefacts, charcoal	High	All sites have cultural value	Over 5,000 m from works areas	No impact	No loss
Tchelery Mound 1-3	Earth mound, hearths	High	All sites have cultural value	Over 7,000 m from works areas	No impact	No loss
Tchelery Mounds 1-3	Burials	High	All sites have cultural value	Over 7,000 m from works areas	No impact	No loss
Tchelery/Abercrombie Creek	Burials, artefacts, hearths, burnt animal bone	High	All sites have cultural value	Over 4,000 m from works areas	No impact	No loss
Tchelery #4	Burials, artefacts	High	All sites have cultural value	Over 5,500 m from works areas	No impact	No loss
Tchelery Mound 1 Complex	Aboriginal resource and gathering (swamp), earth mound	High	All sites have cultural value	Over 7,000 m from works areas	No impact	No loss
PEC-E-G1	Artefact	Low	All sites have cultural value	Over 450 m from works areas	No impact	No loss
PEC-E-07	Artefact	Low	All sites have cultural value	Over 350 m from works areas	No impact	No loss
PEC-E-08	Artefact	Low	All sites have cultural value	Over 450 m from works areas	No impact	No loss
PEC-E-09	Artefact	Low	All sites have cultural value	Over 600 m from works areas	No impact	No loss
PEC-E-10	Artefact, Hearth	Moderate	All sites have cultural value	Over 600 m from works areas	No impact	No loss
PEC-E-11	Artefact	Low	All sites have cultural value	Over 450 m from works areas	No impact	No loss
PEC-E-12	Artefact	Low	All sites have cultural value	Over 400 m from works areas	No impact	No loss
PEC-E-13	Artefact, Hearth	Moderate	All sites have cultural value	Over 450 m from works areas	No impact	No loss

Site name	Feature(s)	Scientific significance	Cultural significance	Impact zone	Impact type	Potential loss of significance
PEC-E-14	Artefact, Hearth	Moderate	All sites have cultural value	Over 450 m from works areas	No impact	No loss
PEC-E-15	Artefact	Low	All sites have cultural value	Over 500 m from works areas	No impact	No loss

11.2 Consideration of the principles of ecological sustainable development

According to the Operational Policy: Protecting Aboriginal Cultural Heritage, an objective of the NPW Act is to conserve places, objects and features of significance to Aboriginal people (s.2A(1)(b)(i)). This is to be achieved by applying the principles of ecologically sustainable development (ESD) (s.2A(2)). An ESD (defined in Section 6 of the *Protection of the Environment Administration Act 1991* [NSW]) requires the integration of economic and environmental considerations (including cultural heritage) in the decision-making process. With regard to heritage, ESD can be achieved by applying the principle of intergenerational equity and the precautionary principle.

11.2.1 Intergenerational equity

Intergenerational equity is the principle whereby the present generation should ensure the health, diversity and productivity of the environment for the benefit of future generations. The precautionary principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In applying the precautionary principle, decisions should be guided by:

- a careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
- an assessment of the risk-weighted consequences of various options.

Intergenerational equity is being considered through the avoidance of impact to archaeological sites where practicable, and through the salvaging of archaeological sites where impacts cannot be avoided. Measures taken to avoid impact to sites (including planning the location of work to physically avoid sites, and the use of protective barriers such as site fencing) ensures that these sites remain in their current condition and are available for future generations. The initial design and construction planning process has sought to minimise potential impacts to sites and features of Aboriginal heritage significance.

Where impacts are unavoidable for Aboriginal sites, salvage of the archaeological material through surface collection, and/or sampling in the case of hearths, would identify, recover and analyse Aboriginal objects that would potentially be subject to harm. To ensure that the objects themselves would be available for future generations to potentially access they would be subject to continuing consultation with the appropriate RAPs regarding their long-term storage and keeping.

11.2.2 Precautionary principle

The precautionary principle is relevant to the Heritage NSW consideration of potential impacts to Aboriginal cultural heritage where:

- the project involves a risk of serious or irreversible damage to Aboriginal objects or places or to the value of those objects or places
- there is uncertainty about the Aboriginal cultural heritage values or scientific or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted.

Where this is the case, a precautionary approach should be taken, and all cost-effective measures should be implemented to prevent or reduce damage to the objects/place.

The archaeological survey and subsurface test excavations, engagement with the RAPs and preparation of a thorough ACHAR has vastly improved the knowledge on the cultural heritage of the project area. This has allowed design and construction measures to be prepared with this knowledge.

Where impacts cannot be avoided, the proposed salvage of surface artefacts and subsurface deposits represents a precautionary measure against the harm to archaeological material at these locations. The recorded finds from these actions would inform an understanding of past human

behaviour and the subsequent written record created through the reporting process would create new knowledge. The knowledge generated through the reporting process acts as a measure to mitigate harm.

11.2.3 Cumulative Impacts

Substantial investigation has occurred in the area including numerous archaeological surveys and a program of archaeological test excavation. This has provided a clear understanding of the cultural values and scientific vales of the project site. A region wide cultural values assessment has not been undertaken for the Edward River Council area and so a fully informed comparison of this region cannot yet be made.

Impact to sites was anticipated during the planning stages of the project and wherever possible avoidance of archaeological sites has been built into the design. Current impacts are ongoing and include continued sheep grazing, surface erosion, weed coverage and vehicle use. It is likely that the continued sheep grazing, erosion, disturbance by weeds and vehicle damage over time would have a similar attrition and disturbance rate to the archaeological resource at the project site compared to the proposed impacts from the project.

Assessing cumulative impacts involves the consideration of the proposed impact in the context of existing developments and past destruction of heritage sites, as well as the population of heritage sites that still exist in the region of interest (Godwin, 2011). The assessment of cumulative impacts considers projects that are currently under development, or at the planning state that may also influence the assessment of this project's potential impacts. The concept of assessing cumulative impacts aims to avoid discussing the impact of a development in isolation and aims to assess the impact in terms of the overall past and future degradation of a region's heritage resource.

A number of proposed developments have been identified within 50 kilometres of the project.

- EnergyConnect (NSW – Eastern Section), that traverses the project (approved)
- Baldon Wind Farm, directly west of the project (EIS submitted)
- Keri Keri Wind Farm, 7.5 kilometres west of the project (EIS submitted)
- Romani Solar Farm, 25 kilometres east of the project
- Abercrombie Wind Farm, 25 kilometres north of the project
- Wilan Wind Farm, 35 kilometres northwest of the project
- Junction River Wind Farm (formerly Burrawong Wind Farm), 40 kilometres west of the project (EIS submitted)
- West Nyangay Solar Farm, 40 kilometres east of the project
- Victoria to NSW Interconnector West, 45 kilometres southeast of the project
- Booroorban (Saltbush) Wind Farm, 50 kilometres east of the project.

11.2.3.1 EnergyConnect (NSW – Eastern Section)

EnergyConnect (NSW – Eastern Section) comprises the following development:

- around 375 kilometres of new 330 kilovolt (kV) double circuit power line and associated infrastructure between the Buronga substation and the new Dinawan 330 kV substation
- 162 kilometres of new 500 kV double circuit power line and associated infrastructure between the new Dinawan 330 kV substation and the existing Wagga Wagga substation

- upgrade and expansion of the Wagga Wagga substation to accommodate the new power line connections
- provision of three optical repeater structures and associated connections to existing local electrical supplies
- new and/or upgrade of access tracks as required,
- and associated ancillary works required to facilitate the construction.

EnergyConnect (NSW – Eastern Section) was approved in September 2021. Construction commenced in late-2022 and is expected to continue into 2026.

A total of 105 previously unidentified and unrecorded Aboriginal sites, as well as 45 PADs, were identified during the archaeological field survey completed for the EIS (NOHC, 2022), 11 previously recorded sites were also located within the heritage survey area. Of these, 92 sites and PADs have potential to be impacted by EnergyConnect (NSW – Eastern Section). Nine sites located within the current project site were identified as part of works for EnergyConnect (NSW – Eastern Section) project. Six of these sites are considered to be of low significance, and three are considered to be of moderate significance. Of these nine sites, two are subject to direct impacts, and seven to potential direct impact by EnergyConnect (NSW – Eastern Section).

11.2.3.2 Baldon Wind Farm

The Baldon Wind Farm would consist of up to approximately 180 WTGs, a BESS, and associated infrastructure to provide power to the NEM.

The Baldon Wind Farm has not yet been approved. Construction of the project is scheduled to commence in late-2025. Operation is planned to commence in mid-2029 and is projected to be operational for 30 years.

Two hundred and six newly recorded sites, including areas of PADs, as well as ten previously recorded sites were identified during the assessment completed for the EIS (NGH 2024a). A total of 77 newly recorded sites may be impacted by the development, while a further 21 sites currently have undetermined impacts due to unknown management associated with overhead stringing of power lines. All ten previously recorded AHIMS sites and 108 newly recorded sites, within the broader Baldon Wind Farm project area, would be avoided by the development activity.

11.2.3.3 Keri Keri Wind Farm

The Keri Keri Wind Farm would consist of up to approximately 155 WTGs, a BESS, and associated infrastructure to provide power to the NEM.

The Keri Keri Wind Farm has not yet been approved. Construction of the project is scheduled to commence in late-2027. Operation is planned to commence in mid-2029 and is projected to be operational for 30 years.

Two hundred and nine newly recorded sites, including 34 areas of PADs were identified during the assessment completed for the EIS (ERM, 2024). A total of nine newly recorded sites may be directly impacted by the development, with a further 74 sites assessed as having potential to impacted if not mitigated from harm. It has been recommended that an Aboriginal Cultural Heritage Management Plan be developed to manage and mitigate harm for the Aboriginal cultural heritage within the Keri Keri Wind Farm project area.

11.2.3.4 Junction River Wind Farm

The Junction River Wind Farm would consist of up to approximately 96 WTGs, up to four BESSs, and associated infrastructure to provide power to the NEM.

The Junction River Wind Farm has not yet been approved. Construction of the project is scheduled to commence in 2025. Operation is planned to commence in 2029 and is projected to be operational for 35 years.

Eighty newly recorded sites, as well as 15 previously recorded sites, were identified during the assessment completed for the EIS (NGH, 2024b). A total of 45 newly recorded sites may be directly impacted by the development. None of the previously recorded sites would be impacted. Significant design changes occurred throughout the development for this wind farm to ensure the design and micro-siting of the infrastructure components, where possible, has avoided recorded Aboriginal sites through the development of heritage exclusion zones.

11.2.3.5 Summary

The designs of many of the wind farm projects above have been modified to minimise impacts to Aboriginal sites, with all retaining approximately 53 to 60 per cent of all recorded Aboriginal sites. Of the 61 previously recorded sites located by the AHIMS search outside of the current project site, none are to be directly impacted by any of the above projects. One of the 61 sites has potential to be impacted by works for the Keri Keri Wind Farm if not mitigated through the proposed Aboriginal Cultural Heritage Management Plan.

The continued development of the Riverina region has the potential to result in cumulative impacts to Aboriginal cultural and archaeological values, most significantly when impacts overlap with impacts from other projects. During this assessment a number of adjacent projects have been identified that would compound effects to heritage in the region. In relation to the project site, an additional two sites would be subject to direct impact and seven to potential direct impact by EnergyConnect (NSW – Eastern Section) on top of the sites to be impacted by the project. This would result in 18 to 25 sites within the project site being impacted. This is not considered to significantly increase the cumulative impacts to heritage within the project site.

The areas to be impacted by the project have not historically been subject to high levels of impact from residential, commercial, or government development. The lateral nature of the project, as well as the large spans between WTG locations (around 700- 2000 metres) would result in impacts being spread across landforms. Impacts to sites have been largely avoided where practicable, resulting in many sites being preserved within the project site, with a higher retention rate noted for the project than adjacent wind farms (86 per cent versus 53 to 60 per cent). Wherever direct impacts do occur in the project site, there are likely to be numerous similar landforms within the surrounding landscape that would be retained and preserved. Therefore, the cumulative impacts from the project on the Aboriginal heritage of the region are assessed as low.

12 RECOMMENDATIONS

There are several recommendations based on the results of this Aboriginal Cultural Heritage Assessment Report:

1. all portions of artefact scatters and isolated finds that are to be directly impacted require surface collection and salvage prior to construction commencement in those areas

2. hearths that are to be directly impacted would be subject to photographic recording and sampling of hearth material prior to disturbance

3. no areas of PAD would be impacted by the project

4. retrieved archaeological materials would be stored in appropriate, secure facilities confirmed in consultation with the relevant Aboriginal stakeholders. The strategy for the long-term conservation of salvaged or collected Aboriginal objects would be determined in consultation with the RAPs

5. construction planning and management would make sure that indirect impacts that could potentially result in a loss of known heritage values due to harm would not occur

6. Aboriginal heritage exclusion zones would be established to protect sites, including known features/items of significance that have been identified to remain *in situ* throughout construction

7. Aboriginal heritage exclusion zones would be demarcated by a suitably qualified archaeologist in consultation with the RAPs prior to the commencement of construction at each location. Suitable controls include temporary site fencing and, where required, sediment control. Fencing would consist of high visibility construction style machine proof fencing that is not able to be removed or altered during all works. Signage would be included to indicate no-go areas

8. Aboriginal cultural heritage awareness training would be carried out for all personnel working on the project prior to the personnel participating in construction activities. The training would cover features of heritage significance within and adjacent to project locations and project protocols that must be complied with to minimise and manage potential impacts to those features

9. if at any time during construction, any items of potential Aboriginal archaeological or cultural heritage significance outside previously recorded sites or PAD, or human remains are discovered, they would be managed in accordance with the Aboriginal Heritage Unexpected Finds Protocol in Appendix 4.

13 REFERENCES

Allen, H. 1972. Where the Crow Flies Backwards: Man and Land in the Darling Basin. The Australian National University, Canberra.

Australia ICOMOS 2013a. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013. Burwood, Victoria.

Australia ICOMOS, 2013b. Burra Charter Practice Note - Understanding and assessing cultural significance.

Balme, J. and Beck, W. 1996. Earth mounds in southeastern Australia. Australian Archaeology 42, 39-51.

Batten, G. 1975. Aboriginal mounds. Agricultural Gazette of NSW 86, 5l.

Bonhomme, T. 1990. Report on Burials and Sandmining in the Riverine Plain. New South Wales National Parks and Wildlife Service, Sydney.

Brockwell, S. 2006. Earth mounds in Northern Australia: a review. Australian Archaeology 63, 47-56.

Bronk Ramsey, C. 2021. OxCal v4. 4.4. Available at: https://c14 arch.ox.ac.uk/oxcal.html.

Brown, P. 1989. Coobool Creek. Terra Australis No. 13.

Clark, P. and Hope, J. 1985 Aboriginal Burials and Shell Middens at Snaggy Bend and Other Sites on the Central Murray River. Australian Archaeology, 20(1), 68–89.

Department of Environment, Climate Change and Water (DECCW) 2010a. Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW. NSW Government, Sydney.

Department of Environment, Climate Change and Water (DECCW) 2010b. Aboriginal Cultural Heritage Consultation Requirements for Proponents. NSW Government, Sydney.

Eardley, K.A. 1999. A Foundation for Conservation in the Riverina Bioregion. Unpublished Report. NSW National Parks and Wildlife Service, Hurstville.

Environmental Resources Management (ERM) 2024 Keri Keri Wind Farm Environmental Impact Statement. Report to Acciona Energy Australia Global Pty Ltd.

Fanning, P.C., Holdaway, S.J., Rhodes, E.J. and Bryant, T.G. 2009. The surface archaeological record in arid Australia: Geomorphic controls on preservation, exposure, and visibility. Geoarchaeology 24,121-146.

Giles, E. 1974. Cranial variation in Australia and neighbouring areas. In: RL Kirk and AG Thorne (Eds.), The origin of the Australians, AIAS, Canberra (Human Biology series 6).

Godwin, Luke. 2011. 'The Application of Assessment of Cumulative Impacts in Cultural Heritage Management: A Critique.' Australian Archaeology 73: 88 – 91.

Green, M. 1982 A review of enamel hypoplasia and its application to Australian palaeopathology, unpublished BA honours thesis. ANU, Canberra.

Hercus, L. 1989. Three linguistic studies from far south-western NSW. Aboriginal History 13, 45-62.

Jurskis, V. 2009. River red gum and white cypress forests in south-western New South Wales, Australia: Ecological history and implications for conservation of grassy woodlands. Forest Ecology and Management 258, 2593-2601.

Littleton, J. 1998. East and west: burial practices along the Murray River. Archaeology in Oceania 34, 1-14.

Littleton, J. and Allen, H. 2007. Hunter-gatherer burials and the creation of persistent places in southeastern Australia. Journal of Anthropological Archaeology 26, 283-298.

Littleton, J. and Allen, H. 2020, Monumental landscapes and the agency of the dead along the Murray River, Australia. World Archaeology 52, 120-132.

Johnston, H. and Littleton, J. 1993. Report on the Burials Project, Western New South Wales. New South Wales National Parks and Wildlife Service, Sydney.

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

Lyons, K. 1988. Prehistoric Aboriginal relationships with the forests of the Riverine Plain in South-Eastern Australia. In K.J. Frawley and N.M. Semple (eds), Australia's Ever Changing Forests, Proceedings of the First National Conference on Australian Forest History, pp.169-177. Department of Geography and Oceanography, Australian Defence Force Academy, Campbell, ACT.

Macdonald, G. 2011. Territorial boundaries and society in the NSW Riverine: A Wiradjuri analysis. In: T. Bauman and G. Macdonald (Eds.), Utilising Anthropology, pp. 62-81. AIATSIS, Canberra.

Martin, S. 2006. Inscribing the Plains: Constructed, Conceptualised and Socialized Landscapes of the Hay Plain, South Eastern Australia. Unpublished PhD Thesis, University of New England.

Martin, S. 2008. Billa Downs, Dry Lake & Lake Benanee: Assessment of the Cultural Heritage and Potential Effects of a Water Regulator on Taila Creek. Volume 1. Report to the Murray Darling Basin Commission

Martin, S. 2011. Palaeoecological evidence associated with earth mounds of the Murray Riverine Plain, south-eastern Australia. Environmental Archaeology 16, 162-172.

Mathews, R.H. 1906. Notes on Some Native Tribes of Australia. Journal of the Proceedings of the Royal Society of NSW. 40, 95-129.

Mitchell, T. 1839. Three Expeditions into the Interior of Eastern Australia. T & W Boone, London.

Mueller, D., Jacobs, Z., Cohen, T.J., Price, D.M., Reinfelds, I.V. and Shulmeister, J. 2018. Revisiting an arid LGM using fluvial archives: a luminescence chronology for palaeochannels of the Murrumbidgee River, south-eastern Australia. Journal of Quaternary Science 33, 777-793.

Navin Officer Heritage Consultants (NOHC) 2022 EnergyConnect (NSW - Eastern Section) Buronga to Wagga Wagga. Revised Aboriginal Cultural Heritage Assessment Report. Report to WSP Australia Pty. Ltd.

NGH 2024a Aboriginal Cultural Heritage Assessment Report Baldon Wind Farm EIS. Report to Baldon Wind Farm Pty Ltd

NGH 2024b Aboriginal Cultural Heritage Assessment Junction Rivers Wind Project. Report to Windlab Developments Australia.

NSW National Parks and Wildlife Service (NPWS), 2003. The Bioregions of New South Wales: Their Biodiversity, Conservation and History. Sydney.

Office of Environment and Heritage (OEH), 2011. Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW, NSW Government, Sydney.

OEH. 2012. The Land and Soil Capability Assessment Scheme, Second Approximation. NSW Government, Sydney.

Pardoe, C. 1988, The cemetery as symbol. The distribution of prehistoric Aboriginal burial grounds in Southeastern Australia, Archaeology in Oceania 23, 1-16.

Pardoe, C. 1994. Bioscapes: the evolutionary landscape of Australia. Archaeology in Oceania 29, 182-190.

Pardoe, C. and Martin, S. 2011. Murrumbidgee Province Aboriginal Cultural Heritage Study. Australian Archaeological Consulting Monograph Series, Vol. 4. Australian Association of Consulting Archaeologists Inc., Melbourne.

Pardoe, C. and Hutton, D. 2020, Aboriginal heritage as ecological proxy in south-eastern Australia: a Barapa wetland village. Australasian Journal of Environmental Engineering 28, 17-33.

Porteners, M.F. 1993.The natural vegetation of the Hay Plain: Booligal-Hay and Deniliquin-Bendigo 1:250 000 maps. Cunninghamia 3, 1-87.

Ray, L.J. 1959. Metrical and non-metrical features of the clavicle of the Australian Aboriginal. American Journal of Physical Anthropology 17, 217-226.

Read, P.J. 1983. A History of the Wiradjuri People of New South Wales 1883-1969. Unpublished PhD Thesis, ANU, Canberra.

Jones, R., Roberts, A., Westell, C., Moffat, I., Jacobsen, G. and Rudd, R. 2022. Aboriginal earth mounds of the Calperum Floodplain (Murray Darling Basin, South Australia): New radiocarbon dates, sediment analyses and syntheses, and implications for behavioural change. The Holocene 32, 816-834.

Robertson, S. 2007. Sources of bias in the Murray Black collection: implications for palaeopathological analysis. Australian Aboriginal Studies 1, 116-130.

Semple, W.S. 1990. Hay District Technical Manual. Chapters 1, 2, 3, 6, & 7. Soil Conservation Service of NSW, Chatswood.

Stern, H., de Hoedt, G. and Ernst, J. 2000. Objective Classification of Australian Climates. Bureau of Meteorology, Melbourne.

Tindale, N.B. 1974. Aboriginal Tribes of Australia: their Terrain, Environmental controls, Distribution, Limits, and Proper Names, with an Appendix on Tasmanian tribes, Canberra.

Ulm, S. 2013. 'Complexity' and the Australian continental narrative: Themes in the archaeology of Holocene Australia. Quaternary International 285,182-192.

Webb, S. 1995. The Palaeopathology of Aboriginal Australians. Cambridge University Press, Cambridge.

Wildesen, L.E., 1982 'The Study of Impacts on Archaeological Sites." Advances in Method and Archaeological Theory, volume 5. Michael B. Schiffer (ed), pp. 59-96. Academic Press, New York.

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APPENDIX 1 – ABORIGINAL CONSULTATION

13.1 Record of Aboriginal consultation

Table 13.1-1 Aboriginal consultation log

Date	Method of communication	Organisation	Individual	NOHC Staff	Matters discussed
31/05/2022	email	Heritage NSW		NH	Consultation commencement, request for interested parties
1/06/2022	post	Gov organisations A-E		NH	Consultation commencement, request for interested parties
3/06/2022	newspaper notice	The Guardian		NH	Notice for interested parties
2/06/2022	email	Heritage NSW	Barry Gunther		Response received with list of potential Aboriginal parties
8/06/2022	email and post	list of groups identified by Heritage NSW		NH	Invitation to register an interest in the project
8/06/2022	email	Wakool Indigenous Corporation	Gary Pappin		Registration of interest
10/06/2022	email			NH	Received bounce back from email address for Yarkuwa Indigenous Knowledge Centre, sent letter by post
21/06/2022	email	Yarkuwa Indigenous Knowledge Centre Aboriginal Corporation	David Crew	NH	Registration of interest
22/08/2022	call	Barap Wamba	John Jackson	NH	Follow up on call from John to Neoen and asked if he would like to register for the project and receive the consultation document, he indicated that he would.
22/08/2022	email	all registered		NH	Draft method sent
14/02/2023	email	all registered		NH	Project update email sent
6/06/2023	email	all registered		NH	Invitation to field survey
5/12/2023	email	Heritage NSW		NH	List of raps sent to Heritage NSW
15/12/2023	email	all registered		ED	Project update email sent
18/01/2024	email	all registered		ED	Invitation to additional field survey
19/01/2024	email	Deniliquin LALC	Rose Dunn	JF	Confirmation of group attendance
5/02/2024	In person		Dennis Charles	JF	Registration with project for fieldwork

Date	Method of communication	Organisation	Individual	NOHC Staff	Matters discussed
11/06/2024	email	all registered		NH	Draft test excavation method sent
28/06/2024	email/phone	all registered		ED/JF	Invitation to field survey/test excavation
28/06/2024	email	Deniliquin LALC	Rose Dunn	ED	Confirmation of group attendance
28/06/2024	phone		Dennis Charles	JF	Confirming interest in fieldwork, request to chat through details at later date
29/06/2024	email	Wakool Indigenous Corporation	Gary Pappin	ED	Confirmation of group attendance
1/07/2024	phone		Dennis Charles	JF	Phone call to discuss details
5/07/2024	email	Pappin Family Aboriginal Corporation	Mary Pappin	ED	Email invite to field survey/test excavation and sent through methodology
18/12/2024	Email	all registered		JF	Project update email sent
3/03/2025	Email	all registered		JF	Draft ACHAR sent out for comment
5/03/2025	Email	Wakool Indigenous Corporation	Gary Pappin	JF	“Thank you for providing the ACHAR for review. I have some minor comments” comments shown below. JF responded that the report will be amended to reflect the comments, response shown below.

Stage 1a

Aboriginal Consultation Tchelery _ Edward River Council Area

Nicola Hayes
To OEH HD Heritage Mailbox

Reply | Reply All | Forward | ...
Tue 31/05/2022 3:37 PM

Consultation Letters Step 1a_Heritage NSW.pdf
.pdf File

Good afternoon

Please find attached a consultation letter regarding the proposed Tchelery Wind farm in the Edward River Council Area

Kind regards

Nicola Hayes
BA/BSc Grad Dip (Archaeology)
Principal Archaeologist

Navin Officer
heritage consultants Pty Ltd

Number 4
Kingston Warehouse
71 Leichhardt St
Kingston ACT 2604

ph: 02 62829415
fax: 02 62829416
mob: 0421 274470
email: nhayes@nohc.com.au

www.nohc.com.au

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31 May 2022

Heritage NSW
heritagemailbox@environment.nsw.gov.au

Navin Officer
heritage consultants pty ltd
abn: 28 092 901 605

Dear Sir/Madam,

Re: Implementation of the OEH Aboriginal cultural heritage consultation requirements for proponents 2010 for the Tchelery Wind Farm

Navin Officer Heritage Consultants Pty Ltd has been commissioned by WSP on behalf of NEOEN to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

NEOEN Australia Pty Ltd
Level 21, 570 Elizabeth Street
Sydney NSW 2000

The project is located at 46 Kerri East Road, Moulamein, also known as 4608 Booroorban-Tchelery Road, Moulamein. The proposal would likely be classified as State Significant Development and the NSW, Minister for Planning would be the consent authority. The project involves assessment of the installation of around 110 wind turbines.

The project may be the subject of an application for an Aboriginal heritage impact permit, therefore we are implementing the Heritage NSW *Aboriginal cultural heritage consultation requirements for proponents 2010*. This requires us to *ascertain, from reasonable sources, the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects or places* relative to the area.

The purpose of the community consultation with relevant Aboriginal people is to assist NEOEN in the preparation of an application for an Aboriginal heritage impact permit and to assist the Director-General in their consideration and determination of the application.

I am therefore writing to inform you of this development proposal and request that you provide us with the names of Aboriginal people who you know that may hold cultural knowledge relevant to determining the significance of Aboriginal objects or places for the project.

Please respond in writing within 14 days to:

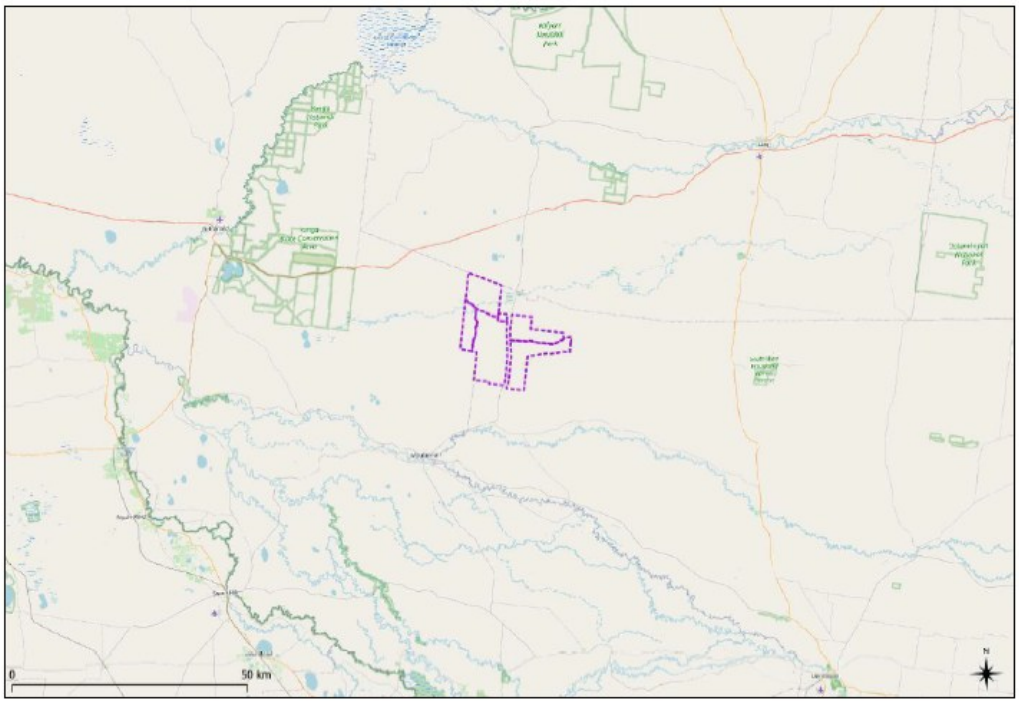
The Secretary
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
KINGSTON ACT 2604

or by fax to; (02) 6282 9416

Yours faithfully,

Nicola Hayes
Principal Archaeologist

Number 4, Kingston Warehouse
71 Leichhardt St, Kingston ACT 2604
ph 02 6282 9415 fax 02 6282 9416 m 0419 296 868
navinofficer@nohc.com.au



Number 4, Kingston Warehouse
71 Leichhardt St, Kingston ACT 2604
ph 02 6282 9415 fax 02 6282 9416 m 0419 296 868
navinofficer@nohc.com.au
www.nohc.com.au

Public Notice

ABORIGINAL HERITAGE ASSESSMENT

Navin Officer Heritage Consultants Pty Ltd have been commissioned by NEOEN to undertake a cultural heritage assessment for the Tchelery Wind Farm.

The investigation is required to assess the potential impact of the proposal on Aboriginal cultural heritage values.

The project involves assessment of the installation of around 110 wind turbines near Keri Keri, NSW, located at 46 Kerri East Road, Moulamein, also known as 4608 Booroorban-Tchelery Road, Moulamein.

We are implementing the Heritage NSW Aboriginal cultural heritage consultation requirements for proponents 2010 for this project.

We invite Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of objects and places in the investigation area, to register an interest in a process of community consultation.

The purpose of this consultation is to assist the proponent and government authorities in the preparation and assessment of legislative requirements, permits and approvals.

Please forward expressions of interest to:
The Secretary
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
Kingston ACT 2604

The closing date for this registration of interest is June 17, 2022

Navin Officer
heritage consultants pty ltd
abn: 28 092 901 605

8 June 2022

Jeanette Crew (Chairperson)
Yarkuwa Indigenous Knowledge Centre

admin@yarkuwa.com

Dear Jeanette Crew,

Re: Implementation of the OEH Aboriginal cultural heritage consultation requirements for proponents 2010 for the Tchelery Wind Farm

Navin Officer Heritage Consultants Pty Ltd has been commissioned by WSP on behalf of NEOEN to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

NEOEN Australia Pty Ltd
Level 21, 570 Elizabeth Street
Sydney NSW 2000

The project is located at 46 Kerri East Road, Moulamein, also known as 4608 Booroorban-Tchelery Road, Moulamein. The proposal would likely be classified as State Significant Development and the NSW, Minister for Planning or their delegate would be the consent authority. The project involves assessment of the installation of around 110 wind turbines.

The project may be the subject of an application for an Aboriginal heritage impact permit, therefore we are implementing the Heritage NSW *Aboriginal cultural heritage consultation requirements for proponents 2010*. This requires us to *ascertain, from reasonable sources, the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects or places* relative to the area.

The purpose of the community consultation with relevant Aboriginal people is to assist NEOEN in the preparation of an application for an Aboriginal heritage impact permit and to assist the Director-General in their consideration and determination of the application.

I am therefore writing to inform you of this development proposal and invite registration as an interested group. Please respond in writing within 14 days to:

The Secretary
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
KINGSTON ACT 2604

or by fax to; (02) 6282 9416
or by email to: navinofficer@nohc.com.au

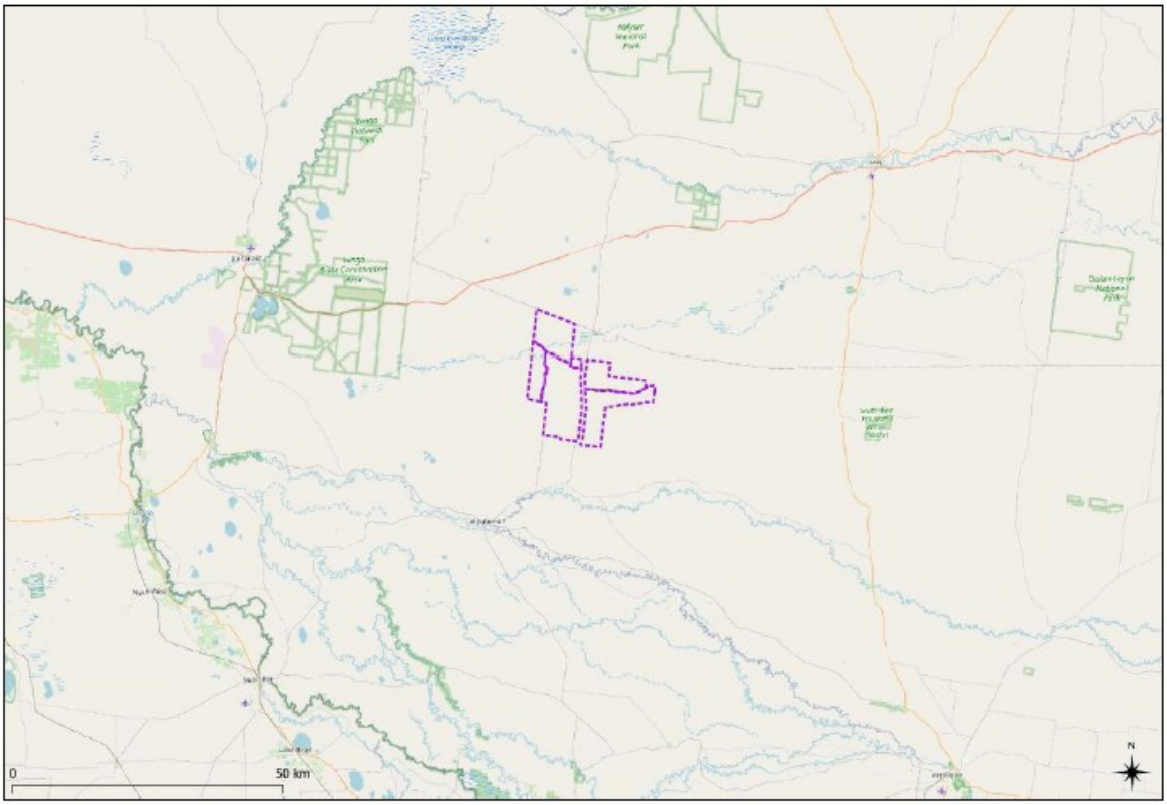
Please note it is a requirement of the *Aboriginal cultural heritage consultation requirements for proponents 2010* that we provide your name to the NSW Office

of Environment and Heritage and to the Local Aboriginal Land council unless you specify otherwise.

Sincerely

N. Hayes

Ms Nicola Hayes
Associate Director NOHC



Re: Implementation of the OEH Aboriginal cultural heritage consultation requirements for proponen...

GP Gary Pappin <gary@pappin.com.au>
To Nicola Hayes

Reply | Reply All | Forward | ...

Wed 8/06/2022 7:26 PM

Hello Nicola,

The Wakool Indigenous Corporation wish to be recorded as an interested party (RAP). Please ensure you contact us for all future engagement on the Tchelery project.

Kind Regards,

-Gary Pappin

Tcherley Wind Farm

DC David Crew <david.crew@yarkuwa.org.au>
To Navin Officer

Reply | Reply All | Forward | ...
Tue 21/06/2022 9:13 AM

I would like to register Yarkuwa as an interested group in this project

David

David Crew JP

Manager

Yarkuwa Indigenous Knowledge Centre

Aboriginal Corporation

RE: Aboriginal Registrations

WL Whiting, Lizzie <Lizzie.Whiting@wsp.com>
To Nicola Hayes
Cc Maund, Mark

Reply | Reply All | Forward | ...
Fri 19/08/2022 1:13 PM

You replied to this message on 19/08/2022 1:15 PM.

220047 Tchelery Wind Farm_Survey Methodology.docx
.docx File

Hi Nicola,

Neoen have approved the attached survey methodology.

For the registrations, they were contacted directly by and would like you to include John Jackson to the list. We advised you would handle consultation and explained the general process of RAP involvement in surveys through LALC. Please cc Neoen in for any emails sent through consultation: jang.kim@neoen.com

> *Below is more detail regarding the aboriginal person who got in touch with me. The aboriginal person contacted one of our team members and below is the email.*
>
> *Just got a call from John Jackson (0427 927 675) who is an aboriginal man, living in Balrandald who has apparently done some site work at Tchelery. He wants to keep doing site work there but is very rarely checking email.*
>
> *Is it possible for him to be contacted by phone whenever there is site work so that he can get included? I said I would speak to you and (he mentioned Nicole Hays? - is she with WSP?) about it and let him know what would happen next.*

Should you have any queries, please don't hesitate to reach out.

Kind regards,

Lizzie Whiting
Environmental Planner

T: +61 2 6281 9516

Project Methodology

Tchelery Wind Farm Project Methodology

Nicola Hayes
To Nicola Hayes
Cc jang.kim@neoen.com
Bcc Gary Pappin; david.crew@yarkuwa.org.au; 'lalcd@bigpond.com'

Reply | Reply All | Forward | ...
Mon 22/08/2022 9:37 AM

You replied to this message on 11/06/2024 2:56 PM.

220047 Tchelery Wind Farm_Survey Methodology_DRAFT_210622.pdf
.pdf File

Good morning

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

As you are a registered Aboriginal party for this project please find attached *Project information and Proposed Methodology for Cultural Heritage Field Survey* (NOHC 2022). The purpose of the methodology document is to provide, for your review and comment the proposed methodology for surface survey.

If you would like to make any comments, please provide these to NOHC within the 28 day review period which concludes on **19 September 2022**.

Nicola Hayes
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
KINGSTON ACT 2604

or by email to nhayes@nohc.com.au

We look forward to working with you on this project.

Kind Regards

Nicola Hayes
BA/BSc Grad Dip (Archaeology)
Principal Archaeologist

Navin Officer *heritage consultants Pty Ltd*

Number 4
Kingston Warehouse
71 Leichhardt St
Kingston ACT 2604

ph: 02 62829415
fax: 02 62829416
mob: 0421 274470
email: nhayes@nohc.com.au

www.nohc.com.au

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Project Update

From: Nicola Hayes <nhayes@nohc.com.au>
Sent: Tuesday, February 14, 2023 11:05 AM
To: Nicola Hayes <nhayes@nohc.com.au>
Cc: jang.kim@neoen.com
Subject: Tchelery Wind Farm Project Update

Good morning

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

We are writing to inform you that the project is ongoing and to invite you to the community drop-in session on Thursday 23rd February, see attached information flyer.

Kind regards

Nicola Hayes
Archaeologist

Navin Officer heritage consultants pty ltd

act
Kingston Warehouse
4/71 Leichhardt St
Kingston ACT 2604
nsw
PO Box 6
Hurlstone Park NSW 2193
qld
5 Sexton St
Aeroglen QLD 4870

www.nohc.com.au
m +61 421 274 470
o +61 2 6282 9415
f +61 2 6282 9416

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Invitation to survey

Tchelery Wind Farm field survey

Nicola Hayes
To Nicola Hayes
Cc Aniruddha Deshpande

Reply | Reply All | Forward | ...

Tue 6/06/2023 11:02 AM

Good morning

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

As you are a registered Aboriginal party for this project, we would like to invite you to attend the field survey for the project. We will be commencing the surveys on Monday 19th June; the survey is likely to take 2 weeks to complete.

At this stage we would like to find out if you have a representative available to complete the survey with us. We will confirm the meeting place and time and any safety requirements with you closer to the survey date.

If you can please reply to the is email with your availability and the name of the best contact person to arrange the meeting and place and time with.

Neoen would like to register you in their accounts system to make the invoice payments. They will need either a bank letter confirming the details (perhaps there would have been one when the account was established) or a snapshot from a statement that shows the account name and bank account details, for example below:

Two contact numbers and names of the contact persons for the account's purposes. The profile registration takes about a week and the payment may take up to 3 weeks upon receiving the invoice.
If you have any questions or concerns, please get in touch with Ani, Tchelery WF Project Manager aniruddha.deshpande@neoen.com, +61 414 316 634

Kind regards

Nicola Hayes
Archaeologist

Navin Officer heritage consultants pty ltd

act
Kingston Warehouse
4/71 Leichhardt St
Kingston ACT 2604
nsw
PO Box 6
Hurlstone Park NSW 2193
qld
5 Sexton St
Aeroglen QLD 4870

www.nohc.com.au
m +61 421 274 470
o +61 2 6282 9415
f +61 2 6282 9416

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Project Update

Tchelery Wind Farm project update

Ellaine Dickens
To
Cc Aniruddha.Deshpande@neoen.com; Jasmine Fenyvesi

Reply | Reply All | Forward

Fri 15/12/2023 10:32 AM

Good morning,

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

We are writing to inform you that the project is ongoing, and there are expected to be surveys taking place in January/February 2024.

We will keep you updated of further developments when they occur.

Kind Regards,

Ellaine Dickens
Archaeologist / Heritage Consultant

Navin Officer heritage consultants pty ltd

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Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: +61 2 6282 9415
Fax: +61 2 6282 9416
Mob: +61 0457 298 202

Invitation to survey

Tchelery Wind Farm additional field survey

JF Jasmine Fenyvesi
To Ellaine Dickens
Cc Aniruddha Deshpande
Bcc gary@pappin.com.au; david.crew@yarkuwa.org.au; john.jackson@health.nsw.gov.au; lalcd@bigpond.com

Reply | Reply All | Forward | ...
Thu 18/01/2024 1:14 PM

Good afternoon,

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project. As you are a registered Aboriginal party for this project, we would like to invite you to attend the field surveys for the project.

We will be commencing the surveys on Monday 5th February; the survey is likely to take 4 days to complete. We will meet at 10am on Monday (5th) at the Moulamein Wattle Café.

Jasmine will be leading the field team; her number is 0418621588. Your representatives will need long sleeves; full leg wear; appropriate high topped walking boots for the survey, as well as water and lunch/food.

Neoen will be making the invoice payments, and invoices should be directed to Ani as before. If you have any questions or concerns, please get in touch with Ani, Tchelery WF Project Manager aniruddha.deshpande@neoen.com , +61 414 316 634

Please let me know if you will have a representative available for these works and get in touch if you have any questions.

Kind regards,

Jasmine Fenyvesi
Senior Archaeologist

Navin Officer heritage consultants pty ltd

NOHC is a proud sponsor of the Corroboree Frog conservation and captive breeding program

Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: +61 2 62829415
Fax: +61 2 62829416
Mob: +61 0418621588

Test Excavation Methodology

Tchelery Wind Farm Test Excavation Methodology

Reply | Reply All | Forward | ...

Nicola Hayes
To Jasmine Fenyvesi; Nicola Hayes
Cc Aniruddha Deshpande
Bcc Gary Pappin; david.crew@yarkuwa.org.au; lalcd@bigpond.com; antmanjones1973@gmail.com

Tue 11/06/2024 2:57 PM

220047_TcheleryWF_Test Excavation Methodology_DRAFT_110624.pdf
.pdf File

Good afternoon

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project.

As you are a registered Aboriginal party for this project please find attached *Project information and Proposed Methodology for Test Excavation* (NOHC 2024). The purpose of the methodology document is to provide, for your review and comment the proposed methodology for surface survey.

If you would like to make any comments, please provide these to NOHC within the 28 day review period which concludes on **10 July 2024**.

Nicola Hayes
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
KINGSTON ACT 2604

or by email to nhayes@nohc.com.au

We look forward to working with you on this project.

Kind Regards

Nicola Hayes
BA/BSc Grad Dip (Archaeology)
Principal Archaeologist

Navin Officer heritage consultants Pty Ltd

Number 4
Kingston Warehouse
71 Leichhardt St
Kingston ACT 2604

ph: 02 62829415
fax: 02 62829416
mob: 0421 274470
email: nhayes@nohc.com.au

www.nohc.com.au

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Invitation to survey/test excavation

Tchelery Wind Farm Field Work

Ellaine Dickens
To ceo@lalcd.com
Cc Aniruddha Deshpande; Jasmine Fenyvesi
You forwarded this message on 5/07/2024 10:38 AM.

Reply | Reply All | Forward | ...
Fri 28/06/2024 8:44 AM

Good morning,

As you are aware Navin Officer Heritage Consultants (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project. As you are a registered Aboriginal party for this project, we would like to invite you to attend the test excavation and survey program for the project.

We will be commencing on Monday 15th July; the field work is likely to take two weeks to complete. We will meet at 10am on Monday (15th) at the Moulamein Wattle Café.

Jasmine will be leading the field team in the week of the 15th; her number is 0418621588. Nicola will be leading the field team in the week of the 22nd; her number is 0421274470.

Your representatives will need long sleeves, full leg wear, appropriate footwear for excavation and survey, as well as water and lunch/food.

We will be following the methodology for the field work program sent to your group on the 11th of June 2024. If you have any comments or concerns, please let us know before the 12th of July.

Neoen will be making the invoice payments, and invoices should be directed to Ani as before. If you have any questions or concerns, please contact Ani, Tchelery WF Project Manager aniruddha.deshpande@neoen.com , +61 414 316 634.

Please let me know if you will have a representative available for these works and get in touch if you have any questions.

Warm regards,

Ellaine Dickens
Archaeologist / Heritage Consultant

Navin Officer heritage consultants pty ltd

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Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: 02 6282 9415
Mob: +61 0457 298 202
E: edickens@nohc.com.au
Web: www.nohc.com.au

FW: Tchelery Wind Farm Field Work

Ellaine Dickens
To pfac1@outlook.com
Cc Aniruddha Deshpande; Jasmine Fenyvesi

Reply | Reply All | Forward | ...

Fri 5/07/2024 10:39 AM

220047_TcheleryWF_Test Excavation Methodology_Final DRAFT_110624.pdf
.pdf File

Good morning Mary,

Just following up from our phone call, please see below for information regarding the upcoming field work, noting that the project only has the budget to pay one representative from each group for the works.

I have also attached the test excavation methodology to this email for your review.

The following are insurance details required by your group to be provided to Neoen:

Insurance

1. The Contractor must have and keep, for the duration of this Agreement, and for a period of 12 months following the termination of this Agreement:

   (a) current and fully paid public liability insurance with a reputable insurer for damage and injury to person and property for an amount not less than $10 million for any one occurrence in which the Principal is endorsed as an insured; and
   (b) workers' compensation insurance as required by the relevant workers compensation legislation in which the Contractor works and will work, while providing the Services.

2. The Contractor must provide the Principal with proof of such insurances.

Please let me know if you will have a representative available for these works and get in touch if you have any questions.

Warm regards,

Ellaine Dickens
Archaeologist / Heritage Consultant

Navin Officer heritage consultants pty ltd

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Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: 02 6282 9415
Mob: +61 0457 298 202
E: edickens@nohc.com.au
Web: www.nohc.com.au

Project Update

Tchelery Wind Farm Project Update

JF Jasmine Fenyvesi

To Ellaine Dickens

Bcc jackojohn@gmail.com; gary@pappin.com.au; david.crew@yarkuwa.org.au; CEO; pfac1@outlook.com

Reply | Reply All | Forward

Wed 18/12/2024 11:27 AM

Good morning,

As you are aware Navin Officer Heritage Consultants Pty Ltd (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project. As you are Registered Aboriginal Party for the project, we are writing to inform you that the project is ongoing and to give you a brief update; the draft ACHAR is expected to be provided for review in mid January.

We will keep you updated of further developments when they occur.

Wishing you and your families a happy and safe holiday season!

Kind regards,

Jasmine Fenyvesi
Senior Archaeologist

Navin Officer heritage consultants pty ltd

Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: +61 2 62829415
Mob: +61 0418621588

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Draft ACHA Report Review

Tchelery Wind Farm ACHA Report for Review

Reply | Reply All | Forward

JF Jasmine Fenyvesi
To Ellaine Dickens
Mon 3/03/2025 2:36 PM
Bcc 'Gary Pappin'; 'CEO'; jackojohn1951@gmail.com; 'antmanjones1973@gmail.com'; 'pfac1@outlook.com'; 'jackojohn@gmail.com'; 'david.crew@yarkuwa.org.au'

You forwarded this message on 3/03/2025 3:01 PM.

Tchelery Wind Farm Wind Turbine_Heritage Assessment Report_v4.1.pdf
28 MB

Good afternoon

As you are aware Navin Officer Heritage Consultants (NOHC) has been commissioned by WSP on behalf of NEOEN (the Proponent) to conduct a cultural heritage assessment for the Tchelery Wind Farm project. Please find attached the draft Tchelery Wind Farm ACHA Report for review. We are pleased to provide this document to your organisation as part of:

- Enabling you/your organisation to provide further information or comment on the site significance assessments as identified within the proposed project area;
- Enabling your organisation to comment on the proposed salvage and impact mitigation actions;
- Enabling you to have input into the development of any cultural heritage management options; and
- To provide an opportunity for your organisation to comment on the report's archaeological findings and recommendations.

Given that an assessment of the Aboriginal cultural values of sites can only be made by the Aboriginal community, we invite your organisation to review the report and methodology and provide feedback giving your organisation/group's views and assessments.

In order for your organisation/group's views to be taken into account during the development of cultural management options for this project, it would be very helpful if you could provide a response by **31 March 2025** by return email (jfenyvesi@nohc.com.au).

Please do not hesitate to contact me if you have any questions about the report.

Kind regards,

Jasmine Fenyvesi
Senior Archaeologist

Navin Officer heritage consultants pty ltd

Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: +61 2 62829415
Mob: +61 0418621588

NOHC is a proud sponsor of the Corroboree Frog conservation and captive breeding program

Re: Tchelery Wind Farm ACHA Report for Review

Reply | Reply All | Forward

GP Gary Pappin <gary@pappin.com.au>
To Jasmine Fenyvesi
Tue 4/03/2025 9:16 PM

You replied to this message on 5/03/2025 9:02 AM.

Dear Jasmine,

Thankyou for providing the ACHAR for review. I have some minor comments:

1. In Section 1 you need to recognise that the Local Aboriginal Land Councils are statutory bodies established under the NSW Land Rights Act 1983 and are not representative of Traditional Owners. The Tchelery Wind Farm project site lies between the Mutthi Mutthi and Wiradjuri tribal boundaries with Dry Lake generally accepted as the boundary location. The Watti Wattie tribal boundary is also close by to the south.
2. On page 44 you mention Swan Hill as being 30km to the south. This is incorrect. Swan Hill is 130km to the south.
3. You have spelt Yarramundi wrong on two occasions.
4. Darren Curnoe is an Anthropologist not an Archaeologist. Please correct or provide proof of his archaeology degree. Please also identify if other members of your staff listed are appropriately skilled and experienced persons as per the "Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW".

Kind Regards,

-Gary Pappin

RE: Tchelery Wind Farm ACHA Report for Review

JF Jasmine Fenyvesi
To Gary Pappin

Reply | Reply All | Forward

Wed 5/03/2025 9:02 AM

Thanks for your comments Gary, I will amend the report to reflect them.

Regarding point 4, I think there may have been some miscommunication somewhere. Darren is an archaeologist who specialty is in biological anthropology/ physical anthropology which is the study of human remains. If you want some extra info on Darren please check out his info page on our website https://nohc.com.au/people/darren-curnoe or his staff page for UNSW https://www.unsw.edu.au/staff/darren-curnoe. All of our staff are appropriately skilled and experienced archaeologists.

Kind regards,

Jasmine Fenyvesi
Senior Archaeologist

Navin Officer heritage consultants pty ltd

NOHC is a proud sponsor of the Corroboree Frog conservation and captive breeding program

Canberra, ACT
Sydney, NSW
Cairns, QLD

Ph: +61 2 62829415
Mob: +61 0418621588

APPENDIX 2 – AHIMS SITES WITHIN AND SURROUNDING THE PROJECT SITE

AHIMS Client Service ID: 773509, 966523, and 966543

13.2 AHIMS sites within and surrounding the project site

Table 13.2-1 AHIMS sites within and surrounding the project site

AHIMS No.	Site Name	Latitude	Longitude	Description
48-1-0017	Back Oaks	144.231563008	-34.751703421	Art (Pigment or Engraved), Burial
48-4-0100	Dry Lake TSR 4	144.250964961	-34.799644942	Hearth
48-4-0011	Dry Lake 10	144.251662165	-34.798723235	Burial
48-4-0012	Dry Lake TSR4	144.253082977	-34.788839824	Burial
48-4-0530	PEC-E-09	144.329354597	-34.867793427	Artefact
48-4-0532	PEC-E-11	144.347381033	-34.868404626	Artefact
48-4-0533	PEC-E-12	144.349642794	-34.868814550	Artefact
48-4-0540	Lyntot Swamp Burial	144.049236694	-34.783599194	Burial
48-4-0546	Keri Keri 123	144.052965550	-34.767340412	Artefact
48-4-0182	PTQ1	144.024688685	-34.754401296	Artefact
48-4-0075	Back Baldon; Baldon	144.026973119	-34.805515535	Burial, Earth Mound, Hearth
48-4-0317	WA-OS24 (West Abercrombie Open Site 24)	144.032719432	-34.782962219	Artefact, Earth Mound, Hearth, Potential Archaeological Deposit (PAD)
48-4-0068	Back Oaks 4; Ravensworth	144.235569774	-34.742573074	Earth Mound, Hearth, Artefact, Burial
48-4-0103	Dry Lake TSR 7	144.251292103	-34.798678815	Earth Mound, Hearth, Artefact
48-4-0104	Dry Lake TSR 8	144.251768068	-34.798824784	Earth Mound, Artefact, Hearth
48-4-0117	Moulamein Road TSR 3	144.266210013	-34.767853176	Burial
48-4-0527	PEC-E-G1	144.267973485	-34.875821495	Artefact
48-4-0529	PEC-E-08	144.267984117	-34.875830748	Artefact
48-4-0537	PEC-E-16	144.368480425	-34.871441489	Artefact, Modified Tree (Carved or Scarred)
48-4-0008	Tchelery Mound 1-3	144.207229135	-34.771570341	Earth Mound, Hearth
48-4-0542	Keri Keri 063	144.005463863	-34.787812021	Artefact
48-4-0069	Back Oaks 3; Ravensworth	144.230822556	-34.760790804	Burial, Earth Mound, Heart, Artefact
48-1-0018	Back Oaks	144.231563008	-34.751703421	Burial

AHIMS No.	Site Name	Latitude	Longitude	Description
48-4-0398	South Farm 009	144.234814113	-34.749514801	Artefact
48-4-0099	Dry Lake TSR 3	144.249645482	-34.800219050	Earth Mound
48-4-0098	Dry Lake TSR 2	144.249857744	-34.800079625	Earth Mound
48-4-0105	Dry Lake TSR 9	144.253397738	-34.798122446	Earth Mound, Artefact, Hearth
48-4-0106	Dry Lake TSR 10	144.253399076	-34.797752898	Earth Mound, Artefact, Hearth
48-4-0109	Dry Lake TSR 13	144.253589703	-34.794313817	Earth Mound, Artefact, Hearth
48-4-0531	PEC-E-10	144.336339789	-34.867225611	Artefact, Hearth
48-4-0115	Moulamein Road TSR 1	144.271198433	-34.761330730	Burial
48-4-0549	Keri Keri 067	144.002455485	-34.788607403	Artefact
48-4-0101	Dry Lake TSR 5	144.250231870	-34.799015409	Hearth, Earth Mound, Artefact
48-4-0444	Dry Lake TSR EM 1	144.252541751	-34.788298516	Earth Mound, Non-Human Bone, Organic Material
48-4-0113	Dry Lake TSR 17	144.253971318	-34.791374821	Earth Mound, Artefact, Hearth
48-4-0539	Keri Keri Burial 1 2021	144.033570393	-34.747605628	Burial
48-4-0552	Keri Keri 072	144.039238659	-34.786161440	Artefact
48-4-0538	PEC-E-17	144.370485242	-34.871683206	Modified Tree (Carved or Scarred)
48-4-0395	South Farm 012	144.219199445	-34.725343784	Artefact
48-1-0016	Back Oaks 1	144.231563008	-34.751703421	Burial
48-4-0076	Back Oaks 2; Ravensworth	144.232062662	-34.750864697	Artefact
48-4-0397	South Farm 010	144.235569774	-34.742573074	Artefact
48-4-0442	Dry Lake TSR EM 2	144.251745097	-34.796167860	Burial, Earth Mound
48-4-0443	Dry Lake TSR B 1	144.252487953	-34.790577871	Burial
48-4-0110	Dry Lake TSR 14	144.253570380	-34.793249716	Earth Mound, Artefact, Hearth
48-4-0111	Dry Lake TSR 15	144.253715452	-34.792829329	Earth Mound, Artefact, Hearth
48-4-0114	Dry Lake TSR 18	144.253767900	-34.786637820	Earth Mound, Artefact, Hearth
48-4-0112	Dry Lake TSR 16	144.254143049	-34.792126869	Earth Mound, Artefact, Hearth
48-4-0534	PEC-E-13	144.350345926	-34.869397783	Artefact, Hearth

AHIMS No.	Site Name	Latitude	Longitude	Description
48-4-0541	Baldon IF 01	144.113827557	-34.932747718	Artefact
48-4-0007	Kerri East Gravesite	144.118176378	-34.787971433	Burial
48-4-0019	KerriEast Woolshed 2	144.119566740	-34.781553458	Burial, Earth Mound, Hearth, Artefact
48-4-0386	South Farm 022	144.219645178	-34.725074529	Earth Mound, Artefact
55-6-0014	Tchelery Mounds 1-3	144.207229135	-34.771570341	Burial
48-4-0017	Dry Lake West	144.232092614	-34.785930136	Burial, Earth Mound, Hearth
48-4-0097	Dry Lake TSR1	144.249125535	-34.800081092	Hearth
48-4-0102	Dry Lake TSR 6	144.250766031	-34.798396500	Earth Mound, Hearth, Artefact
48-4-0107	Dry Lake TSR 11	144.254501602	-34.797128779	Earth Mound, Artefact, Hearth
48-4-0535	PEC-E-14	144.352658434	-34.869249874	Artefact, Hearth
48-4-0544	Keri Keri 112	144.056642497	-34.766346745	Artefact
48-4-0014	Tchelery / Abercrombie Creek	144.162570833	-34.815606171	Burial
48-4-0550	Keri Keri 068	144.004530618	-34.787384411	Artefact
48-4-0551	Keri Keri 069	144.007160133	-34.787589820	Artefact
48-4-0116	Moulamein Road TSR 2	144.266635500	-34.767538226	Burial
48-4-0010	Kerri East 1	144.081445053	-34.738962491	Burial
48-4-0018	Kerri East Woolshed 1	144.120095873	-34.779904525	Burial, Earth Mound, Hearth
48-4-0528	PEC-E-07	144.155692408	-34.851233118	Artefact
48-4-0002	Tchelery Station Moulamein	144.162647541	-34.808910679	Earth Mound, Shell, Artefact
48-4-0193	Tchelery Mound 1 Complex	144.209530514	-34.770967936	Aboriginal Resource and Gathering, Earth Mound
48-4-0553	Keri Keri 073	144.021816173	-34.771272889	Hearth
48-4-0080	Back Oaks	144.232469127	-34.750732482	Burial, Earth Mound, Hearth
48-4-0108	Dry Lake TSR 12	144.253077572	-34.794599715	Earth Mound, Artefact, Hearth
48-4-0536	PEC-E-15	144.359428705	-34.870614117	Artefact
48-4-0013	Kerrie East #4	144.118904495	-34.814128506	Burial
48-4-0015	Tchelery #4	144.194505170	-34.792460364	Burial

AHIMS No.	Site Name	Latitude	Longitude	Description
48-4-0067	Back Oaks 5; Ravensworth	144.207618213	-34.755753462	Earth Mound, Hearth, Artefact
48-4-0543	Keri Keri 062	144.002931391	-34.788775920	Artefact
48-4-0545	Keri Keri 121	144.003969862	-34.738184949	Artefact
48-4-0318	West Abercrombie – Open Site 23 (WA-OS23)	144.021010718	-34.770752094	Artefact, Earth Mound, Potential Archaeological Deposit (PAD)
48-4-0078	Back Baldon; Baldon	144.026973119	-34.805515535	Burial, Earth Mound, Hearth

APPENDIX 3 – NEW SITE RECORDINGS

13.3 Sites Recorded During Field Surveys

13.3.1 Surface Sites

TWF Site01 (AHIMS #48-4-0571)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1900 m

TWF Site01 is a hearth site. The site consists of a scatter of burnt clay nodules in an area of 12 x 7 m. A sparse concentration of clay nodules was noted in the centre of the scatter as well as slight staining of the ground. No charcoal or lithic artefacts were found associated with the hearth. Figure 13.3-1 depicts the hearth and Figure 13.3-2 indicates the location of the hearth. Exposures in the area were 70 per cent and visibility within exposures was at 90 per cent. The site is located on open plain, surrounded by scrub. It is located within the siliceous sands soil type, the soils at the site were described as a pale orange-brown silty clay.

Figure 13.3-1 Hearth at TWF Site01

Figure 13.3-2 TWF Site01 facing east

TWF Site02 (AHIMS #48-4-0572)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2000 m

TWF Site02 is an artefact scatter site. The site consists of a scatter of two lithic artefacts within a clay pan. Artefacts were located over an area of 5 x 2 m. Figure 13.3-3 depicts the artefacts and Figure 13.3-4 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain, surrounded by low scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Pale tan silcrete flake 15 x 11 x 3 mm
2. Grey quartzite flake 31 x 28 x 11 mm

Figure 13.3-3 Artefacts at TWF Site02

Figure 13.3-4 TWF Site02 facing east

TWF Site03 (AHIMS #48-4-0573)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1870 m

TWF Site03 is a hearth site with associated artefacts. The site consists of a scatter of burnt clay nodules in an area of 8 x 7 m. A concentration of clay nodules was noted in the centre of the scatter measuring 90 x 65 cm. Three lithic artefacts were found associated with the hearth over an area of 20 x 25 m. Figure 13.3-5 depicts the hearth, Figure 13.3-7 and Figure 13.3-8 depicts the artefacts, and Figure 13.3-6 indicates the location of the hearth. Exposures in the area were 85 per cent and visibility within exposures was at 95 per cent. The site is located on open plain, surrounded by low scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey FGS complete split flake 34 x 20 x 10 mm
2. Milky quartz flake 17 x 19 x 6 mm
3. Grey mudstone flake 23 x 18 x 3 mm

Figure 13.3-5 Hearth at TWF Site03

Figure 13.3-6 TWF Site03 facing north

Figure 13.3-7 Artefacts at TWF Site03

Figure 13.3-8 Artefacts at TWF Site03

TWF Site04 (AHIMS #48-4-0829)

GDA (zone 55):

Distance to Water (Forest Creek) 5650 m

TWF Site04 is a hearth site with associated artefacts. The site consists of a scatter of burnt clay nodules in an area of 3 x 2 m. A concentration of clay nodules was noted in the centre of the scatter measuring 130 x 120 cm. Eight lithic artefacts were found associated with the hearth over an area of 10 x 5 m. Figure 13.3-9 and Figure 13.3-10 depict the artefacts and Figure 13.3-11 and Figure 13.3-12 indicates the location of the hearths. Exposures in the area were 90 per cent and visibility within exposures was at 85 per cent. The site is located on open plain, surrounded by low scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete flake 26 x 24 x 13 mm
2. White/grey silcrete flake 31 x 15 x 7 mm
3. Tan fine grained silcrete 22 x 23 x 5 mm
4. Milky quartz flake 29 x 18 x 5 mm
5. Tan/grey silcrete flake 16 x 17 x 4 mm
6. Grey chert flake 11 x 13 x 2 mm
7. Tan silcrete flaked piece 36 x 21 x 8 mm
8. Maroon silcrete flake 16 x 20 x 4 mm

Figure 13.3-9 Artefacts at TWF Site04

Figure 13.3-10 Artefacts at TWF Site04

Figure 13.3-11 Hearth at TWF Site04

Figure 13.3-12 Hearth at TWF Site04

TWF Site05 (AHIMS #48-4-0574)

GDA (zone 55):

Distance to Water (Forest Creek) 4950 m

TWF Site05 is an artefact scatter site. The site consists of a scatter of two lithic artefacts within a clay pan. Artefacts were located over an area of 1 x 2 m. Figure 13.3-13 depicts the artefacts and Figure 13.3-14 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain, surrounded by low scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Black fine grained silcrete core 60 x 50 x 45 mm
2. Tan medium grain silcrete flake 42 x 50 x 12 mm

Figure 13.3-13 Artefacts at TWF Site05

Figure 13.3-14 TWF Site05 facing northwest

TWF Site06 (AHIMS #48-4-0575)

GDA (zone 55):

Distance to Water (Forest Creek) 5640 m

TWF Site06 is an isolated artefact site. The site consists of one lithic artefact located an erosion scald in patchy grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-15 depicts the artefact and Figure 13.3-16 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 50 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Sandstone grinding stone 90 x 80 x 70 mm

Figure 13.3-15 Artefact at TWF Site06

Figure 13.3-16 TWF Site06 facing south

TWF Site07 (AHIMS #48-4-0576)

GDA (zone 55):

Distance to Water (Dry Lake) 4560 m

TWF Site07 is an artefact scatter site. The site consists of a scatter of two lithic artefacts within a clay pan. Artefacts were located over an area of 1 x 2 m. Figure 13.3-17 depicts the artefacts and Figure 13.3-18 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 85 per cent. The site is located on open plain, surrounded by low scrub. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan silcrete flake 27 x 23 x 6 mm
2. Basalt grinding stone 62 x 49 x 43 mm

Figure 13.3-17 Artefacts at TWF Site07

Figure 13.3-18 TWF Site07 facing north

TWF Site08 (AHIMS #48-4-0577)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 4260 m

TWF Site08 is an isolated artefact site. The site consists of one lithic artefact located an area of erosion in patchy grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-19 depicts the artefact and Figure 13.3-20 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 70 per cent. The site is located on open grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Sandstone grindstone 120 x 110 x 20mm

Figure 13.3-19 Artefact at TWF Site08

Figure 13.3-20 TWF Site08 facing south

TWF Site09 (AHIMS #48-4-0578)

GDA (zone 55):

Distance to Water (Forest Creek) 4500 m

TWF Site09 is an isolated artefact site. The site consists of one lithic artefact located in a sandy erosion scald on a slight rise. Artefacts were located over an area of 1 x 1 m. Figure 13.3-21 depicts the artefact and Figure 13.3-22 indicates the location of the site. Exposures in the area were 30 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Tan fine grained silcrete flake 35 x 16 x 5 mm

Figure 13.3-21 Artefact at TWF Site09

Figure 13.3-22 TWF Site09 facing south

TWF Site10 (AHIMS #48-4-0579)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 670 m

TWF Site10 is an isolated artefact site. The site consists of one lithic artefact located within a clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-23 depicts the artefact and Figure 13.3-24 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 80 per cent. The site is located on open grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Highly weathered yellow medium grain silcrete medial flake 19 x 23 x 5 mm

Figure 13.3-23 Artefact at TWF Site10

Figure 13.3-24 TWF Site10 facing east

TWF Site11 (AHIMS #48-4-0580)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2550 m

TWF Site11 is an isolated artefact site. The site consists of one lithic artefact located within a clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-25 depicts the artefact and Figure 13.3-26 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 80 per cent. The site is located on open plain with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan coloured silcrete flake 17 x 21 x 4 mm

Figure 13.3-25 Artefact at TWF Site11

Figure 13.3-26 TWF Site11 facing south

TWF Site12 (AHIMS #48-4-0581)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3200 m

TWF Site12 is an isolated artefact site. The site consists of one lithic artefact located 3 m from a dirt vehicle track within open scrub. Artefacts were located over an area of 1 x 1 m. Figure 13.3-27 depicts the artefact and Figure 13.3-28 indicates the location of the site. Exposures in the area were 30 per cent and visibility within exposures was at 50 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete flake 12 x 19 x 5 mm

Figure 13.3-27 Artefact at TWF Site12

Figure 13.3-28 TWF Site12 facing west

TWF Site13 (AHIMS #48-4-0582)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3290 m

TWF Site13 is an isolated artefact site. The site consists of one lithic artefact located within a clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-29 depicts the artefact and Figure 13.3-30 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 95 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete flake 12 x 9 x 3 mm

Figure 13.3-29 Artefact at TWF Site13

Figure 13.3-30 TWF Site13 facing east

TWF Site14 (AHIMS #48-4-0583)

GDA (zone 55):

Distance to Water (Forest Creek) 3130 m

TWF Site14 is an isolated artefact site. The site consists of one lithic artefact located within a clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-31 depicts the artefact and Figure 13.3-32 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Tan silcrete flake 17 x 10 x 4 mm

Figure 13.3-31 Artefact at TWF Site14

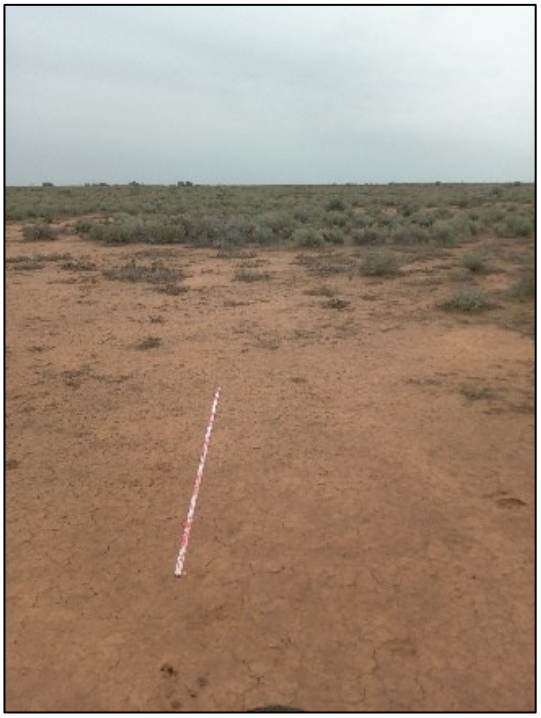

Figure 13.3-32 TWF Site14 facing west

TWF Site15 (AHIMS #48-4-0584)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3110 m

TWF Site15 is an isolated artefact site. The site consists of one lithic artefact located in an area of patchy low grasses. Artefacts were located over an area of 1 x 1 m. Figure 13.3-33 depicts the artefact and Figure 13.3-34 indicates the location of the site. Exposures in the area were 10 per cent and visibility within exposures was at 30 per cent. The site is located on open plain with low vegetation and isolated shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey quartzite proximal flake 24 x 19 x 3 mm

Figure 13.3-33 Artefact at TWF Site15

Figure 13.3-34 TWF Site15 facing north

TWF Site16 (AHIMS #48-4-0585)

GDA (zone 55):

Distance to Water (Forest Creek) 4920 m

TWF Site16 is an isolated artefact site. The site consists of one lithic artefact located on the edge of a clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-35 depicts the artefact and Figure 13.3-36 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 80 per cent. The site is located on open plain in grassland. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Grinding stone 90 x 80 x 50 mm

Figure 13.3-35 Artefact at TWF Site16

Figure 13.3-36 TWF Site16 facing west

TWF Site17 (AHIMS #48-4-0586)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2970 m

TWF Site17 is an isolated artefact site. The site consists of one lithic artefact located in sandy clay flat clearing on edge of rise. Artefacts were located over an area of 1 x 1 m. Figure 13.3-37 depicts the artefact and Figure 13.3-38 indicates the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 90 per cent. The site is located on open plain in scattered shrubs with isolated trees. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan silcrete flake 17 x 20 x 4 mm

Figure 13.3-37 Artefact at TWF Site17

Figure 13.3-38 TWF Site17 facing east

TWF Site18 (AHIMS #48-4-0587)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3030 m

TWF Site18 is an isolated artefact site. The site consists of one lithic artefact located on semi waterlogged silty clay. Artefacts were located over an area of 1 x 1 m. Figure 13.3-39 depicts the artefact and Figure 13.3-40 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 40 per cent. The site is located on open plain with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Yellow FGS flaked piece 26 x 20 x 16 mm

Figure 13.3-39 Artefact at TWF Site18

Figure 13.3-40 TWF Site18 facing west

TWF Site19 (AHIMS #48-4-0588)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 5260 m

TWF Site19 is an isolated artefact site. The site consists of one lithic artefact located on a clay pan surrounded by scattered shrubs. Artefacts were located over an area of 1 x 1 m. Figure 13.3-41 depicts the artefact and Figure 13.3-42 indicates the location of the site. Exposures in the area were 75 per cent and visibility within exposures was at 70 per cent. The site is located on open plain with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Silcrete flake 40 x 38 x 12 mm

Figure 13.3-41 Artefact at TWF Site19

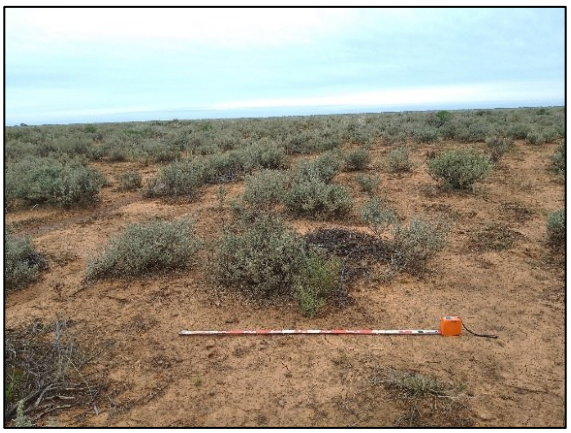

Figure 13.3-42 TWF Site19 facing north

TWF Site20 (AHIMS #48-4-0589)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3750 m

TWF Site20 is a small artefact scatter site. The site consists of two lithic artefacts located near small sandy swale in open clay pan. Artefacts were located over an area of 2 x 1 m. Figure 13.3-43 depicts the artefacts and Figure 13.3-44 indicates the location of the site. Exposures in the area were 85 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with low vegetation. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan FGS flake 15 x 5 x 2 mm
2. Yellow FGS flake 20 x 11 x 4 mm

Figure 13.3-43 Artefact at TWF Site20

Figure 13.3-44 TWF Site20 facing east

TWF Site21 (AHIMS #48-4-0590)

GDA (zone 55):

Distance to Water (Forest Creek) 4950 m

TWF Site21 is an artefact scatter site. The site consists of twelve lithic artefacts located on a large open erosion pan. Artefacts were located over an area of 50 x 30 m. Figure 13.3-45 depicts the artefacts and Figure 13.3-46 indicates the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grass land. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Medium grain silcrete core 55 x 48 x 35 mm
2. Silcrete flake 25 x 30 x 8mm
3. Silcrete partial flake 17 x 26 x 15 mm
4. Quartzite flake 20 x 25 x 10 mm
5. Silcrete flake 14 x 25 x 7 mm
6. Silcrete partial flake 8 x 13 x 3 mm
7. Silcrete partial flake 10 x 17 x 4 mm
8. Chert flake 17 x 23 x 4 mm
9. Chert flake 10 x 16 x 3 mm
10. Chert flake 15 x 12 x 7 mm
11. Red mudstone flake 10 x 12 x 1 mm
12. Silcrete flake 17 x 26 x 11 mm

Figure 13.3-45 Artefacts at TWF Site21

Figure 13.3-46 TWF Site21 facing south

TWF Site22 (AHIMS #48-4-0591)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3830 m

TWF Site22 is a small artefact scatter site. The site consists of two lithic artefacts located an open area surrounded by saltbush. Artefacts were located over an area of 10 x 2 m. Figure 13.3-47 depicts the artefacts and Figure 13.3-48 indicates the location of the site. Exposures in the area were 30 per cent and visibility within exposures was at 40 per cent. The site is located on open plain surrounded by scrub. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Grey IMT flake 25 x 26 x 4 mm
2. White fine grained silcrete flaked stone 25 x 9 x 7 mm

Figure 13.3-47 Artefacts at TWF Site22

Figure 13.3-48 TWF Site22 facing north

TWF Site23 (AHIMS #48-4-0592)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 900 m

TWF Site23 is an artefact scatter site. The site consists of ten lithic artefacts located on a windswept dune, likely more artefacts associated with site, estimated 20 plus artefacts. Artefacts were located over an area of 52 x 57 m. Figure 13.3-49 depicts the artefacts and Figure 13.3-50 indicates the location of the site. Exposures in the area were 75 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grass land. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Quartz flake 15 x 8 x 3 mm
2. Weathered tan silcrete flake 4 x 15 x 5 mm
3. Grey fine grained silcrete flake 14 x 11 x 3 mm
4. Grey silcrete flake 12 x 9 x 2 mm
5. Grey silcrete flaked piece 12 x 10 x 4 mm
6. Tan silcrete flake 24 x 17 x 4 mm
7. Red/mottled silcrete flake 30 x 21 x 5 mm
8. Grey silcrete flake 11 x 8 x 3 mm
9. Grey silcrete flaked piece 13 x 12 x 5 mm
10. Tan/grey silcrete flake 23 x 18 x 5 mm

Figure 13.3-49 Artefacts at TWF Site23

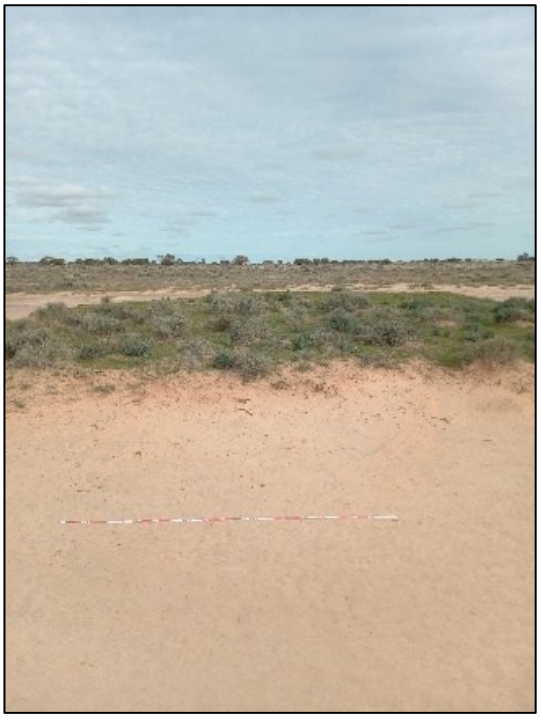

Figure 13.3-50 TWF Site23 facing northwest

TWF Site24 (AHIMS #48-4-0593)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2350 m

TWF Site24 is a small artefact scatter site associated with a hearth. The site consists of two lithic artefacts and a hearth made up of clay heat retainers eroding out of small dune. Artefacts were located over an area of 13 x 3 m. Figure 13.3-51 depicts the artefacts, Figure 13.3-53 depicts the hearth, and Figure 13.3-52 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 80 per cent. The site is located on open plain surrounded by grassland. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Tan fine grained silcrete flaked piece 19 x 10 x 5 mm

2. Red and tan mottled silcrete flaked piece 15 x 11 x 8 mm

Figure 13.3-51 Artefacts at TWF Site24

Figure 13.3-52 TWF Site22 facing north

Figure 13.3-53 Hearth at TWF Site22

TWF Site25 (AHIMS #48-4-0594)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2300 m

TWF Site25 is a small artefact scatter site. The site consists of two lithic artefacts located within a clay pan. Artefacts were located over an area of 2 x 2 m. Figure 13.3-54 depicts the artefacts and Figure 13.3-55 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland and scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Yellow FGS flake 23 x 20 x 4 mm
2. Grey coarse grained silcrete flake 15 x 14 x 11 mm

Figure 13.3-54 Artefacts at TWF Site25

Figure 13.3-55 TWF Site25 facing north

TWF Site26 (AHIMS #48-4-0595)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 6450 m

TWF Site26 is a small artefact scatter site. The site consists of three lithic artefacts located on clay soils surrounded by scrub. Artefacts were located over an area of 10 x 5 m. Figure 13.3-56 depicts the artefacts and Figure 13.3-57 indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 70 per cent. The site is located on open plain surrounded by scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Yellow calcite flake 30 x 25 x 7 mm
2. Yellow calcite flake 29 x 15 x 5 mm
3. Red IMT proximal flake 15 x 17 x 3 mm

Figure 13.3-56 Artefacts at TWF Site26

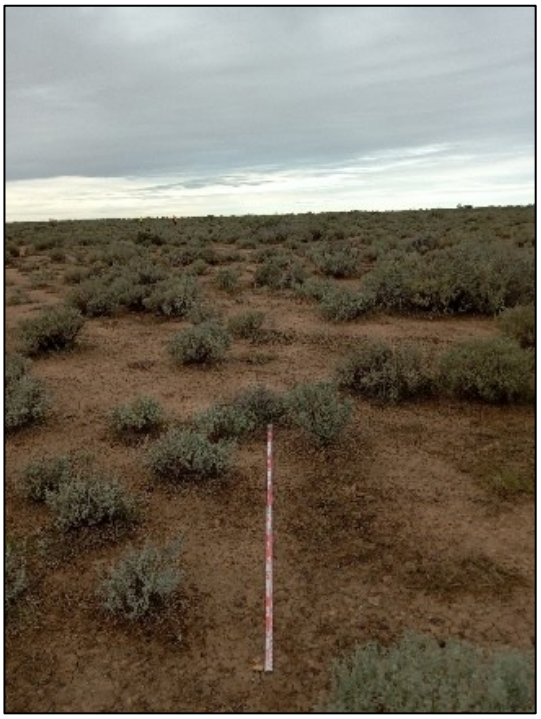

Figure 13.3-57 TWF Site26 facing east

TWF Site27 (AHIMS #48-4-0596)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3180 m

TWF Site27 is an artefact scatter site. The site consists of four lithic artefacts located within a clay pan. Artefacts were located over an area of 2 x 2 m. Figure 13.3-58 depicts the artefacts and Figure 13.3-59 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 100 per cent. The site is located on open plain surrounded by grassland and scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete flake 18 x 10 x 2 mm
2. Grey silcrete flake 17 x 9 x 3 mm
3. Quartz flake 7 x 8 x 4 mm
4. Quartz flake 13 x 8 x 5 mm

Figure 13.3-58 Artefacts at TWF Site27

Figure 13.3-59 TWF Site27 facing north

TWF Site28 (AHIMS #48-4-0597)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1500 m

TWF Site28 is an artefact scatter site. The site consists of four lithic artefacts eroding out of dune. Artefacts were located over an area of 32 x 20 m. Figure 13.3-60 depicts the artefacts and Figure 13.3-61 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 90 per cent. The site is located on open plain surrounded by grassland and scattered scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Flaked piece of broken hammerstone 45 x 22 x 16mm, with 40% cortex, cortex has pitting marks
2. Red FGS core 36 x 30 x 21mm
3. Grey silcrete flake 17 x 11 x 3mm
4. Grey quartzite flake 13 x 14 x 4mm
5. Quartz flake 6 x 11 x 3mm

Figure 13.3-60 Artefacts at TWF Site28

Figure 13.3-61 TWF Site28 facing east

TWF Site29 (AHIMS #48-4-0598)

GDA (zone 55):

Distance to Water (Forest Creek) 5140 m

TWF Site29 is an artefact scatter site. The site consists of five lithic artefacts located within a clay pan. Artefacts were located over an area of 15 x 10 m. Figure 13.3-62 depicts the artefacts and Figure 13.3-63 indicates the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 100 per cent. The site is located on open plain surrounded by grassland and scattered scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Silcrete flake 40 x 20 x 3mm
2. Basalt flake 30 x 16 x 7mm
3. Silcrete flake 20 x 15 x 4mm
4. Quartz flake 15 x 10 x 3mm
5. Basalt flake 18 x 10 x 2mm

Figure 13.3-62 Artefacts at TWF Site29

Figure 13.3-63 TWF Site29 facing northwest

TWF Site30 (AHIMS #48-4-0599)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2830 m

TWF Site30 is an isolated artefact site associated with a hearth. The site consists of one lithic artefact and a hearth located on a clay pan. The main hearth concentration is 50 x 60 cm with clay nodules spread over 8 x 3 m. Artefacts were located over an area of 1 m x 1 m. Figure 13.3-64 depicts the artefacts, Figure 13.3-65 depicts the hearth, and Figure 13.3-66 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey quartzite flake 18 x 11 x 8mm

Figure 13.3-64 Artefact at TWF Site30

Figure 13.3-65 Hearth at TWF Site30

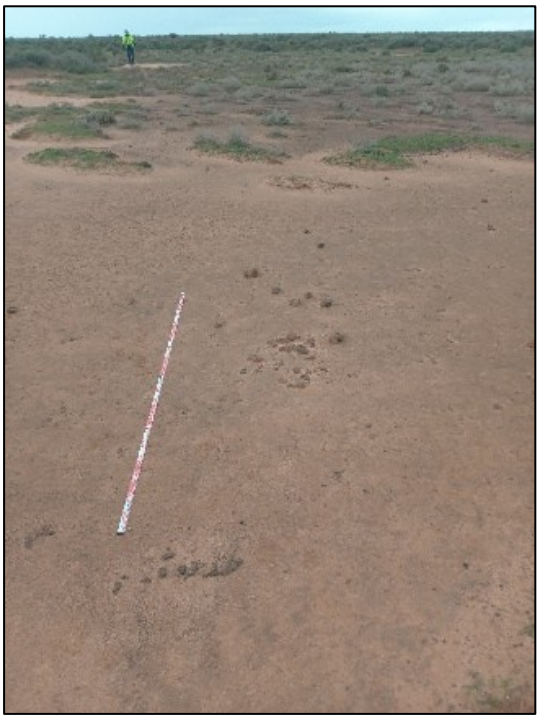

Figure 13.3-66 TWF Site30 facing east

TWF Site31 (AHIMS #48-4-0600)

GDA (zone 55):

Distance to Water (Forest Creek) 5380 m

TWF Site31 is a hearth site. The site consists of a hearth located on a clay pan. The main hearth concentration is highly disbursed, roughly covering an area of 80 x 50 cm, with clay nodules spread over 3 x 2 m. Figure 13.3-68 depicts the hearth and Figure 13.3-67 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by scrub. It is located within the siliceous sands soil type.

Figure 13.3-67 TWF Site31 facing west

Figure 13.3-68 Hearth at TWF Site31

TWF Site32 (AHIMS #48-4-0601)

GDA (zone 55):

Distance to Water (Forest Creek) 5100 m

TWF Site32 is an artefact scatter site. The site consists of eleven lithic artefacts located within a clay pan. Artefacts were located over an area of 110 x 30 m. Figure 13.3-69 depicts the artefacts and Figure 13.3-70 indicates the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 100 per cent. The site is located on open plain surrounded by grassland and scattered scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Tan flake piece 26 x 20 x 7mm
2. Quartzite flaked piece 20 x 12 x 8mm
3. Grey quartz flake 17 x 11 x 3mm
4. Cream silcrete flake 20 x 12 x 5mm
5. Tan silcrete flaked piece 17 x 8 x 4mm
6. Quartz flake 10 x 7 x 1mm
7. Quartz flaked piece 14 x 9 x 3mm
8. Black IMT flake 10 x 8 x 2mm
9. Tan silcrete split flake 23 x 18 x 5mm
10. Milky quartz flaked piece 24 x 9 x 7mm
11. Brown silcrete flake w 40 per cent cortex 28 x 20 x 8mm

Figure 13.3-69 Artefacts at TWF Site32

Figure 13.3-70 TWF Site32 facing northeast

TWF Site33 (AHIMS #48-4-0602)

GDA (zone 55):

Distance to Water (Forest Creek) 5160 m

TWF Site33 is an isolated artefact site. The site consists of one lithic artefact located a clay pan in patchy grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-71 depicts the artefact and Figure 13.3-72 indicates the location of the site. Exposures in the area were 40 per cent and visibility within exposures was at 70 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Pale grey silcrete flake 27 x 32 x 9mm

Figure 13.3-71 Artefact at TWF Site33

Figure 13.3-72 TWF Site33 facing east

TWF Site34 (AHIMS #48-4-0620)

GDA (zone 55):

Distance to Water (Forest Creek) 5080 m

TWF Site34 is an isolated artefact site. The site consists of one lithic artefact located a clay pan in patchy scrub. Artefacts were located over an area of 1 x 1 m. Figure 13.3-73 depicts the artefact and Figure 13.3-74 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete core with one negative flake scar 31 x 27 x 25mm

Figure 13.3-73 Artefact at TWF Site34

Figure 13.3-74 TWF Site34 facing west

TWF Site35 (AHIMS #48-4-0621)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3300 m

TWF Site35 is an isolated artefact site. The site consists of one lithic artefact located an erosion scald in grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-75 depicts the artefact and Figure 13.3-76 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 70 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Cream silcrete flake 27 x 30 x 16 mm

Figure 13.3-75 Artefact at TWF Site35

Figure 13.3-76 TWF Site35 facing south

TWF Site36 (AHIMS #48-4-0622)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2420 m

TWF Site36 is an isolated artefact site. The site consists of one lithic artefact located an erosion scald within scrub. Artefacts were located over an area of 1 x 1 m. Figure 13.3-77 depicts the artefact and Figure 13.3-78 indicates the location of the site. Exposures in the area were 15 per cent and visibility within exposures was at 50 per cent. The site is located on open plain with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Cream silcrete flake 25 x 20 x 7 mm

Figure 13.3-77 Artefact at TWF Site36

Figure 13.3-78 TWF Site36 facing southwest

TWF Site37 (AHIMS #48-4-0623)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2580 m

TWF Site37 is an isolated artefact site. The site consists of one lithic artefact located an erosion scald in grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-79 depicts the artefact and Figure 13.3-80 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 80 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Grey silcrete flake with slight red tinge, may be evidence of heat treating 30 x 20 x 12 mm

Figure 13.3-79 Artefact at TWF Site37

Figure 13.3-80 TWF Site37 facing west

TWF Site38 (AHIMS #48-4-0624)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2830 m

TWF Site38 is an artefact scatter site. The site consists of six lithic artefacts located in clay pan adjacent to dirt vehicle track. Artefacts were located over an area of 10 x 10 m. Figure 13.3-81 depicts the artefacts and Figure 13.3-82 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 85 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Pale pink IMT flake 28 x 16 x 10 mm
2. Brown silcrete flake 22 x 23 x 8 mm
3. Grey quartzite flake 23 x 21 x 6 mm
4. Yellow silcrete flake 32 x 20 x 7 mm
5. Pink coarse grain silcrete flake 29 x 37 x 5 mm
6. Orange silcrete flake 38 x 15 x 7 mm

Figure 13.3-81 Artefacts at TWF Site38

Figure 13.3-82 TWF Site38 facing west

TWF Site39 (AHIMS #48-4-0625)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2890 m

TWF Site39 is an artefact scatter site. The site consists of nine recorded lithic artefacts located in clay pan; the site is noted to have potential to contain 30+ artefacts. Artefacts were located over an area of 30 x 30 m. Figure 13.3-83 depicts the artefacts and Figure 13.3-84 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 95 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Broken grindstone 65 x 40 x 16mm
2. Tan silcrete flake 64 x 35 x 17mm
3. Quartzite flake 39 x 27 x 9mm
4. Flaked pebble 34 x 16 x 33mm
5. Grey silcrete flake 20 x 14 x 4mm
6. Pink silcrete flake 30 x 15 x 25
7. Grey IMT flaked piece 26 x 25 x 8mm
8. Grey silcrete flake 22 x 13 x 7mm
9. Pink IMT retouched flake, potential scraper tool 27 x 18 x 9mm, see Figure 13.3-85

Figure 13.3-83 Artefacts at TWF Site39

Figure 13.3-84 TWF Site39 facing northwest

Figure 13.3-85 Potential scraper tool at TWF Site39

TWF Site40 (AHIMS #48-4-0626)

GDA (zone 55):

Distance to Water (Forest Creek) 5160 m

TWF Site40 is a small artefact scatter site. The site consists of two recorded lithic artefacts located in an exposure surrounded by small shrubs. Artefacts were located over an area of 1 x 1 m.
Figure 13.3-86 depicts the artefacts and Figure 13.3-87 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 70 per cent. The site is located on open plain in scrub. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Cream silcrete flake 15 x 22 x 5mm
2. Quartz flaked piece 14 x 11 x 5mm

Figure 13.3-86 Artefacts at TWF Site40

Figure 13.3-87 TWF Site40 facing east

TWF Site41 (AHIMS #48-4-0627)

GDA (zone 55):

Distance to Water (Forest Creek) 4930 m

TWF Site41 is an isolated artefact site. The site consists of one lithic artefact located an area of erosion in patchy grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-88 depicts the artefact and Figure 13.3-89 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 70 per cent. The site is located on open grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Weathered milky quartz flake 18 x 13 x 3mm

Figure 13.3-88 Artefact at TWF Site41

Figure 13.3-89 TWF Site41 facing northeast

TWF Site42 (AHIMS #48-4-0628)

GDA (zone 55):

Distance to Water (Forest Creek) 4820 m

TWF Site41 is an isolated artefact site. The site consists of one lithic artefact located an area of erosion in thick grassland. Artefacts were located over an area of 1 x 1 m. Figure 13.3-90 depicts the artefact and Figure 13.3-91 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 90 per cent. The site is located on open grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Grey silcrete flake 20 x 6 x 5mm

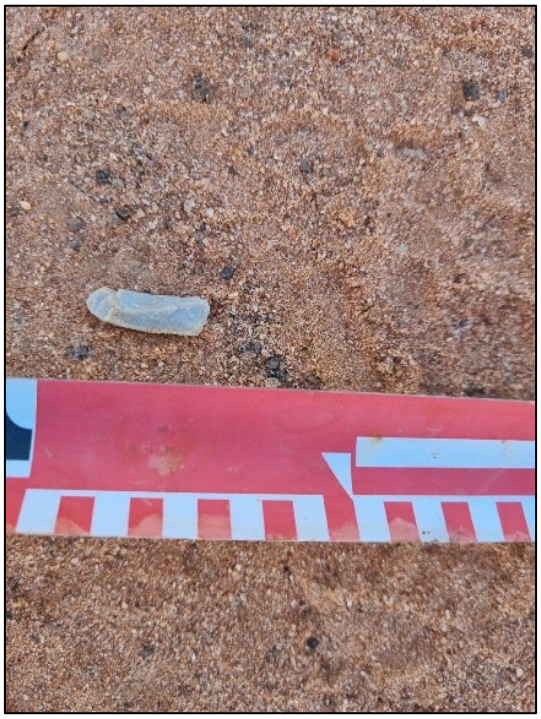

Figure 13.3-90 Artefact at TWF Site42

Figure 13.3-91 TWF Site42 facing north

TWF Site43 (AHIMS #48-4-0629)

GDA (zone 55):

Distance to Water (Forest Creek) 2940 m

TWF Site43 is a small artefact scatter site associated with a hearth. The site consists of two lithic artefacts and a highly dispersed hearth made up of clay heat retainers located within a sandy exposure. The hearth measures 55 x 40 cm with nodules spread up to 1.5 m and 4 m away. Artefacts were located over an area of 50 x 20 m. Figure 13.3-93 depicts the artefacts, Figure 13.3-92 depict the hearth, and Figure 13.3-94 indicates the location of the site. Exposures in the area were 75 per cent and visibility within exposures was at 90 per cent. The site is located on open plain surrounded by grassland. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Conglomerate pebble, potential grindstone 56 x 45 x 28mm
2. Pink silcrete flake 22 x 14 x 6mm

Figure 13.3-92 Hearth at TWF Site43

Figure 13.3-93 Artefacts at TWF Site43

Figure 13.3-94 TWF Site43 facing northeast

TWF Site44 (AHIMS #48-4-0603)

GDA (zone 55):

Distance to Water (Forest Creek) 2980 m

TWF Site44 is a hearth site. The site consists of a hearth located on a clay pan. The main hearth concentration covers an area of 95 x 80 cm, with clay nodules spread over 6 x 3 m, charcoal is present within the concentration. Figure 13.3-95 depicts the hearth and Figure 13.3-96 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Figure 13.3-95 Hearth at TWF Site44

Figure 13.3-96 TWF Site44 facing northeast

TWF Site45 (AHIMS #48-4-0604)

GDA (zone 55):

Distance to Water (Forest Creek) 3460 m

TWF Site45 is a hearth site. The site consists of two hearths located on a clay pan. The first hearth concentration covers an area of 130 x 100 cm and the second an area of 85 x 95 cm, with clay nodules spread over 5 x 2 m. A number of piles of waste sheep fleece have been dumped next to the site, indicating that there has likely been some vehicular disturbance to the site. Figure 13.3-97 depicts the hearths and Figure 13.3-98 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Figure 13.3-97 Hearths at TWF Site45

Figure 13.3-98 TWF Site45 facing east

TWF Site46 (AHIMS #48-4-0605)

GDA (zone 55):

Distance to Water (Forest Creek) 3320 m

TWF Site41 is an isolated artefact site. The site consists of one lithic artefact located a large clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-99 depicts the artefact and Figure 13.3-100 indicates the location of the site. Exposures in the area were 100 per cent and visibility within exposures was at 100 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Igneous flake 25 x 13 x 11mm

Figure 13.3-99 Artefact at TWF Site46

Figure 13.3-100 TWF Site46 facing west

TWF Site47 (AHIMS #48-4-0606)

GDA (zone 55):

Distance to Water (Forest Creek) 3330 m

TWF Site47 is an isolated artefact site. The site consists of one lithic artefact located within a large clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-101 depicts the artefact and Figure 13.3-102 indicates the location of the site. Exposures in the area were 100 per cent and visibility within exposures was at 100 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Milky quartz flake 19 x 15 x 8mm

Figure 13.3-101 Artefact at TWF Site47

Figure 13.3-102 TWF Site47 facing north

TWF Site48 (AHIMS #48-4-0607)

GDA (zone 55):

Distance to Water (Forest Creek) 3290 m

TWF Site48 is a small artefact scatter site. The site consists of two recorded lithic artefacts on the edge of a large clay pan. Artefacts were located over an area of 1 x 1 m. Figure 13.3-103 depicts the artefacts and Figure 13.3-104 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 100 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Brown coarse silcrete flake 20 x 8 x 5mm
2. Milky quartz flake 8 x 7 x 3mm

Figure 13.3-103 Artefact at TWF Site48

Figure 13.3-104 TWF Site48 facing south

TWF Site49 (AHIMS #48-4-0830)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 3900 m

TWF Site49 is a small artefact scatter site. The site consists of three recorded lithic artefacts within a small claypan surrounded by scrub. Artefacts were located over an area of 2 x 1 m. Figure 13.3-105 depicts the artefacts and Figure 13.3-106 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 90 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Tan silcrete complete flake 17 x 19 x 3mm
2. Milky quartz flake 21 x 11 x 7mm,
3. Milky quartz flake 10 x 9 x 4mm

Figure 13.3-105 Artefact at TWF Site49

Figure 13.3-106 TWF Site49 facing southwest

TWF Site50 (AHIMS #48-4-0831)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 5135 m

TWF Site50 is an isolated find site. The site consists of one recorded lithic artefact in a small exposure surrounded by scrub. Artefacts were located over an area of 1 x 1 m. Figure 13.3-107 depicts the artefacts and Figure 13.3-108 indicates the location of the site. Exposures in the area were 15 per cent and visibility within exposures was at 50 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Milky quartz flake 15 x 6 x 2mm

Figure 13.3-107 Artefact at TWF Site50

Figure 13.3-108 TWF Site50 facing north

TWF Site51 (AHIMS #48-4-0832)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 5240 m

TWF Site51 is a small artefact scatter site. The site consists of five recorded lithic artefacts on the edge of a narrow clay pan. Artefacts were located over an area of 32 x 8 m. Figure 13.3-109 depicts the artefacts and Figure 13.3-110 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 90 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan silcrete flake 28 x 26 x 8mm
2. Tan silcrete flaked piece 19 x 5 x 6mm
3. Coarse grained mottled silcrete flake 24 x 26 x 4mm
4. Coarse grained mottled silcrete flake 14 x 15 x 4mm
5. Coarse grained mottled silcrete flaked piece 14 x 13 x 9mm

Figure 13.3-109 Artefact at TWF Site51

Figure 13.3-110 TWF Site51 facing northeast

TWF Site52 (AHIMS #48-4-0833)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 5343 m

TWF Site52 is a small artefact scatter site. The site consists of two recorded lithic artefacts in a small exposure surrounded by scrub. Artefacts were located over an area of 12 x 2 m. Figure 13.3-111 depicts the artefacts and Figure 13.3-112 indicates the location of the site. Exposures in the area were 30 per cent and visibility within exposures was at 75 per cent. The site is located on open plain with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Tan silcrete distal flake 28 x 17 x 8mm
2. Orange tan silcrete flake 21 x 15 x 6mm

Figure 13.3-111 Artefact at TWF Site52

Figure 13.3-112 TWF Site52 facing east

TWF Site53 (AHIMS #48-4-0834)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 5560 m

TWF Site53 is an isolated find site. The site consists of one recorded lithic artefact in a small exposure surrounded by scrub. Artefacts were located over an area of 1 x 1 m. Figure 13.3-113 depicts the artefacts and Figure 13.3-114 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 90 per cent. The site is located on open plain in grassland with scattered shrubs. It is located within the grey, brown and red clays soil type.

Artefacts recorded:

1. Red coarse silcrete distal flake 14 x 17 x 4mm

Figure 13.3-113 Artefact at TWF Site53

Figure 13.3-114 TWF Site53 facing southeast

TWF Site54 (AHIMS #48-4-0835)

GDA (zone 55):

Distance to Water (The Forest Creek) 5420 m

TWF Site54 is an artefact scatter site associated with a hearth. The site consists of ten recorded lithic artefacts and a dispersed hearth made up of clay heat retainers across interconnected small clay pan exposures surrounded by scrub. Artefacts were located over an area of 44 x 17 m. The hearth measures 50 x 50 cm with nodules spread up to 13 x 4 m. Figure 13.3-115 depicts the artefacts, Figure 13.3-116 depicts the hearth concentration, and Figure 13.3-117 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Milky quartz flake 10 x 5 x 4mm
2. Maroon silcrete flake 14 x 7 x 1mm
3. Tan split silcrete flake 11 x 9 x 1mm
4. Grey silcrete med flake 7 x 8 x 1mm
5. Crystal quartz flake 17 x 9 x 3mm
6. Mustard silcrete flake 22 x 15 x 4mm
7. Milky quartz angular fragment 12 x 14 x 5mm
8. Tan silcrete flake 26 x 6 x 4mm
9. Crystalline quartz flaked piece 34 x 22 x 17mm
10. Milky quartz flake 14 x 9 x 2mm

Figure 13.3-115 Artefacts at TWF Site54

Figure 13.3-116 Hearth at TWF Site54

Figure 13.3-117 TWF Site54 facing west

TWF Site55 (AHIMS #48-4-0836)

GDA (zone 55):

Distance to Water (The Forest Creek) 5170 m

TWF Site55 is a small artefact scatter site. The site consists of two recorded lithic artefacts located across interconnected small exposures surrounded by scrub. Artefacts were located over an area of 30 x 2 m. Figure 13.3-118 depicts the artefacts and Figure 13.3-119 indicates the location of the site. Exposures in the area were 60 per cent and visibility within exposures was at 80 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Beige weathered silcrete flake 20 x 9 x 4mm
2. Beige silcrete flake 17 x 16 x 3mm

Figure 13.3-118 Artefact at TWF Site55

Figure 13.3-119 TWF Site55 facing east

TWF Site56 (AHIMS #48-4-0837)

GDA (zone 55):

Distance to Water (The Forest Creek) 5170 m

TWF Site56 is a small artefact scatter site. The site consists of two recorded lithic artefacts located within a small exposure surrounded by scrub. Artefacts were located over an area of 2 x 1 m. Figure 13.3-120 depicts the artefacts and Figure 13.3-121 indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 80 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Purple grey silcrete flake 29 x 15 x 4mm
2. Purple grey silcrete flake 17 x 9 x 2mm

Figure 13.3-120 Artefact at TWF Site56

Figure 13.3-121 TWF Site56 facing east

TWF Site57 (AHIMS #48-4-0838)

GDA (zone 55):

Distance to Water (The Forest Creek) 3180 m

TWF Site57 is an artefact scatter site. The site consists of two recorded lithic artefacts located within a small exposure surrounded by scrub along the Booroorban-Tchelery Road. Artefacts were located over an area of 100 x 30 m. Figure 13.3-122 depicts the artefacts and Figure 13.3-123 indicates the location of the site. Exposures in the area were 85 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

3. Tan silcrete flake 19 x 23 x 3mm
4. Maroon coarse grain silcrete flaked coble 39 x 27 x 26mm
5. Milk quartz flake 23 x 19 x 4mm
6. Milky quartz angular fragment 19 x 19 x 6mm
7. Tan silcrete flake 17 x 11 x 6mm
8. Brown chert flake 10 x 14 x 4mm
9. Tan silcrete flake 29 x 22 x 6mm
10. Tan silcrete backed flake 27 x 26 x 9mm
11. Pale grey silcrete flake 20 x 15 x 4mm

Figure 13.3-122 Artefact at TWF Site57

Figure 13.3-123 TWF Site57 facing west

TWF Site58 (AHIMS #48-4-0839)

GDA (zone 55):

Distance to Water (The Forest Creek) 3160 m

TWF Site58 is a small artefact scatter site. The site consists of three recorded lithic artefacts located within an exposure surrounded by scrub along the Booroorban-Tchelery Road. Artefacts were located over an area of 30 x 2 m. Figure 13.3-124 depicts the artefacts and Figure 13.3-125 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Grey silcrete flake 18 x11 x 2 mm
2. Tan silcrete spilt flake 17 x 15 x 6 mm
3. Maroon volcanic flaked piece 33 x 29 x 7 mm

Figure 13.3-124 Artefact at TWF Site58

Figure 13.3-125 TWF Site58 facing northeast

TWF Site59 (AHIMS #48-4-0840)

GDA (zone 55):

Distance to Water (The Forest Creek) 3040 m

TWF Site59 is an isolated find site. The site consists of one recorded lithic artefact located within a small exposure surrounded by scrub along the Booroorban-Tchelery Road. Artefacts were located over an area of 1 x 1 m. Figure 13.3-126 depicts the artefacts and Figure 13.3-127 indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 80 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Weathered tan/pink silcrete proximal flake 19 x 15 x 5mm

Figure 13.3-126 Artefact at TWF Site59

Figure 13.3-127 TWF Site59 facing north

TWF Site60 (AHIMS #48-4-0841)

GDA (zone 55):

Distance to Water (The Forest Creek) 0 m

TWF Site60 is a hearth site associated with an isolated find. The site consists of one recorded lithic artefact and a widespread hearth made up of clay heat retainers scattered across the dry creek bed of Forest Creek surrounded by open eucalypt forest and scrub. Artefacts were located over an area of 1 x 1 m. No main hearth concentration was noted with heat retainer clay nodules spread across an area of 20 x 37 m. Figure 13.3-128 depicts the artefacts and Figure 13.3-129 and Figure 13.3-130 indicate the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 80 per cent. The site is located within a stream channel on open plain with open forest. It is located within the red-brown earths soil type.

Artefacts recorded:

1. Red silcrete flake 14 x 10 x 4 mm

Figure 13.3-128 Artefact at TWF Site60

Figure 13.3-129 Hearth at TWF Site60

Figure 13.3-130 TWF Site60 facing west

TWF Site61 (AHIMS #48-4-0842)

GDA (zone 55):

Distance to Water (The Forest Creek) 3160 m

TWF Site61 is a small artefact scatter site. The site consists of six recorded lithic artefacts located within a clay pan exposure surrounded by scrub. Artefacts were located over an area of 60 x 60 m. Figure 13.3-131 depicts the artefacts and Figure 13.3-132 indicates the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 90 per cent. The site is located on open plain with scattered shrubs. It is located within the silicious sands soil type.

Artefacts recorded:

1. Pale purple silcrete proximal flake 21 x 17 x 10mm
2. Grey quartzite proximal flake 15 x 11 x 4mm
3. Red/purple silcrete core fragment 65 x 38 x 34mm
4. IMT flake 25 x 20 x 7mm
5. Milky quartz flake 9 x 8 x 3mm
6. Milky quartz flake 12 x 9 x 5mm

Figure 13.3-131 Artefacts at TWF Site61

Figure 13.3-132 TWF Site61 facing northeast

13.3.2 PAD Sites

TWFPAD01 (AHIMS #48-4-0608)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1510 m

TWFPAD01 is an artefact scatter site with associated PAD. The site consists of five recorded lithic artefacts within a sandy clay pan, an additional artefact was located half buried within the clay pan, it was unable to be removed to be fully recorded. The scatter was located on a large, mounded dune that is considered to have PAD. The PAD is considered to cover an area of 1,600 x 500 m. Figure 13.3-133 depicts the artefacts and Figure 13.3-134 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type bordered by the grey, brown and red clays soil type.

Artefacts recorded:

1. Mudstone flake 32 x 24 x 4mm
2. Tan silcrete flake 11 x 13 x 4mm
3. Quartz flaked piece 12 x 6 x 3mm
4. Yellow FGS flake 19 x 9 x 6mm
5. Orange/tan mottled IMT medial flake 23 x 17 x 8mm

Figure 13.3-133 Artefacts at TWFPAD01

Figure 13.3-134 TWFPAD01 facing east

TWFPAD02 (AHIMS #48-4-0609)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1000 m

TWFPAD02 is an artefact scatter and hearth site complex with associated PAD. The site consists of 39 recorded lithic artefacts on a mounded dune. Three hearths were located associated with the site during field surveys, with varying levels of condition. The PAD is considered to cover an area of 670 m x 550 m. Figure 13.3-137 depicts the artefacts, Figure 13.3-135 and Figure 13.3-136 depict the hearths, and Figure 13.3-138 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type bordered by the grey, brown and red clays soil type.

Hearths recorded:

Hearth 1 – hearth has been heavily impacted by water wash with many of the heat retainers washed over the dune surface, main concentration is 110 x 80 cm, spread is approximately 50 x 30 m.

Hearth 2 – main concentration of heat retainers is 70 x 45 cm and spread is approximately 7 x 3 m.

Hearth 3 – erosion around the hearth has made pedestal, main concentration of heat retainers is 17 x 24 cm, and spread is approximately 1.8 x 1.2 m.

Artefacts recorded:

1. Quartz flaked piece 15 x 13 x 11 mm
2. Quartz flake 15 x 19 x 4 mm
3. IMT flake 9 x 7 x 2 mm
4. Grey IMT flaked piece 11 x 9 x 6 mm
5. IMT flake 19 x 11 x 3 mm
6. Quartz flake 9 x 5 x 2 mm
7. Pink FGS flake 7 x 6 x 2 mm
8. Quartz flake 5 x 4 x 1 mm
9. Tan FGS flake 26 x 15 x 5 mm
10. Heat treated grey IMT 19 x 17 x 1 mm
11. Red brown FGS proximal flake 20 x 26 x 5 mm
12. IMT flaked piece 16 x 15 x 9 mm
13. Quartz flake 9 x 9 x 2 mm
14. Grey quartzite flake 28 x 17 x 5 mm
15. Red/grey mottled IMT flake 17 x 12 x 3 mm
16. Purple IMT flake 11 x 10 x 2 m
17. Grey quartzite flaked piece 19 x 6 x 4 mm
18. Purple/grey IMT flaked piece 15 x 8 x 3 mm
19. Grey FGS flake 17 x 20 x 4 mm
20. Tan silcrete flake 15 x 7 x 2 mm

21. Grey FGS flake 20 x 10 x 4 mm
22. Tan silcrete flake 17 x 10 x 7 mm
23. Quartz flake 16 x 17 x 4 mm
24. Red/grey FGS flaked piece 15 x 10 x 3 mm
25. Tan FGS proximal flake 20 x 25 x 7 mm
26. Grey quartzite flake 29 x 21 x 7 mm
27. Tan chert flake 11 x 10 x 2 mm
28. White FGS flake 28 x 16 x 4 mm
29. Purple IMT flaked piece 11 x 9 x 2 mm
30. Pink/grey FGS flake 20 x 24 x 5 mm
31. Quartz flake 20 x 12 x 2 mm
32. Quartz flake 12 x 5 x 1 mm
33. Grey FGS flake 9 x 5 x 1 mm
34. Pale grey quartzite flake 22 x 17 x 5 mm
35. Tan silcrete flake 20 x 11 x 3 mm
36. Grey FGS flake 27 x 20 x 3 mm
37. Tan quartzite flake 35 x 12 x 10 mm
38. Tan quartzite flake 12 x 20 x 4 mm
39. White FGS flaked piece 22 x 16 x 4 mm

Figure 13.3-135 Hearth at TWFPAD02

Figure 13.3-136 Hearth at TWFPAD02

Figure 13.3-137 Artefacts at TWFPAD02

Figure 13.3-138 TWFPAD02 facing south

TWFPAD03 (AHIMS #48-4-0610)

GDA (zone 55):

Distance to Water (Forest Creek) 4650 m

TWFPAD02 is an artefact scatter and hearth site complex with associated PAD. The site consists of 39 recorded lithic artefacts within a large area of interconnected clay pans. Three hearths were located associated with the site during field surveys, with varying levels of condition. The PAD is considered to cover an area of 440 x 330 m. Figure 13.3-139 and Figure 13.3-141 depicts the artefacts, Figure 13.3-140 depict the hearths, and Figure 13.3-142 indicates the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type bordered by the grey, brown and red clays soil type.

Hearths recorded:

Hearth 1 – scatter of baked clay nodules, 5x concentrated in 2 x 3 m area, others scattered across sandy erosion scald.

Hearth 2 – large concentration of clay heat retainers, looks to have been disturbed.

Artefacts recorded:

1. Tan silcrete flake 16 x 11 x 3 mm
2. Grey silcrete flake 13 x 12 x 3 mm
3. Grey silcrete piece with 50% cortex 13 x 13 x 4 mm
4. Quartz flake 12 x 5 x 3 m
5. White silcrete flake 19 x15 x 7 mm
6. Black FGS comp split flake 29 x 17 x 5 mm
7. White/grey silcrete flake 26 x 16 x 9 mm
8. Tan silcrete flaked piece 45 x 30 x 11 mm
9. Black FGS flake 19 x 9 x 3 mm
10. Grey silcrete flake 26 x 24 x 13 mm
11. White/grey silcrete flake 31 x 15 x 7 mm
12. Tan fine grained silcrete 22 x 23 x 5 mm
13. Quartz flake 29 x 18 x 5 mm
14. Tan/grey silcrete flake 16 x 17 x 4 mm
15. Grey chert flake 11 x 13 x 2 mm
16. Tan silcrete flaked piece 36 x 21 x 8 mm
17. Maroon silcrete flake 16 x 20 x 4 mm
18. Heat treated silcrete flake with baked clay attached, measurements including clay = 25 x 18 x 11 mm, flake measurements 21 x 13 x 3 mm
19. Quartz flake 20 x 15 x 9 mm
20. Grey/green FGS weathered flake with recent breakage on margins 25 x 19 x 2 mm

Figure 13.3-139 Artefacts at TWFPAD03

Figure 13.3-140 Hearth at TWFPAD03

Figure 13.3-141 Heat treated silcrete flake with baked clay attached

Figure 13.3-142 TWFPAD03 facing southeast

TWFPAD04 (AHIMS #48-4-0611)

GDA (zone 55):

Distance to water (Forest Creek) 4850 m

TWFPAD04 is an artefact scatter site with associated PAD. The site consists of 14 recorded lithic artefacts on a large open clay pan. The PAD is considered to cover an area of 400 x 170 m. Figure 13.3-143 depicts the artefacts and Figure 13.3-144 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Quartzite flake 22 x 20 x 5 mm
2. Silcrete flake 23 x 16 x 5 mm
3. Silcrete flake 24 x 25 x 10 mm
4. Silcrete flake 30 x 16 x 8 mm
5. Chert core 22 x 18 x 17 mm
6. Chert core 32 x 30 x 19 mm
7. Chert core 26 x 32 x 14 mm
8. Silcrete flake 22 x 22 x 9 mm
9. Silcrete flake 19 x 15 x 4 mm
10. Quartz flake 22 x 12 x 6 mm
11. Chert flake 17 x 6 x 4 mm
12. Silcrete flake 14 x 13 x 3 mm
13. Quartz flake 16 x 10 x 2 mm
14. Quartz flake 11 x 10 x 2 mm

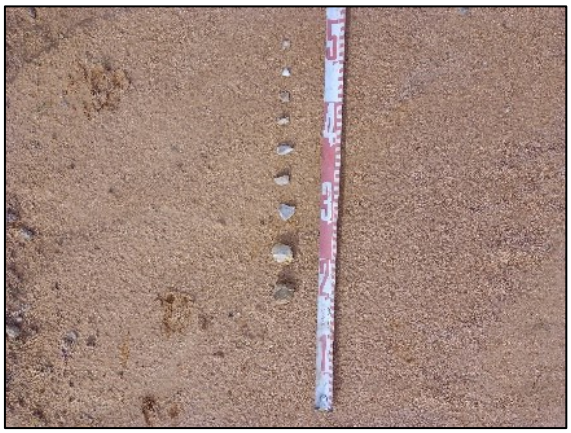

Figure 13.3-143 Artefacts at TWFPAD04

Figure 13.3-144 TWFPAD04 facing south

TWFPAD05 (AHIMS #48-4-0612)

GDA (zone 55):

Distance to Water (Forest Creek) 3630 m

TWFPAD05 is an artefact scatter site with associated PAD. The site consists of seventeen recorded lithic artefacts within a large area of interconnected clay pans. The PAD is considered to cover an area of 600 x 290 m. Figure 13.3-145 and Figure 13.3-146 depicts the artefacts and Figure 13.3-147 and Figure 13.3-148 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded scrub. It is located within the siliceous sands soil type.

Artefacts recorded:

1. Coarse grain silcrete flake 31 x 16 x 11 mm
2. Coarse silcrete flaked piece 30 x 24 x 10 mm
3. Grey fine grain silcrete flake 19 x 10 x 4 mm
4. Grey chert flake 17 x 13 x 4 mm
5. Silcrete flake 35 x 25 x 10 mm
6. Quartz flaked piece 22 x 11 x 8 mm
7. Medium grain silcrete flake 36 x 48 x 8 mm
8. Grey chert flake 17 x 13 x 4 mm
9. Grey fine grain silcrete flake 19 x 10 x 4 mm
10. Coarse grain silcrete flake 31 x 16 x 11 mm
11. Course silcrete flakes piece 30 x 24 x 10 mm
12. Silcrete flake 35 x 25 x 10 mm
13. Quartz flakes price 22 x 11 x 8 mm
14. Medium grain silcrete flake 36 x 48 x 8 mm
15. Medium grain silcrete flake 22 x 19 x 6 mm
16. Quartz flake 11 x 11 x 3 mm
17. Red mudstone flake 18 x 21 x 4 mm

Figure 13.3-145 Artefacts at TWFPAD05

Figure 13.3-146 Artefacts at TWFPAD05

Figure 13.3-147 TWFPAD05 facing east

Figure 13.3-148 TWFPAD05 facing west

TWFPAD06 (AHIMS #48-4-0613)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 1990 m

TWFPAD06 is an artefact scatter and hearth site complex with associated PAD. The site consists of 39 recorded lithic artefacts within a large area of interconnected clay pans. Three hearths were located associated with the site during field surveys, with varying levels of condition. The PAD is considered to cover an area of 500 x 200 m. Figure 13.3-151 depicts the artefacts, Figure 13.3-149 and Figure 13.3-150 depict the hearths, and Figure 13.3-152 indicates the location of the site. Exposures in the area were 50 per cent and visibility within exposures was at 80 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type.

Hearths recorded:

Hearth 1 – hearth eroding out of side of small dune

Hearth 2 – hearth is contained and eroding out of side of small dune.

Hearth 3 and 4 – two hearths, one larger and one smaller, spaced 1.5 metres apart. charcoal staining noted at both.

Artefacts recorded:

1. Grey silcrete flaked piece 25 x 22 x 12 mm
2. Tan silcrete flake 9 x 8 x 2 mm
3. Quartz flaked piece 20 x 16 x 8 mm
4. Quartz flake 17 x 9 x 5 mm
5. Yellow course silcrete flake 21 x 4 x 4 mm
6. Tan silcrete flake with 20% cortex 21 x 10 x 5 mm
7. Grey silcrete flake with purple mottling 17 x 23 x 10 mm
8. Yellow tan silcrete flake 34 x 21 10 mm
9. Grey silcrete flaked piece 25 x 22 12 mm
10. Tan silcrete flake 9 x 8 x 2 mm
11. Quartz flaked piece 20 x 16 x 8 mm
12. Quartz flake 17 x 9 x 5 mm
13. Yellow course silcrete flake 21 x 4 x 4 mm
14. Tan silcrete flake 22 x 20 x 7 mm
15. Grey silcrete flake 26 x 14 x 3 mm
16. Tan silcrete flake with 45% cortex 19 x 16 x 3 mm
17. Purple/tan silcrete flake 21 x 17 x 10 mm

Figure 13.3-149 Hearth at TWFPAD06

Figure 13.3-150 Hearth at TWFPAD06

Figure 13.3-151 Artefacts at TWFPAD06

Figure 13.3-152 TWFPAD06 facing south

TWFPAD07 (AHIMS #48-4-0614)

GDA (zone 55):

Distance to Water (Abercrombie Creek) 2330 m

TWFPAD07 is an artefact scatter and hearth site complex with associated PAD. The site consists of six recorded lithic artefacts within a large area of interconnected clay pans. Two hearths were located associated with the site during field surveys. The PAD is considered to cover an area of 420 x 230 m. The area has been disturbed by rabbit burrowing. Figure 13.3-153 depicts the artefacts and Figure 13.3-154 depict the hearth and indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 90 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type.

Hearths recorded:

Hearth 1 – Mounded hearth with clay heat retainers

Hearth 2 – mounded hearth with clay heat retainers. The main concentration of heat retainers is 3 m x 2 m, the wider scatter spreads 12 x 6 m

Artefacts recorded:

1. Heat treated red/purple silcrete core 50 x 39 x 25mm
2. Tan silcrete flake 27 x 22 x 10 mm
3. Grey silcrete flake 15 x 22 x 9 mm
4. Heat treated red/purple silcrete core 50 x 39 x 25 mm
5. Tan silcrete flake 27 x 22 x 10 mm
6. Grey silcrete flake 15 x 22 x 9 mm

Figure 13.3-153 Artefacts at TWFPAD07

Figure 13.3-154 Hearth at TWFPAD07

TWFPAD08 (AHIMS #48-4-0615)

GDA (zone 55):

Distance to Water (Forest Creek) 5710 m

TWFPAD08 is a hearth site with an isolated artefact and associated PAD. The site consists of one recorded lithic artefact and three hearths located within a large area of interconnected clay pans. The PAD is considered to cover an area of 220 x 140 m. Figure 13.3-157 depicts the artefacts, Figure 13.3-155 and Figure 13.3-156 depict the hearths, and Figure 13.3-158 indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type.

Hearths recorded:

Hearth 1 –hearth with clay heat retainers, 100 x 50 cm

Hearth 2 – hearth with clay heat retainers, 20 x 15 cm

Hearth 3 – hearth with clay heat retainers, 220 x 100 cm

Artefacts recorded:

1. Silcrete flake 55 x 50 x 4 mm

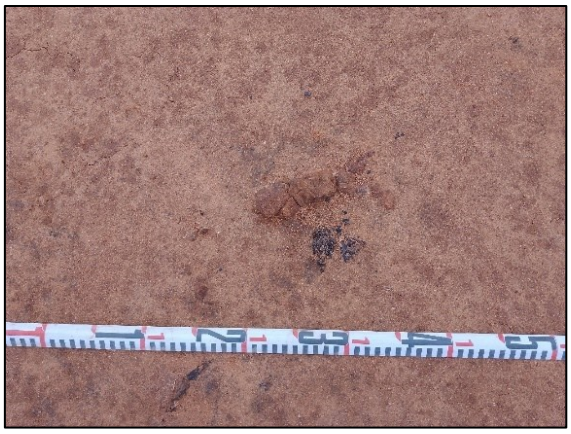

Figure 13.3-155 Hearth at TWFPAD08

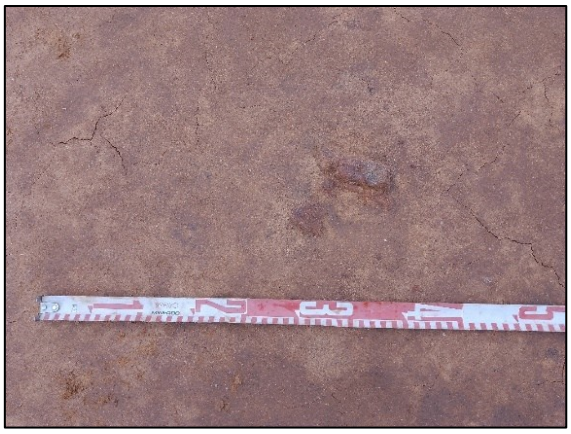

Figure 13.3-156 Hearth at TWFPAD08

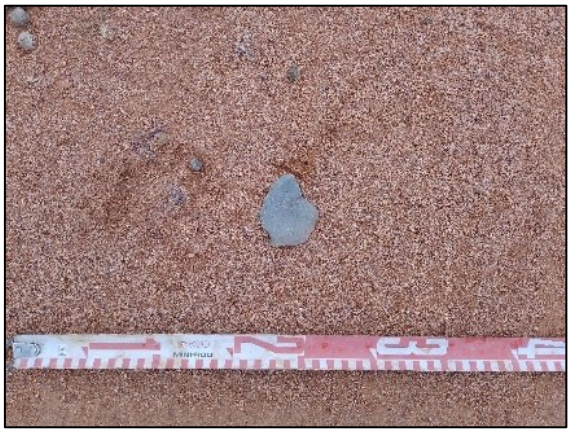

Figure 13.3-157 Artefact at TWFPAD08

Figure 13.3-158 TWFPAD08 facing southwest

TWFPAD09 (AHIMS #48-4-0616)

GDA (zone 55):

Distance to Water (Forest Creek) 5710 m

TWFPAD09 is a hearth site with an isolated artefact and associated PAD. The site consists of one recorded lithic artefact and two hearths located within an area of erosion amongst scattered shrubs. The PAD is considered to cover an area of 160 x 130 m. Figure 13.3-159 depicts the artefact, Figure 13.3-160 depicts the hearth, and Figure 13.3-161 indicates the location of the site. Exposures in the area were 70 per cent and visibility within exposures was at 80 per cent. The site is located on open plain surrounded by scrub. It is located within the siliceous sands soil type bordered by the grey, brown and red clays soil type.

Hearths recorded:

Hearth 1 –hearth with clay heat retainers, 250 x 200 cm

Hearth 2 – hearth with clay heat retainers, 130 x 100 cm

Artefacts recorded:

1. Silcrete flake 20 x 18 x 2 mm

Figure 13.3-159 Artefact at TWFPAD09

Figure 13.3-160 Hearth at TWFPAD09

Figure 13.3-161 TWFPAD09 facing south

TWFPAD10 (AHIMS #48-4-0617)

GDA (zone 55):

Distance to Water (Forest Creek) 6900 m

TWFPAD10 is an artefact scatter site with associated PAD. The site consists of 14 recorded lithic artefacts within a large clay pan. The PAD is considered to cover an area of 185 x 55 m.
Figure 13.3-162 and Figure 13.3-163 depicts the artefacts and Figure 13.3-164 indicates the location of the site. Exposures in the area were 90 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded grassland and scattered shrubs. It is located within the siliceous sands soil type bordered by the grey, brown and red clays soil type.

Artefacts recorded:

1. Silcrete flake 27 x 23 x 12 mm
2. Quartz core 18 x 14 x 15 mm
3. Basalt flake 18 x 4 x 2 mm
4. Quartz flake 16 x 10 x 4 mm
5. Quartz flake 17 x 10 x 3 mm
6. Quartz flake 7 x 12 x 7 mm
7. Quartz flake 10 x 9 x 2 mm
8. Quartz flake 9 x 7 x 4 mm
9. Silcrete core 30 x 20 x 15 mm
10. Basalt flake 28 x 12 x 8 mm
11. Silcrete flake 22 x 18 x 2 mm
12. Chert flake 17 x 15 x 2 mm
13. Silcrete flake 28 x 17 x 3 mm
14. Silcrete flake 13 x 11 x 4 mm

Figure 13.3-162 Artefacts at TWFPAD10

Figure 13.3-163 Artefacts at TWFPAD10

Figure 13.3-164 TWFPAD10 facing north

TWFPAD11 (AHIMS #48-4-0618)

GDA (zone 55):

Distance to Water (Forest Creek) 6000 m

TWFPAD11 is a hearth site complex with a small artefact scatter and associated PAD. The site consists of eight recorded lithic artefacts and seven recorded hearths located within a large area of interconnected clay pans. It is estimated that the entire clay pan contains 25+ hearths. The lithic artefacts and hearths seem to be focused on separate sides of the PAD, hearths on eastern side, artefacts on western. The PAD is considered to cover an area of 740 x 120 m. Figure 13.3-168 and Figure 13.3-169 depict the artefacts, Figure 13.3-166, Figure 13.3-170, Figure 13.3-171 and Figure 13.3-172 depict the hearths, and Figure 13.3-167 and Figure 13.3-165 indicate the location of the site. Exposures in the area were 80 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by scrub. It is located within the siliceous sands soil type.

Hearths recorded:

Hearth 1 –hearth with clay heat retainers, 60 x 40 cm

Hearth 2 – hearth with clay heat retainers, 80 x 100 cm

Hearth 3 – hearth with clay heat retainers, 115 x 110 m

Hearth 4 – hearth with clay heat retainers, 100 x 80 cm. Charcoal present in main deposit.

Hearth 5 – hearth with clay heat retainers, 100 x 11 cm

Hearth 6 – hearth with clay heat retainers, 60 x 55 cm

Hearth 7 – hearth with clay heat retainers, 110 x 110 cm

Artefacts recorded:

1. Milky quartz flake 14 x 10 x 4 mm
2. Milky quartz flake 11 x 25 x 7 mm
3. Purple coarse silcrete flaked piece 48 x 41 x 11 mm
4. Black IMT medial flake 36 x 27 x 14 mm
5. Black IMT flake 38 x 29 x 15 mm
6. Milky quartz flake 12 x 18 x 7 mm
7. Black IMT flake 24 x 24 x 9 mm
8. Tan mudstone flake 30 x 21 x 17 mm

Figure 13.3-165 Hearths at TWFPAD11, facing southeast

Figure 13.3-166 Hearth at TWFPAD11

Figure 13.3-167 Hearths at TWFPAD11, facing east

Figure 13.3-168 Artefact at TWFPAD11

Figure 13.3-169 Artefacts at TWFPAD11

Figure 13.3-170 Hearth at TWFPAD11

Figure 13.3-171 Hearth at TWFPAD11

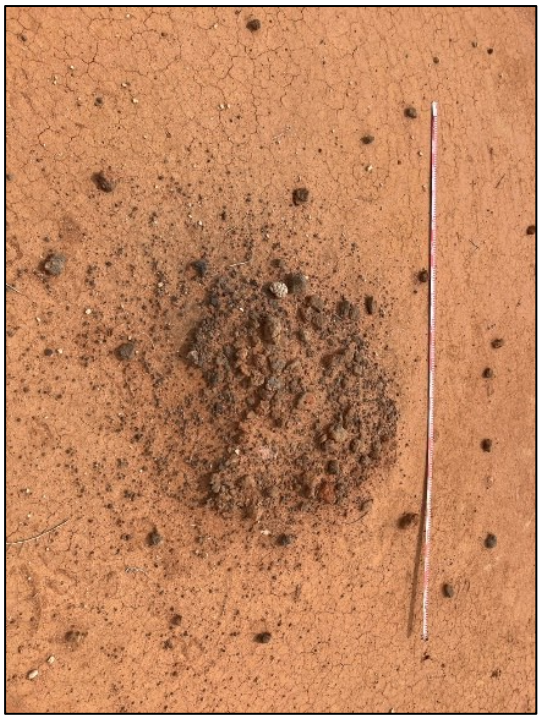

Figure 13.3-172 Hearth at TWFPAD11

TWFPAD12 (AHIMS #48-4-0619)

GDA (zone 55):

Distance to Water (Forest Creek) 3200 m

TWFPAD12 is an artefact scatter and hearth site complex with associated PAD. The site consists of 11 recorded lithic artefacts on a large clay pan. Two hearths were located associated with the site during field surveys, located 14 m apart. The PAD is considered to cover an area of 460 x 120 m. Figure 13.3-173 and Figure 13.3-174 depict the artefacts, Figure 13.3-175 and Figure 13.3-176 depict the hearths, and Figure 13.3-177 and Figure 13.3-178 indicate the location of the site. Exposures in the area were 95 per cent and visibility within exposures was at 95 per cent. The site is located on open plain surrounded by grassland with scattered shrubs. It is located within the siliceous sands soil type.

Southern portions of the PAD were tested during works for the current project during which no artefacts were recovered. These works were limited in scope and did not comprehensively test the PAD. Through the results of testing the PAD area has been reduced. The area of PAD is limited to the northern portion of the clay pan as the southern portion has been disturbed through grading that has removed all top soil down to clay, leaving no archaeological deposit.

Hearths recorded:

Hearth 1 – hearth with clay heat retainers, 100 x 90 cm

Hearth 2 – hearth with clay heat retainers, 100 x 90 cm

Artefacts recorded:

1. Quartzite flake 16 x 22 x 8 mm
2. Quartz flake 9 x 7 x 2 mm
3. Red silcrete flake with slight notching and potential heat treating 8 x 17 x 5 mm
4. Grey FGS flake15 x 12 x 4 mm
5. Quartz flake 20 x 15 x 8 mm
6. Milky quartz longitudinally flaked flake with cortex and retouch along lateral margins 26 x 15 x 6 mm
7. Tan silcrete flaked piece 29 x 23 x 10 mm
8. Olive silcrete flake 21 x 16 x 9 mm
9. Quartz flake 15 x 13 x 4 mm
10. Grey silcrete flake 26 x 18 x 6 mm
11. Quartz flaked piece 24 x 9 x 9 mm

Figure 13.3-173 Artefacts at TWFPAD12

Figure 13.3-174 Artefacts at TWFPAD12

Figure 13.3-175 Hearth at TWFPAD12

Figure 13.3-176 Hearth at TWFPAD12, facing west

Figure 13.3-177 TWFPAD12 facing east

Figure 13.3-178 TWFPAD12 facing south

APPENDIX 4 – TEST PIT DESCRIPTIONS

Transect 1

Test Pit 1	Spit	Depth (cm)
	2 (5 cm)	10
	Description	
GDA (Zone 55): 253733.49,6136454.37	Patchy grass and vegetation on surface, shallow rooted. No notable humic layer, straight onto red brown clay. No gravels or other inclusions noted.	

**Note: T1 P1 was dug in 5 cm spits, all other pits were dug in 10 cm spits*

Test Pit 2	Spit	Depth (cm)
	2	20
	Description	
GDA (Zone 55): 253747.90,6136446.93	No vegetation on surface, dry clay pan forms a slight crust. Sediment below is a dry red brown clay of moderate compaction. Sediment becomes more compact with depth. No gravels or other inclusions noted.	

Test Pit 3	Spit	Depth (cm)
	1	10
	Description	
GDA (Zone 55): 253763.73,6136437.06	No vegetation on surface, dry clay pan forms a slight crust. Sediment below is a dry red brown clay of moderate compaction. Charcoal staining is noted across the pit, also noted in pit 4 and 5, likely associated with widespread fire event.	

Test Pit 4	Spit	Depth (cm)
	3	30
	Description	
GDA (Zone 55): 253783.08,6136430.43	Shallow rooted grass and scrub on surface. Onto orange brown moderately compact silty sand. Sediment is damp with no inclusions or gravels. Some grey discolouration noted from 13 cm onwards associated with charcoal mottling. Shift at 24 cm from silty sand to a heavily compact dry silty clay. Some small gravels (<2 mm) noted in sieve. Charcoal mottling through, sediment is a greyish yellow brown.	

Test Pit 5	Spit	Depth (cm)
	2	20
	Description	
GDA (Zone 55): 253798.37,6136432.05	Pit is located on sloped intersection between clay pan and vegetated rise. Sediment is a damp orange brown moderately compact sandy loam. No gravels or inclusions. At 13 cm an abrupt shift to a dry silty clay is noted. Charcoal staining and flecks noted throughout.	

Transect 2

Test Pit 1(A)	Spit	Depth (cm)
	1	10
	Description	
GDA (Zone 55): 254098.61,6136346.40	Shallow rooted grass and scrub on surface onto sticky plastic red brown clay. Moderate compaction, no inclusions or gravels. Only one 50 cm x 50 cm unit was dug.	

Test Pit 2(A)	Spit	Depth (cm)
	1	10
	Description	
GDA (Zone 55): 254116.87,6136347.62	Shallow rooted grass and scrub on surface onto sticky plastic red brown clay. Moderate compaction, no inclusions or gravels. Only one 50 cm x 50 cm unit was dug.	

Test Pit 3	Spit	Depth (cm)
	5	50
	Description	
GDA (Zone 55): 254135.68,6136348.30	Shallow rooted grass and scrub on surface onto moist loosely compact brown orange silty sand. No inclusions or gravels. Transition at 23 cm to a dry firmly compacted sandy clay with dark brown clay mottling. Shift at 30 cm to a light brown dry silty clay. Shift 45 cm to a very firmly compacted lighter brown dry clay.	

Test Pit 4	Spit	Depth (cm)
	2	20
	Description	
	Shallow rooted grass and scrub on surface onto moderately compact orange brown sandy loam. No inclusions or gravels. Sediment becomes more compact with depth. Shift to a dry clay noted at 19 cm with plastic clay inclusions noted in base.	
GDA (Zone 55): 254155.43,6136349.38		

Test Pit 5	Spit	Depth (cm)
	2	20
	Description	
	Pit is located on sloped intersection between clay pan and vegetated rise. Sediment is a yellow brown silt clay with plastic clay inclusions. No gravels are noted. Sediment becomes more compact and drier with depth. Calcrete nodules are noted from 10–20 cm.	
GDA (Zone 55): 254174.38,6136351.00		

Test Pit 6	Spit	Depth (cm)
	4	40
	Description	
	Shallow rooted grasses on surface onto softly compacted red brown silty sand. No gravels or other inclusions noted. Sediment becomes more compact with depth. Transition at 24 cm to a heavily compacted orange brown silty clay. Clay content increases with depth.	
GDA (Zone 55): 254193.99,6136351.41		

Test Pit 7	Spit	Depth (cm)
	2	20
	Description	
GDA (Zone 55): 254212.80,6136352.09	Yellow brown moderately compact dry silty clay. Sediment is non-friable, forming small clumps when dug that are difficult to break apart. Calcrete nodules noted from 10 cm onwards within dry clay sediment in quadrant A. It was considered unnecessary to dig quadrants B-D as quadrant A contained all clay.	

Test Pit 8	Spit	Depth (cm)
	2	30
	Description	
GDA (Zone 55): 254235.26,6136351.27	Shallow rooted grasses on surface onto moderately compact orange brown sandy loam. No gravels or other inclusions noted. Shift at 22 cm to a heavily compact dry clay.	

Test Pit 9	Spit	Depth (cm)
	4	40
	Description	
GDA (Zone 55): 254254.47,6136350.73	Shallow rooted grasses and vegetation on surface onto damp moderately compact orange brown sandy loam. No gravels or other inclusions noted. Shift at 27 cm to a heavily compact dry silty clay, slightly bleached colouring (light orange brown). Sediment is semi-friable forming small clumps when dug.	

APPENDIX 5 – UNANTICIPATED DISCOVERY PROTOCOLS

Protocol to follow in the event that Aboriginal object(s) or historical relics (other than human remains) are encountered

In the event that object(s) that are suspected of being Aboriginal object(s) or relic(s) are encountered during development works, then the following protocol will be followed:

1. Cease any further excavation or ground disturbance, in the area of the find(s);

    a. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be temporarily halted; and

    b. The site supervisor and the project archaeologist will be informed of the find(s).

2. Do not remove any find(s) or unnecessarily disturb the area of the find(s);

3. Ensure that the area of the find(s) is adequately marked as a no-go area for machinery or further disturbance, and that the potential for accidental impact is avoided;

4. Note the location and nature of the finds, and report the find to:

    a. Relevant project personnel responsible for project and construction direction and management, and

    b. Report the find to Heritage NSW.

5. Where feasible, ensure that any excavation remains open so that the finds can be recorded and verified. An excavation may be backfilled if this is necessary to comply with work safety requirements, and where this action has been approved by Heritage NSW. An excavation that remains open should only be left unattended if it is safe and adequate protective fencing is installed around it.

6. Following consultation with the relevant statutory authority (Heritage NSW), and, where advised, any other relevant stakeholder groups, the significance of the finds should be assessed, and an appropriate management strategy followed. Depending on project resources and the nature of the find(s), this process may require input from a consulting heritage specialist.

7. Development works in the area of the find(s) may re-commence, if and when outlined by the management strategy, developed in consultation with, and approved by the relevant statutory authority.

8. If human skeletal material is encountered, the protocol for the discovery of human remains should be followed (refer attached).

Protocol to follow in the event of the discovery of suspected human remains

The following protocol will be actioned if suspected human material is revealed during development activities or excavations:

1. All works must halt in the immediate area of the find(s) and any further disturbance to the area of the find(s) prevented.

    c. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and

    d. The site supervisor and the project archaeologist will be informed of the find(s).

2. If there is substantial doubt regarding a human origin for the remains, then consider if it is possible to gain a qualified opinion within a short period of time. If feasible, gain a qualified opinion (this can circumvent proceeding further along the protocol for remains that are not human). If conducted, this opinion must be gained without further disturbance to the find(s) or the immediate area of the find(s). (Be aware that the site may be considered a crime scene that retains forensic evidence). If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.

3. Immediately notify the following of the discovery:

    a. The local Police (this is required by law);

    b. Heritage NSW;

    c. Heritage archaeologist or Aboriginal Heritage Officer from the Local Aboriginal Lands Council;

4. Co-operate and be advised by the Police and/or coroner with regard to further actions and requirements concerning the find area. If required, facilitate the definitive identification of the material by a qualified person (if not already completed).

5. In the event that the Police or coroner instigate an investigation, construction works are not to resume in the designated area until approval in writing is gained from the NSW Police.

6. In the event that the Police and/or Coroner advise that they do not have a continuing or statutory role in the management of the finds then proceed with the following steps:

7. If the finds are not human in origin but are considered to be archaeological material relating to Aboriginal occupation, then proceed with Protocol for the discovery of Aboriginal objects (other than human remains).

8. If the finds are Aboriginal or probably Aboriginal in origin:

    a. Ascertain the requirements of Heritage NSW, the Project Manager, and the views of the Heritage Archaeologist or Aboriginal Heritage Officer.

    b. Based on the above, determine and conduct an appropriate course of action. Possible strategies could include one or more of the following:

        i. Avoiding further disturbance to the find and conserving the remains *in situ*;

        ii. Conducting archaeological salvage of the finds following receipt of any required statutory approvals;

        iii. Scientific description (including excavation where necessary), and possibly also analysis of the remains prior to reburial;

iv. Recovering samples for dating and other analyses; and/or

v. Subsequent reburial at another place and in an appropriate manner determined by the Aboriginal Heritage Officer.

9. If the finds are non-Aboriginal in origin:

c. Ascertain the requirements of Heritage NSW, Project Manager, and the views of any relevant community stakeholders and the project archaeologist.

a. Based on the above, determine and conduct an appropriate course of action. Possible strategies could include one or more of the following:

a. Avoiding further disturbance to the find and conserving the remains *in situ*;

b. Conducting archaeological salvage of the finds following receipt of any required statutory approvals;

c. Scientific description (including excavation where necessary), and possibly also analysis of the remains prior to reburial;

d. Recovering samples for dating and other analyses; and/or

e. Subsequent reburial at another place and in an appropriate manner determined in consultation with Heritage NSW and other relevant stakeholders.

10. Construction related works in the area of the remains (designated area) may not resume until the proponent receives written approval in writing from the relevant statutory authority: from the Police or Coroner in the event of an investigation, from Heritage NSW in the case of Aboriginal and remains outside the jurisdiction of the Police or Coroner.