Appendix K
Aboriginal Cultural Heritage Assessment

A view within the Modification Disturbance Footprint.

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

BOGGABRI COAL MINE MODIFICATION 10

BOGGABRI COAL MINE

APRIL 2025

Report prepared by

OzArk Environment & Heritage

on behalf of Boggabri Coal Operations Pty Ltd.

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Heritage NSW

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT COVER SHEET

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Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

ABBREVIATIONS AND GLOSSARY

ACHAR	Aboriginal Cultural Heritage Assessment Report. As set out in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, all developments where harm to Aboriginal objects is likely must be assessed in an ACHAR.
ACHCRs	*Aboriginal Cultural Heritage Consultation Requirements for Proponents.* Guidelines for conducting Aboriginal community consultation for developments where harm to Aboriginal objects is likely.
ACHMP	Aboriginal Cultural Heritage Management Plan. A requirement of SSDs. An ACHMP both manages impacts to Aboriginal cultural heritage within approved disturbance areas (AHIPs are not required), as well as management of Aboriginal cultural heritage sites and values outside of approved impact areas but within land able to be managed by a proponent.
AHIMS	Aboriginal Heritage Information Management System. Administered by the DCCEEW, AHIMS is the central register of all Aboriginal sites within NSW.
AHIP	Aboriginal Heritage Impact Permit. Issued by Heritage NSW to allow harm to Aboriginal objects.
ASIRF	Aboriginal Site Impact Recording Form. A standardised form for recording authorised impacts to Aboriginal sites. Only with a completed ASIRF can a site be listed as 'destroyed' on the AHIMS.
Assemblage	All artefacts recorded at a location. In this report, assemblage refers to stone artefacts as this was the only artefact class recorded.
BCM	Boggabri Coal Mine
BCOPL	Boggabri Coal Operations Pty Ltd
BP	Years before present
Code of Practice	*Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* under Part 6 NPW Act. Issued = in 2010, the Code of Practice is a set of guidelines that allows limited test excavation without the need to apply for an AHIP.
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water. NSW DCCEEW contains the Environment and Heritage Group including Heritage NSW.
DCCEEW (Cth)	Commonwealth Department of Climate Change, Energy, the Environment and Water.

DPE	Former NSW Department of Planning and Environment. The functions of DPE are now undertaken by DCCEEW and DPHI.
DPHI	NSW Department of Planning, Housing and Infrastructure. DPHI contains the Planning agency.
EIS	Environmental Impact Statement. A required document for major projects documenting all potential impacts to the environment, including heritage, that may arise due to the development.
GSE	Ground surface exposure. A measure of factors that may reveal surface artefacts such as erosion scalds.
GSV	Ground surface visibility. A measure of factors that may obscure the detection of surface artefacts such as leaf litter.
Heritage NSW	Government department tasked with ensuring compliance with the NPW Act. Heritage NSW is advised by the Aboriginal Cultural Heritage Advisory Committee (ACHAC).
HMP	Heritage Management Plan
IA	Idemitsu Australia Pty Limited
LGA	Local Government Area
MCCM	Maules Creek Coal Mine
NPW Act	*National Parks and Wildlife Act 1974*. Primary legislation governing Aboriginal cultural heritage within NSW.
PAD	Potential archaeological deposit. Indicates that a particular location has potential to contain subsurface archaeological deposits, although no Aboriginal objects are visible.
Pleistocene	Geological epoch which lasted from about 2.5 million years ago to 10,000 BCE. This period spans the world's recent period of repeated glaciations. Aboriginal occupation of Australia occurs during the upper Pleistocene.
RAP	Registered Aboriginal Party. An individual or group who have indicated through the ACHCR process that they wish to be consulted regarding the project.
SEARs	Secretary's Environmental Assessment Requirements issued by DPHI.
SSD	State Significant Development

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by Xenith Consulting Pty Ltd (Xenith) on behalf of Boggabri Coal Operations Pty Ltd (the proponent) (BCOPL) to prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the proposed Boggabri Coal Mine (BCM) Modification 10 (MOD 10). The proposal is within the Narrabri Local Government Area and is located at Boggabri, 13 kilometres (km) south of Maules Creek in central northern NSW.

The proposal is a modification to a State Significant Development (SSD) 09_0182 and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*.

The Modification Disturbance Footprint covers an area of approximately 85 hectares (ha) outside of the existing approved Mine Disturbance Boundary where additional mining disturbance will occur because of MOD 10.

A search of the Aboriginal Heritage Information Management System (AHIMS) register on 11 October 2024 returned 37 results for Aboriginal sites within a 1 km radius of the Modification Disturbance Footprint. There is one site previously recorded in the Modification Disturbance Footprint: 20-4-0220 (LFNV11), an isolated find. A further site, 20-4-0572 (TC7/15) has been subject to surface salvage, however, the associated potential archaeological deposit (PAD) remains extant. The recorded location of the site lies outside the Modification Disturbance Footprint; however, an inspection was required to determine whether the PAD extends into the Modification Disturbance Footprint.

A field survey was completed by OzArk Archaeologist, Tenae Robertson on 17–18 October 2024 with the assistance of two Aboriginal Site Officers, Tyann Silver (Cacatua Cultural Consultants) and Kamilla Silver (Red Chief Local Aboriginal Land Council).

No previously unrecorded Aboriginal sites were identified during the survey. The recorded location of LFVN11 was visited, however, no Aboriginal objects were observed. Similarly, TC7/15 was located, and it was assessed that the recorded PAD does not extend into the Modification Disturbance Footprint.

Overall, the archaeological potential for the Modification Disturbance Footprint to contain significant archaeological deposits of conservation value has been assessed as low. This assessment is supported by the steeply sloping terrain and lack of reliable waters within the Modification Disturbance Footprint which are not supportive of long-term or seasonal occupation.

Recommendations concerning Aboriginal cultural values within the Modification Disturbance Footprint are as follows:

1. Following approval of MOD 10, the management measures, including the unanticipated finds protocol, outlined in the existing BCM Heritage Management Plan (HMP); as

amended and approved by the NSW Department of Planning, Housing and Infrastructure must be followed.

2. AHIMS site 20-4-0220 (LFNV11) must be salvaged prior to works commencing as per the measures outlined in **Section 9.2** of this ACHAR and in accordance with those measures outlined in Section 4 of the BCM HMP.
3. All land disturbing activities associated with MOD 10 must be confined within the Modification Disturbance Footprint. Should the parameters of MOD 10 extend beyond this area then further archaeological assessment may be required.
4. Inductions for work crews should include a cultural heritage awareness procedure to inform workers of their responsibility to notify their supervisors if a suspected Aboriginal object is noticed. The cultural heritage awareness procedure will illustrate common artefact attributes such as those shown in **Appendix 4**.

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1 INTRODUCTION

1.1 DESCRIPTION OF THE PROPOSAL

OzArk Environment & Heritage (OzArk) has been engaged by Xenith Consulting, on behalf of Boggabri Coal Operations Pty Ltd (BCOPL, the proponent), to complete an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the proposed Boggabri Coal Mine Modification 10 (MOD 10).

BCOPL is a wholly owned subsidiary of Idemitsu Australia Pty Limited (IA) which operates the Boggabri Coal Mine (BCM) on behalf of IA and its joint venture partners. BCM is an open cut coal mine located approximately 15 kilometres (km) northeast of Boggabri, 13 km south of Maules Creek in central northern NSW (**Figure 1-1**). MOD 10 is within the Narrabri Local Government Area (LGA).

1.2 MODIFICATION DISTURBANCE FOOTPRINT

The Modification Mining Area describes the area in which additional mining operations are proposed to occur because of MOD 10. The Modification Mining Area includes areas of additional mining operations proposed within the approved Mine Disturbance Boundary, as well as the Modification Disturbance Footprint which includes areas beyond the approved Mine Disturbance Boundary where additional surface impacts associated with MOD 10 will be located. The Modification Disturbance Footprint covers an area of approximately 85 hectares (ha) outside of the existing approved Mine Disturbance Boundary where additional mining disturbance will occur because of MOD 10 (**Figure 1-2**).

Figure 1-1: Location of Modification Mining Area.

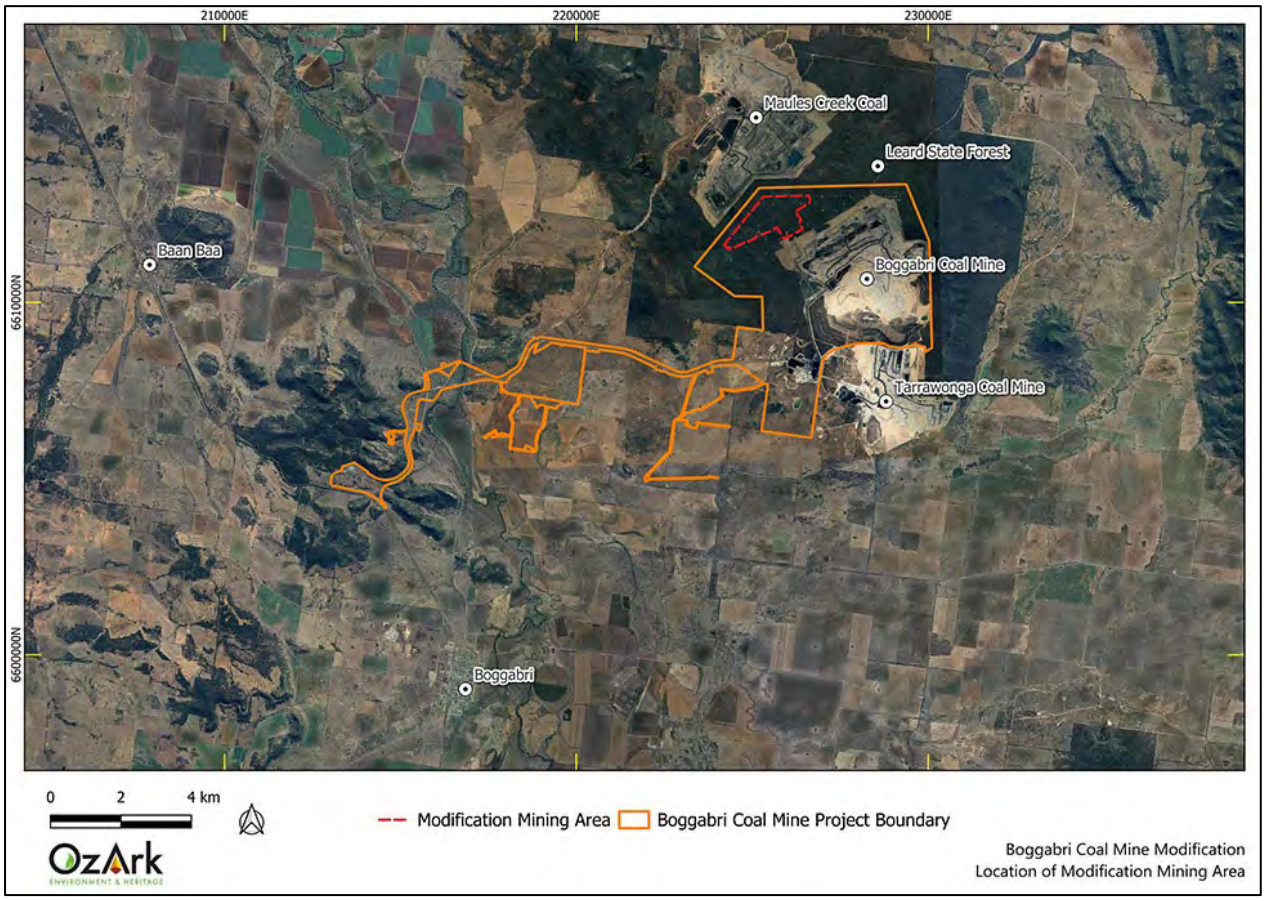
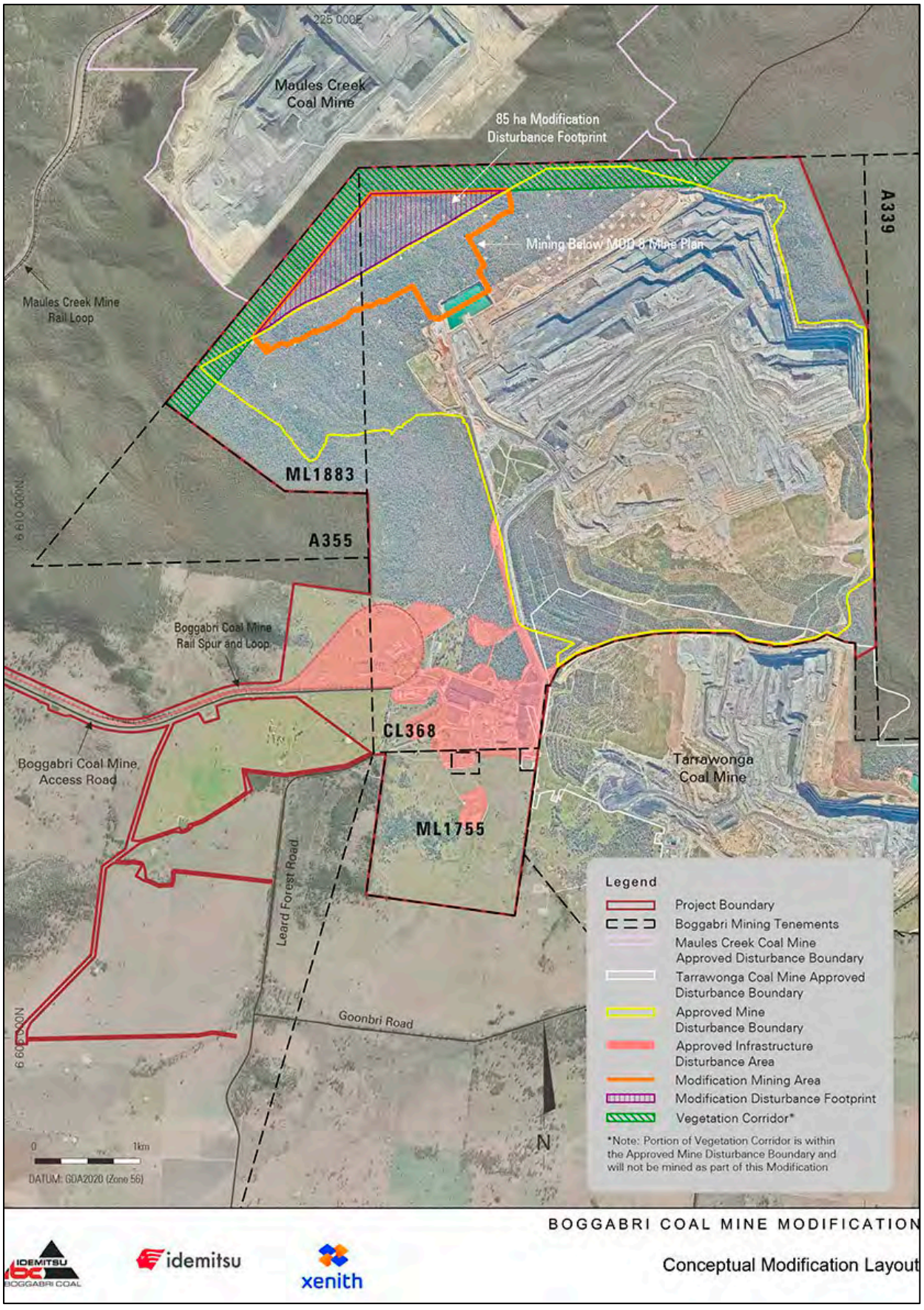


Figure 1-2: Conceptual Modification layout.



1.3 MODIFICATION OVERVIEW

MOD 10 proposes the progression of mining operations at BCM towards the northwest beyond the currently approved Mine Disturbance Boundary, however, will remain entirely within the existing Project Boundary. MOD 10 is proposed to recover an additional 30 million tonnes (Mt) of Run of Mine (ROM) coal which will generate approximately 25 Mt of product coal. MOD 10 would involve the following:

- Disturbance to an additional 85 ha of land in the Modification Disturbance Footprint (**Figure 1-2**)
- Extension to the life of mining operations by four years until the end of 2040
- Revisions to the Conceptual Final Landform design to reflect the additional mining area.

MOD 10 does not seek to extend mining disturbance into the Vegetation Corridor between the BCM and the Maules Creek Coal Mine (MCCM) which BCOPL will retain on its side of the mining lease in accordance with the current approval requirements.

This assessment only covers the Modification Disturbance Footprint where MOD 10 impacts to unassessed landforms are located. Disturbance within the approved Mine Disturbance Boundary has been previously assessed and is approved under the current BCM approval (SSD 09_0182). Management of Aboriginal cultural heritage in the approved Mine Disturbance Boundary occurs in accordance with the approved BCM HMP.

2 THE ABORIGINAL CULTURAL HERITAGE ASSESSMENT

2.1 RELEVANT LEGISLATION

Cultural heritage is managed by several state and national Acts. Baseline principles for the conservation of heritage places and relics can be found in the Burra Charter (Burra Charter). The Burra Charter has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The Burra Charter generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a state level.

Several Acts of parliament provide for the protection of heritage at various levels of government.

2.1.1 Commonwealth legislation

2.1.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW [Cth]), provides a framework to protect nationally significant flora, fauna, ecological communities, and heritage places. The EPBC Act establishes both a National Heritage List and Commonwealth Heritage List of protected places. These lists may include Aboriginal cultural sites or sites in which Aboriginal people have interests. The assessment and permitting processes of the EPBC Act are triggered when a proposed activity or development could potentially have an impact on one of the matters of national environment significance listed by the Act. Ministerial approval is required under the EPBC Act for proposals involving significant impacts to national/commonwealth heritage places.

2.1.1.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is aimed at the protection from injury and desecration of areas and objects that are of significance to Aboriginal Australians. This legislation has usually been invoked in emergency and conflicted situations.

Applicability to MOD 10

It is noted there are no Commonwealth or National heritage listed places within the Modification Mining Area, and as such, the heritage provisions of the EPBC Act and other Commonwealth Acts do not apply.

2.1.2 State legislation

2.1.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) established requirements relating to land use and planning. The main parts of the EP&A Act that relate to development assessment and approval are Part 4 (development assessment) and Part 5 (environmental assessment). The Minister responsible for the Act is the Minister for Planning and Public Spaces.

The EP&A Act currently provides the primary legislative basis for planning and environmental assessment in NSW. The objects of the EP&A Act include encouragement of:

- The proper management, development, and conservation of natural resources
- The provision and coordination of the orderly and economic use and development of land
- Protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats
- Ecologically sustainable development.

The objects also provide for increased opportunity for public involvement and participation in environmental planning and assessment.

The EP&A Act includes provisions to ensure that the potential environmental impacts of a development or activity are rigorously assessed and considered in the decision-making process.

The framework governing environmental and heritage assessment in NSW is contained within the following parts of the EP&A Act:

- Part 4: Local government development assessments, including heritage. May include schedules of heritage items
    - Division 4.7: Approvals process for state significant development

<u>Applicability to MOD 10</u>

MOD 10 will be assessed under Part 4, Division 4.55(2) of the EP&A Act.

If approved, Section 4.41 of the EP&A Act would apply and therefore an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Act 1974* (NPW Act) to harm Aboriginal objects would not be required. Instead, all management related to Aboriginal cultural heritage within the Modification Disturbance Footprint will be governed by the policies within an approved Heritage Management Plan (HMP) (as amended and approved by the NSW Department of Planning, Housing and Infrastructure [NSW DPHI]).

2.1.2.2 National Parks and Wildlife Act 1974

The NPW Act provides for the protection of Aboriginal objects (sites, objects, and cultural material) and Aboriginal places. Under the Act (Part 6), an Aboriginal object is defined as: any deposit, object, or material evidence (not being a handicraft for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction and includes Aboriginal remains.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

It is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86, such as:

- The harm was authorised by and conducted in accordance with the requirements of an *Aboriginal Heritage Impact Permit* (AHIP) under Section 90 of the Act
- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the Secretary of DCCEEW of the location of an Aboriginal object. Identified Aboriginal items and sites are registered on Aboriginal Heritage Information Management System (AHIMS) that is administered by Heritage NSW.

Applicability to MOD 10

Any Aboriginal sites within the Modification Disturbance Footprint are afforded legislative protection under the NPW Act.

The Secretary of DCCEEW will be notified of the location of an Aboriginal object recorded by sending the relevant details to the AHIMS register.

2.1.2.3 Secretary's Environmental Assessment Requirements

NSW DPHI issued the Secretary's Environmental Assessment Requirements (SEARs) on 24 September 2024.

These SEARs refer to a Controlled Action under the EPBC Act. This Controlled Action is for potential impacts to threatened species and communities, and water resources. Accordingly, there are no requirements regarding heritage investigations in the SEARs.

2.2 ASSESSMENT APPROACH

The archaeological assessment followed the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice; DECCW 2010).

The Aboriginal cultural heritage assessment followed the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (the Guide; OEH 2011) and the *Aboriginal cultural heritage consultation requirements for proponents* (ACHCRs; DECCW 2010b).

2.3 PURPOSE AND OBJECTIVES

The purpose of this study is to identify and assess heritage constraints relevant to the proposed works.

The study will apply the Code of Practice, the Guide, and the ACHCRs in the completion of the Aboriginal cultural heritage assessment to meet the following objectives:

Objective One: Undertake background research on the Modification Disturbance Footprint to formulate a predicative model for site location within the Modification Disturbance Footprint.

Objective Two: Identify and record Aboriginal cultural heritage values within the Modification Disturbance Footprint. This includes intangible cultural values, Aboriginal objects, and any landforms likely to contain further archaeological deposits.

Objective Three: To assess the significance of any recorded Aboriginal cultural values, Aboriginal objects, or sites in consultation with Registered Aboriginal Parties (RAPs).

Objective Four: Assess the likely impacts of the proposed work to Aboriginal cultural heritage values and provide management recommendations.

2.4 REPORT COMPLIANCE WITH THE CODE OF PRACTICE

The Code of Practice establishes requirements that should be followed by all archaeological investigations where harm to Aboriginal objects may be possible. **Table 2-1** tabulates the compliance of this report with the requirements established by the Code of Practice.

Table 2-1: Report compliance with the Code of Practice.

Code of Practice Requirement	Context of the Requirement	Concordance in this report
Requirement 1a	Review previous archaeological work	**Section 5.2** and **5.3**
Requirement 1b	Review AHIMS searches	**Section 5.4.1**
Requirement 2	Review the landscape context	**Section 4**
Requirement 3	Summarise and discuss the local and regional character of Aboriginal land use and its material traces	**Section 5.1**
Requirement 4a	Develop predictive model	**Section 5.5**
Requirement 4b	Present predictive model results	**Section 5.5.3**
Requirement 5a	Archaeological survey sampling strategy	**Section 6.1**
Requirement 5b	Archaeological survey requirements	This Requirement was fulfilled during the undertaking of the survey
Requirement 5c	Archaeological survey units	**Section 4.1.1**
Requirement 6	Site definition	**Section 5.5.1**
Requirement 7a	Site recording information to be recorded	**Section 6**
Requirement 7b	Site recording: scales for photography	All artefact photographs employed a centimetre scale bar.
Requirement 8a	Geospatial information	All artefact locations were logged using a non-differential handheld GPS.
Requirement 8b	Datum and grid coordinates	All coordinates are provided in GDA Zone 56.
Requirement 9	Record survey coverage data	**Section 6.1**
Requirement 10	Analyse survey coverage	**Section 6.3**
Requirement 11	Archaeological Report content and format	This report adheres to this Requirement.
Requirement 12	Records	OzArk undertakes to maintain all survey records for at least five years.
Requirement 13a	Notifying Heritage NSW of breaches	Not applicable
Requirement 13b	Providing Heritage NSW with information	Not applicable
Requirement 14–17	Test excavation which is not excluded from the definition of harm	Not applicable as test excavation was not warranted
Requirement 18–20	Artefact recording	The procedures for artefact recording were adhered to during the investigation.

2.5 DATE OF ARCHAEOLOGICAL ASSESSMENT

The field survey was undertaken by OzArk on the 17–18 October 2024.

2.6 OZARK INVOLVEMENT

2.6.1 Field survey

The fieldwork survey was undertaken by:

- Fieldwork Director: Tenae Robertson, (OzArk Project Archaeologist; B Archaeological Practices, Australian National University).

2.6.2 Reporting

The reporting component of the heritage assessment was undertaken by:

- Report author: Dr. Bernadette Drabsch (OzArk Heritage Consultant, BA Ancient History, BNHI Hons and PhD Design/Archaeology, University of Newcastle)
- Contributor: Tenae Robertson
- Reviewer: Ben Churcher (OzArk Director and Principal Archaeologist; BA (hons) University of Queensland, Dip Ed. University of Sydney).

3 ABORIGINAL COMMUNITY CONSULTATION

3.1 INTRODUCTION TO CULTURAL VALUES

No matter who you are, we all have culture. Each person's culture is important; it's part of what makes us who we are.

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Many Aboriginal people in Australia have a unique view of the world that's distinct from the mainstream. Land, family, law, ceremony, and language are five key interconnected elements of Aboriginal culture. For example, families are connected to the land through the kinship system, and this connection to land comes with specific roles and responsibilities which are enshrined in the law and observed through ceremony. In this way, the five elements combine to create a way of seeing and being in the world that is distinctly Aboriginal.

Aboriginal and Torres Strait Islander peoples are connected to Country through lines of descent (paternal and maternal), as well as clan and language groups. Territory is defined by spiritual as well as physical links. Landforms have deep meaning, recorded in art, stories, songs, and dance. Songlines or Dreaming Tracks as well as kinship structures link Aboriginal peoples to the territories of other groups. In the past, these links were also used for trade.

Living on this land for more than 50,000 years, Aboriginal and Torres Strait Islanders established effective ways to use and sustain resources. One important aspect is the right of certain people to control the use of resources in a particular area, as well as cultural and spiritual values like totemism that were fundamental in resource management. There was a wide range of traditional methods for gathering food including fish traps, subsistence agriculture, hunting and harvesting a wide range of natural fruits and vegetables. Some groups of people would stay in one place, while others moved around the land according to the seasons, to ensure sustainable and rich food supplies, and to fulfil their spiritual and cultural obligations.

In much of eastern Australia, Aboriginal communities live their lives like most Australians. However, in certain crucial areas, particularly associated with family, leadership roles and caring for Country, Aboriginal lore continues, even in the most urbanised communities.

3.2 ABORIGINAL COMMUNITY CONSULTATION

A major aim of this assessment is to identify any cultural values within the landscape in which MOD 10 is located so that those values can be recognised and incorporated into the MOD 10 management recommendations.

The Aboriginal cultural heritage assessment of the proposal has followed the ACHCRs. A log and copies of correspondence with Aboriginal community stakeholders is presented in **Appendix 1 Figure 1**.

The ACHCRs include four main stages, and these will be detailed in the following sections.

3.2.1 ACHCRs Stage 1

The aim of Stage 1 is to identify the RAPs who wish to be consulted about MOD 10.

BCOPL proposed to use the BCM RAP list established through the BCM Aboriginal Stakeholder Community Forum (ASCF), rather than commencing the formal consultation process and placing an advertisement seeking expressions of interest in MOD 10. This approach was utilised for previous modifications at BCM and has been accepted by DPHI to date.

To refresh the RAP list, OzArk contacted Heritage NSW on 19 July 2024 to obtain the Aboriginal stakeholder list for the LGA (**Appendix 1 Figure 2**). This allowed people not on the BCM RAP list to be identified and invited to be registered and involved in the consultation for MOD 10. OzArk wrote to all those people/groups on the Heritage NSW stakeholder list who were not already on the BCM RAP list asking if they wished to be consulted. As a result, an additional four people/groups registered to be consulted. Therefore, MOD 10 will rely on this revised version of the existing BCM RAP list to form the RAP group for MOD 10.

Letters were sent to individuals and groups whose contact details had been provided by BCOPL and the government agencies (**Appendix 1 Figure 3**).

By the closing date for registration concerning this project, 31 groups or individuals registered to be consulted as RAPs:

- Bigundi Biame Traditional People
- Brian Draper
- Cacatua Cultural Consultants
- Cindy Foley
- Cyril Sampson
- David Horton
- Deslee Talbott Consultant
- Gloria Foley
- Gomeroi Narrabri Aboriginal Corporation (GNAC)
- Gomilaroi Cultural Consultants
- Gunida Gunya
- James Foley
- Leonard Talbott

- Loretta Long
- Michael Trindall
- Min Min Aboriginal Corporation
- Mooki Plains Clan
- Natasha Rodgers
- Red Chief Local Aboriginal Land Council
- Ronald Long
- Shannon Draper
- Sony Fitzroy
- Stephen Matthews
- Steve Talbott
- T & G Cultural Consultants
- Tania Matthews
- TNL Site Trackers
- Veronica Talbot
- White Cockatoo
- Yvonne Rodgers.

3.2.2 ACHCRs Stage 2

The aim of Stage 2 is to provide information about the project to the RAPs.

Detailed project information was provided in the assessment methodology that was issued to all RAPs for their consideration on 19 August 2024 (**Appendix 1 Figure 4**; **Appendix 2**).

3.2.3 ACHCRs Stage 3

The aim of Stage 3 is to acquire information regarding Aboriginal cultural values associated with MOD 10 through RAP consultation and field work.

To inform the RAPs of the assessment, an assessment methodology was issued to all RAPs for their consideration on 19 August 2024 (**Appendix 1 Figure 4**; **Appendix 2**). This document provided the archaeological context of the Modification Disturbance Footprint, a description of the proposed survey, and asked whether there were any cultural values that should be considered in the assessment.

RAPs were provided the stipulated 28 days in which to review and comment on the assessment methodology as per Stage 3 of the ACHCRs. The closing date for comment was 16 September 2024 and no responses were received from the RAPs.

The field survey as per Stage 3 of the ACHCRs was undertaken on the 17–18 October 2024 with the assistance of two Aboriginal Site Officers, Tyann Silver (Cacatua Cultural Consultants) and Kamilla Silver (Red Chief LALC).

3.2.4 ACHCRs Stage 4

Stage 4 involves the production of a draft ACHAR that is issued to all RAPs for their consideration. The ACHAR will document the results of the assessment, outline opportunities for the conservation of Aboriginal cultural values, and suggest recommendations for the management of Aboriginal objects should impacts to these objects be unavoidable.

A draft ACHAR was issued to all RAPs on 25 February 2025 with a closing date for comments of 25 March 2025 (**Appendix 1 Figure 5**).

At the conclusion of the RAP review period, only two responses were received. T&G Cultural Consultants (Wayne Griffiths) called OzArk on 26 February 2025 to discuss MOD 10 and where it is in relation to culturally significant sites at BCM. Once the location of MOD 10 was explained, Wayne agreed with the ACHAR's recommendations. On 20 March 2025, OzArk received a call from Yvonne Long (acting on behalf of RAP Loretta Long) who believed that they should have been engaged with the field survey for MOD 10. OzArk explained the situation and suggested that Yvonne contact the BCM Environment and Community team to discuss being placed on the BCM RAP list so that they would be available for on-going work at the BCM.

No responses were received from the RAPs that necessitated changes to the ACHAR.

3.3 CULTURAL VALUES IDENTIFIED THROUGHOUT THE ACHCR PROCESS

No specific cultural values were identified by the RAPs regarding the Modification Disturbance Footprint, however, the strong cultural values of Aboriginal communities towards landscapes and cultural heritage sites are recognised.

4 LANDSCAPE CONTEXT

An understanding of the environmental context of a study area is a requisite in any Aboriginal archaeological investigation (DECCW 2010). It is a particularly important consideration in the development and implementation of survey strategies for the detection of archaeological sites. In addition, natural geomorphic processes of erosion and/or deposition, as well as human-activated landscape processes, influence the degree to which the remains of material culture are retained in the landscape as archaeological sites; and the degree to which they are preserved, revealed and/or conserved in present environmental settings.

4.1 TOPOGRAPHY AND HYDROLOGY

The Modification Disturbance Footprint is located within the Liverpool Plains land system (Sim & Unwin 1984). The land is described as having extensive grasslands on alluvial plains with some small wooded sedimentary and volcanic hills. The topography of the Modification Disturbance Footprint is primarily moderate to steep slopes ranging from approximately 370 m Australian Height Datum (AHD) to 440 m AHD (**Figure 4-1** and **Figure 4-2**). Landform mapping indicates the entire Modification Disturbance Footprint is made up of upper slopes and ridges within a broader sloping landform.

The Modification Disturbance Footprint is within the Leard State Forest and has been selectively logged (NPWS 2012). The area has an annual rainfall of approximately 620 millimetres (mm) and the Namoi River, the closest permanent water course, is located approximately 9 km to the west of the Modification Disturbance Footprint. The Namoi River alluvial floodplain forms a wide low-lying landform to the west of the Modification Disturbance Footprint. Seasonal climatic conditions vary throughout the year; summer months are predominantly hot, and winter periods are relatively short with frequent frosts.

The nearest named water source is Merrygowen Creek, the headwaters of which are located approximately 560 m northeast of the Modification Disturbance Footprint (**Figure 4-3**). Several unnamed ephemeral drainages intersect with or originate within the Modification Disturbance Footprint, largely comprising run-off gullies.

Figure 4-1: Topography of the Modification Disturbance Footprint.

1. View of a steeply sloping landform unit within the Modification Disturbance Footprint.

2. View of a ridge landform within the Modification Disturbance Footprint.

Figure 4-2: Topography of the Modification Disturbance Footprint.

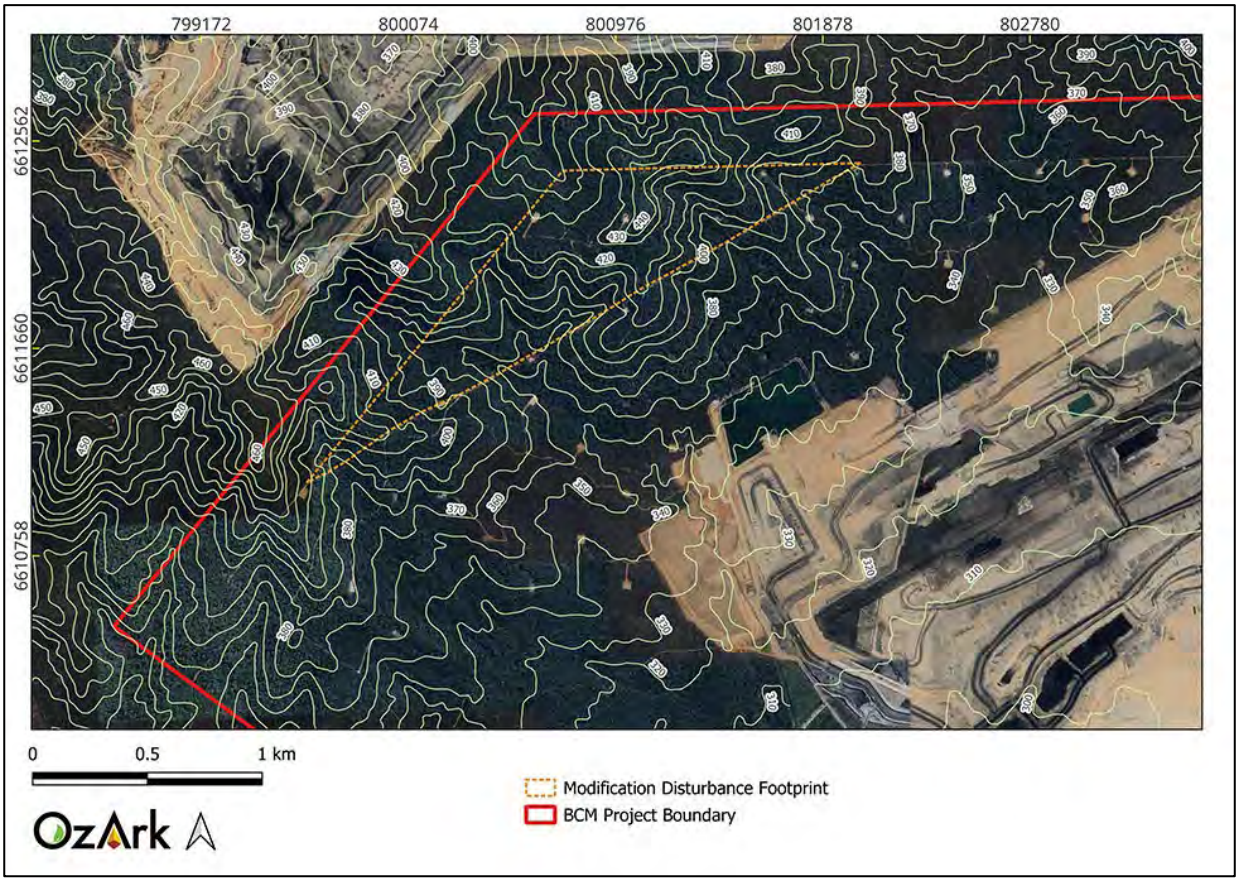
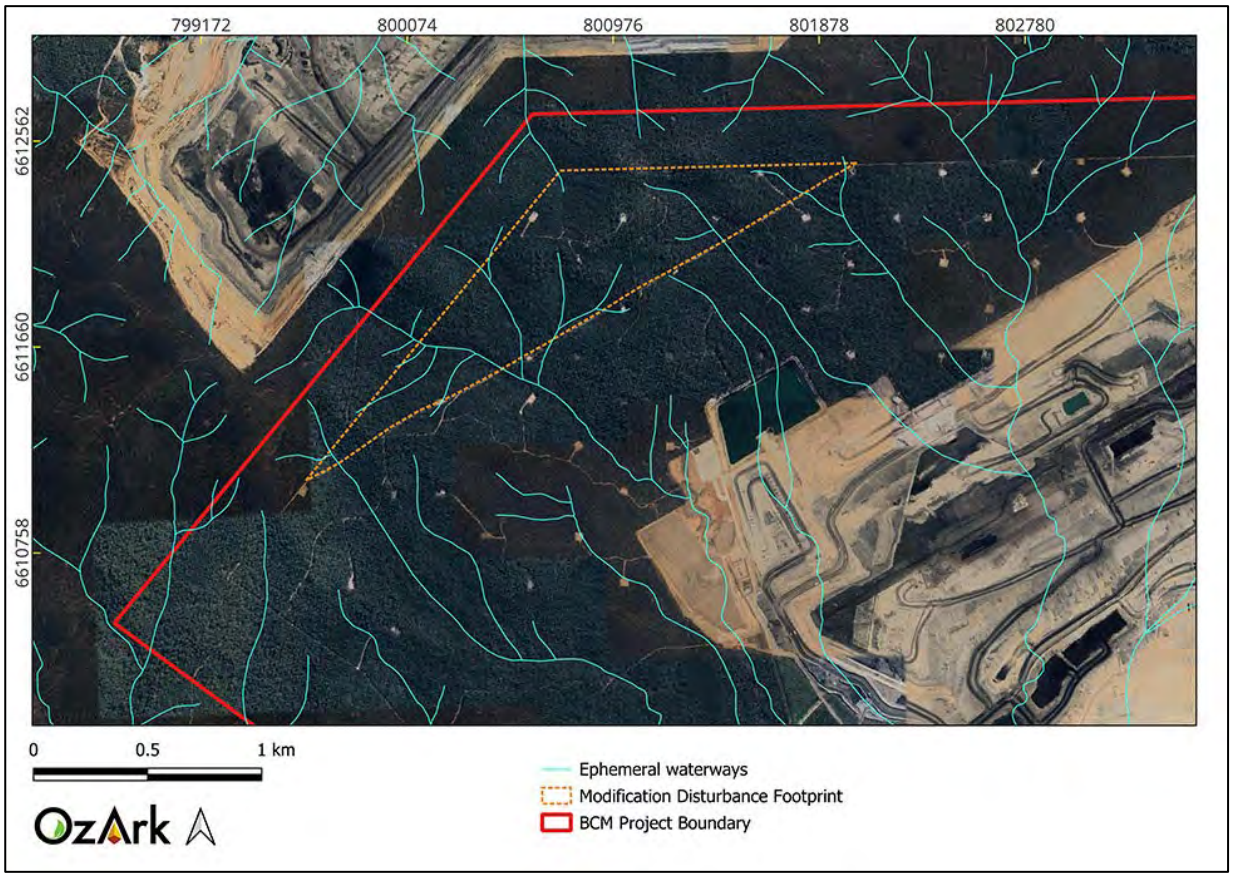


Figure 4-3: Hydrology of the Modification Disturbance Footprint.



4.1.1 Survey units

Based on the topography of the Modification Disturbance Footprint, two survey units were identified to capture the major topographical features (**Figure 4-4**). The designation of survey units allows a comparison of the archaeological potential of each major topographical feature within the Modification Disturbance Footprint to understand whether certain landform types are more likely to contain Aboriginal objects than others:

- Survey Unit 1: Steep and moderate slopes
- Survey Unit 2: Ridges.

Figure 4-4: View of the main landforms within the Modification Disturbance Footprint.

4.2 GEOLOGY AND SOILS

Soil analysis has important ramifications for archaeological research through the potential impact of different soils on human activity (such as agricultural exploitation) and the impact of the soils on archaeological evidence (such as post-depositional movement).

The Modification Disturbance Footprint is located within the major regional geological feature known as the Gunnedah Basin. The following geological description is sourced from a geomorphology report conducted at BCM (ARAS 2007). The underlying geology is described from Tadros 1993.

Boggabri Volcanics: Intrusions and some inter bedded flows or sills of late Carboniferous – Early Permian rhyolite, dacite and ignimbrite with rare shale. The ignimbrites are flow banded and glassy but usually weathered and devitrified in outcrop. The Boggabri Volcanics underlay the Leard Formation.

Leard Formation: The lower part of the early Permian sequence mainly pelletoidal clay sandstone with some coal. This formation dips gently to the east. This sedimentary formation resulted from the weathering of the overlying Boggabri Volcanics.

Maules Creek Formation: Early Permian carbonaceous claystone, pelletoidal clay sandstone, upward fining cycles of sandstone, siltstone and coal, conglomerate dominant toward the top.

Sediments were deposited in braided river systems on alluvial fans coming from the west. A conglomerate component found near the top of the stratigraphic sequence contains small hand sized nodules of silcrete, chalcedony, and mudstone.

A study of soils prepared by GSS Environmental in 2010 (GSSE in Hansen Bailey 2010) indicates that the greatest influence on soil development within the area has been the bedrock sandy conglomerates, and throughout most soil profiles examined, textures ranged from gravely sandy clay loams to sandy clays.

The Duplex soils occur on the gently sloping terrain. Duplex soils (Yellow and Brown Solodics) predominate over lesser amounts of Lithosols and Structured Loams. The soils have a shallow profile, apart from the Structured Loams. The A-horizon of the soil profile rests upon an extremely compacted hardpan which, for the most part, marks the upper boundary of the B-horizon or C-horizon where the B-horizon is absent. Topsoil or A-horizon thickness ranges from 50 to 650 mm and averages 220 mm. They show a strong texture differentiation with an abrupt boundary (hardpan) between the A- and B-horizons and a conspicuously bleached A2-horizon. The profile can be characterised as non-saline. Generally, where A-horizons remain intact and relatively undisturbed at depth, there is the potential for subsurface archaeological deposits to be preserved within the landscape.

The second most abundant soils to be encountered are Lithosols, occupying the steeper sloping terrain and ridge top areas. These lack horizon development, apart from an occasional thin A1-horizon, their surface generally consisting of gravely material, which limits the potential for the preservation of archaeological deposits.

The Light Brown Uniform Gravelly Sand soils are also found on the upper slopes, crests, and ridgelines within the Leard State Forest. These generally consist of light brown to brown very gravelly loamy sands throughout the profile. They are well drained soils ranging from moderately acidic to strongly acidic at depth. The soils are generally non saline with poor fertility characteristics with both topsoil and subsoil non-sodic (Hansen Baily 2010: 159).

4.3 VEGETATION AND FAUNA

The Modification Disturbance Footprint is within the Leard State Forest and contains open forest typical of the western slope districts of NSW. The forest type is uniformly dry sclerophyll and consists mainly of mixed eucalypt/cypress pine community. Vegetation structure is generally open; however, some areas have a lower tree understorey and a dense shrub layer usually reaching 2 to 3 metres (m) in height. Ground cover may consist of dense grasses or sparse grass tussocks, with a thick layer of leaf litter up 100 mm deep.

The most common trees are White Cypress Pine (*Callitris glauca),* preferring light textured soils, and Black Cypress Pine (*Callitris endlicheri),* preferring steep slopes with skeletal soils and gravel

ridges. Both are widespread and occur over large areas. Other species may include, Kurrajong (*Brachychiton populneum*), Narrow Leaved Ironbark (*Eucalyptus crebra)*, Blue Leaved Ironbark (*Eucalyptus fibrosa)*, White Box (*Eucalyptus albens)*, Belah (*Casuarina cristate*), Pilliga Box (*Eucalyptus pilligaensis)*, Silver Leaved Ironbark (*Eucalyptis melanophloia)* and Bimble Box (*Eucalpytus populnea)*. While ironbark species are not suitable for the procurement of bark for cultural purposes, other species listed, such as box and Kurrajong, provided a more favourable material. Selective logging has previously occurred within the Leard State Forest, which may have resulted in the removal of culturally modified trees if present.

During the 2010 field surveys of BCM undertaken by Parsons Brinckerhoff (in Hansen Bailey 2010: 98), 194 species of animal were recorded, including six amphibians, 129 birds, 31 mammals, and 28 reptile species. Birds were the most diverse group with most species common to Grassy Woodlands, Shrubby Woodlands/Open Forest, or Riverine Woodland environments. Species included the Dusky Woodswallow, White-throated Treecreeper, and Fuscous Honeyeater. The Eastern Grey Kangaroo, House Mouse, and microchiropteran bats were the most abundant mammals. Amphibians recorded include Broad-palmed Frog, Long-thumbed Frog, Spotted Grass Frog, Desert Tree Frog, and Peron's Tree Frog. Common reptiles include Burton's Legless Lizard, Thick-tailed Gecko, Tree Skinks, Tiger Snakes, and Red-bellied Black Snakes. Therefore, an abundance and variety of species suitable for food and resource gathering would have been available to traditional Aboriginal people occupying the Leard State Forest.

4.4 LAND USE HISTORY AND EXISTING LEVELS OF DISTURBANCE

Regarding the landscape surrounding the Modification Disturbance Footprint and use of forest environments by Aboriginal people, research by Purcell (2000) shows the following analysis of archaeological survey and geomorphological data at the time of his study:

> *Results of the sites survey and geomorphological study indicate a different story. Aboriginal occupation may have occurred for prolonged periods under the right conditions, made possible by a different array of water features (chains of ponds) that existed prior to European usage of the forests. From what is understood, the chains of ponds and the relationship between vegetation and the morphological structure of the soils, resulted in water being available for prolonged periods. A diversity of plant foods would have been associated with these features.*
>
> *Intensification of forest usage since European arrival has modified stream flow dramatically, resulting in only a few examples of chain of ponds remaining in both forests. These features would have provided Aboriginal people opportunities to exploit the diversity of resources that occurred throughout the forests. The number of cultural plants recorded, the range of vegetation types and the wide distribution of*

recorded Aboriginal sites, notably in areas where chains of ponds may have occurred, support this interpretation (Purcell 2000: 16–26).

The Modification Disturbance Footprint sits within Leard State Forest which was managed by Forests NSW and has been subject to selective logging and stock grazing (NPWS 2012). Additionally, drill pad and access track construction has occurred throughout the Modification Disturbance Footprint, particularly within the ridge landforms. Disturbances such as these are likely to displace and even remove Aboriginal sites if they had been present.

4.5 CONCLUSION

The review of the environmental factors associated with the Modification Disturbance Footprint allows the following conclusions to be drawn in terms of past Aboriginal occupation:

- Topography and hydrology: the moderate and steep sloping landforms which dominate the Modification Disturbance Footprint would have been unsuitable for long term occupation, except for flat benches, where, if present, occupation may have been possible. The absence of permanent water within the Modification Disturbance Footprint would also have restricted any substantial Aboriginal occupation of the landscape. Both the ridges and valleys may have been used as pathways by Aboriginal people in the past.

- Geology and soils: landforms which comprise of outcropping volcanics, sandy conglomerates, sandstone, siltstone, silcrete, chalcedony, and mudstone are likely to be present within the Modification Disturbance Footprint and may have been sources of stone procurement for tool manufacture. Soils present on the slopes and ridges within the Modification Disturbance Footprint are likely to have been affected by water erosion. The erosional qualities of the soils present will have influenced the likelihood for *in situ* archaeological deposits being present. Furthermore, the use of the Modification Disturbance Footprint for selective logging and stock grazing would have further promoted soil erosion and loss.

- Vegetation and fauna: the Modification Disturbance Footprint would have once supported an open woodland which would have provided some resources for Aboriginal subsistence through both resource gathering and hunting practices. However, resources likely to have supported a large population of people would have been present closer to the banks of more permanent water sources including the Namoi River. The selective logging which has taken place across the Modification Disturbance Footprint reduces the likelihood that any culturally modified trees remain present, however, should mature native vegetation remain culturally modified trees may be present.

- Land use: ground surface disturbances, such as access tracks, exist throughout the Modification Disturbance Footprint. These activities may have displaced Aboriginal objects and are likely to have reduced the potential for subsurface archaeological material. However, disturbance at a given location does not necessarily mean that there will be no cultural material present, as often a disturbed context will reveal objects which may have previously been subsurface. As noted above, initial vegetation clearing would also have significantly reduced the likelihood of culturally modified trees remaining.

5 ARCHAEOLOGICAL CONTEXT

5.1 ETHNO-HISTORIC SOURCES OF REGIONAL ABORIGINAL CULTURE

The Modification Disturbance Footprint is situated within the traditional territory of people belonging to the Kamilaroi (also spelt Gomeroi, Gamilaraay) linguistic group. According to Tindale (1974), the Kamilaroi range at the time of British arrival was thought to extend to Walgett in New South Wales to Nindigully in Queensland and included areas such as Moree, Mungindi, Mogil Mogil, Narravri, Pilliga, Gunnedah, Bingara, Tamworth, Quirindi, Bundella, Barraba, Gwabegar, and Come-by-Chance on the headwater of the Hunter River. O'Rourke (1997: 159) noted that social organisation amongst the Kamilaroi was based on a complex system of kinship involving two moieties, the Dhilbay ('dilb I') and Gubadhin ('kupathin').

O'Rourke estimated that there may have been up to 10,000 Kamilaroi speakers before contact with British colonists, with an additional unquantified number of dialectical sub-groups (O'Rouke 1997: 126). O'Rourke noted that the smallest residential unit within the Kamilaroi society was the 'hearth-group' which consisted of up to ten people, typically a man, his wife (or wives) and their dependent children. Larger residential groupings of 40–60 individuals, termed 'bands', were formed through the regular though temporary gathering of several 'hearth-groups'. Annual seasonal aggregations of 'bands' resulted in 'communities' of 200 or more people (O'Rourke 1997: 130). These communities are estimated to have occupied territories of more than 2,500 km^2. The presence of up to eight communities at irregular ceremonial events such as Bora (buurra) assemblies has also been noted (O'Rourke 1997: 130).

The Kamilaroi people appear to have spent summers along rivers exploiting a range of terrestrial, avian, and aquatic food resources and winters spent in the areas away from rivers hunting and/or trapping predominantly terrestrial game. Hunting and gathering 'gear' amongst the Kamilaroi is reported to have included wooden spears, boomerangs, digging sticks, nets, stone fishhooks, fibre-based fishing line, ground stone axes, and a variety of supplementary chipped stone tools (AECOM 2010: 24).

O'Rourke (1997: 148) hypothesised that '*summer villages with semi-permanent huts were [likely] a common feature of Aboriginal life on the plains of New South Wales*'. Observations by the early British explorers provide some support to this claim. In 1825 Cunningham recorded that he observed 14 huts with bark floors and conical roofs scattered through thick woodland to the west of Coxs Creek near Boggabri. Some of the huts were apparently large enough to accommodate up to six people and appeared to have been designed to resist months of inclement weather. Similarly, in 1839, Major Mitchell described the huts in a 'native village' to the south of Moree near the Gwydir River in a similar fashion. He notes that *'each hut was semi-circular, or circular, the roof conical, and from side a flat roof stood forward like a portico, supported by two sticks… The*

interior of each looked clean, and to us, passing in the rain, gave some idea, not only of shelter, but even of comfort and happiness' (Mitchell 1839: 76–77).

The ethno-historic account from George 'the Barber' Clarke, an escaped convict from the Hunter Valley, provides important information about everyday life with the Kamilaroi. After reaching the area around Boggabri in 1825, Clarke was befriended by a local group of Kamilaroi people and adopted their language, dress, and customs, before settling at a lagoon east of Boggabri and directly south of the Modification Disturbance Footprint. In his notes, Clarke refers to *taurai,* the traditional hunting and food gathering grounds of each group as having distinct boundaries.

Major Mitchell refers to Clarke as '*The Bushranger*' and used his carefully recorded account as the basis for his 1831 expedition. Having located 'Barber's Lagoon' Mitchell noted that the stockyard (home to Clarke's stolen cattle) was intact as well as several *gunyahs* (bark huts), indicating substantial encampment. He described the vegetation elsewhere along the flood plain as being rather thickly wooded with a broad-leaved eucalyptus (probably bimble box) and *Acacia pendula.* The banks of the river were said to have '*lofty blue gum-trees (river red gum) and excellent grass*' and, according to his sketch of Tangulda peak, the lower slopes were well forested in what appear to be casuarina, Callitris, and eucalypts – probably box (ARAS 2007: 21).

Mitchell was in the vicinity of Leard State Forest during December 1831 and commented on the extensive smoke and fire in the area, indicating that this period of the year was likely a time of fire stick farming. While he encountered frequent evidence of the local Aboriginal population's existence, such as footprints and evidence of stone axes (*mogo*), he did not interact with any of them, apart from one elderly lady whom he startled (Mitchell 1839: 49). Towards the junction of Maules Creek and the Namoi River (approximately 15 km northwest of the Modification Disturbance Footprint) he encountered a small band of approximately 30 people that were chopping trees with iron tomahawks. As Mitchell was one of the first British person to explore this area, the presence of iron axes suggests links through trade networks with neighbouring tribes with existing links to British settlements (AECOM 2010: 26).

Settlement around the villages of Gunnedah and Boggabri (the name is derived from the Kamilaroi word '*Bukki-bri*' meaning place of many creeks) proceeded from the 1830s with several large sheep and cattle pastoral runs being established through the Australian Agricultural Company. By the 1850s, local Aboriginal people were employed as stock keepers and shepherds and a number of conflicts were reported between settlers and Aboriginal people near Manilla on the Namoi River (ARAS 2005: 13).

5.2 REGIONAL ARCHAEOLOGICAL CONTEXT

The Aboriginal occupation of Australia begins prior to 40,000 BP (years before present) and possibly earlier than 50,000 BP. Dates exceeding 20,000 years occur in almost all parts of Australia resulting in the expectation that most areas should have a Pleistocene (>12,000 BP)

occupational signature. However, such dates remain relatively rare due to a range of factors, both behavioural and post-depositional. These factors include a possible low density of occupation in the Pleistocene period and poor preservation of archaeological materials (particularly dateable organic materials).

There are a number of regional archaeological studies which are in general proximity to the Modification Disturbance Footprint. These studies have been summarised briefly below and presented in chronological order. Those studies closer to the Modification Disturbance Footprint are discussed in **Section 5.3**.

Thompson 1981

A survey was conducted between Boggabri and Gunnedah (approximately 20–70 km from the Modification Disturbance Footprint). During the survey, 29 sites and 11 isolated finds were recorded. Site types included artefact scatters, axe grinding grooves, scarred trees, and a single mythological site. A close spatial association between sites and water sources was evident.

Haglund 1983

A survey was conducted at the MCCM (approximately 1 km from the Modification Disturbance Footprint). A total of 13 sites were identified and these included six artefact scatters and seven isolated finds. Retouched flakes, cores, and flakes were the most common artefact types. It was noted that recorded sites should not be regarded as separate occurrences, but as part of a general scatter of stone artefacts on and in most flat and/or gently sloping surfaces in the vicinity of temporary water sources. Lack of sites about the 340 m contour interpreted as a product of generally unfavourable environmental conditions for occupation, including a lack of surface water and the prevalence of steep, stony surfaces.

Balme 1986

A survey of the Pilliga sand region and the Pilliga State Forests (approximately 40 km from the Modification Disturbance Footprint) was conducted in 1986. The study found that open campsites were the dominant site type, typically identified on erosion surfaces in valleys, alongside streamlines. Most sites were between 20–50 artefacts. Quartz was the dominant raw material type. Silcrete, quartzite, jasper, fine-grained volcanic, and chert were also used. It was concluded that the lack of variety of alternative resources, such as permanent waterholes, may explain why there is little evidence of intensive Aboriginal occupation in the Pilliga Forests.

Dallas 1986

A survey of the rail loop and coal haul route for the MCCM (approximately 1 km from the Modification Disturbance Footprint) was conducted in 1986. The survey identified four sites along or adjacent to the haul route and no sites were identified on the rail loop. Three of the sites were open artefact scatters, numbering 2, 11, and 14 artefacts. Artefact material included quartz,

mudstone, siltstone, agate, volcanic, chalcedony, and silcrete. The fourth site was a rock shelter with one identified stone artefact on the floor of the shelter and three artefacts between the shelter and the creek.

Roberts 1991

A survey was conducted through the Pilliga Forests (approximately 40 km from the Modification Disturbance Footprint). As a result, 89 sites were identified, including 24 open campsites, 62 scarred trees, and three rock shelters. It was noted that quartz was the dominant raw material type. It was also noted that poor ground surface visibility away from water sources prohibited an effective assessment of the relationship between water sources and the extent of Aboriginal activities in the forest. Roberts proposed that Aboriginal people may have utilised the forests' creeks as 'corridors' for movement and suggested that the distribution of scarred trees likely reflects post-contact European land practices.

NSW National Parks and Wildlife Service (Purcell 2002)

A large-scale regional survey of the Brigalow Belt South Bioregion (approximately 40 km from the Modification Disturbance Footprint) was conducted by Philip Purcell in 2002. A total of 1940 sites were identified. Of these, 311 sites were identified in the Liverpool Plains, 303 in the Pilliga Outwash, and 609 in the Pilliga Forests. Sites frequently occurred in the Alluvial group, where 668 sites were identified in total, likely due to the association of the group with water features. The most prolific site types were open camp sites and isolated finds. 90% of the sites recorded were located within 200–300 m of water.

R.W. Corkery & Co, 2005a & 2005b

Two surveys were conducted in East Boggabri (approximately 20 km from the Modification Disturbance Footprint) by Corkery & Co during 2005. During the first survey, four Aboriginal sites were identified, including a possible scarred tree, two low density artefact scatters, and one isolated find of a basalt hatchet head made from a river cobble. The second survey identified four Aboriginal sites comprising of chipped stone artefact scatters, with artefact totals ranging from 5 to 20.

Archaeological Surveys and Reports 2009

A total of 121 sites were recorded during a survey in Narrabri (approximately 18 km from the Modification Disturbance Footprint) in 2009. The dominant site types were low density artefact scatters and isolated finds. Most were assessed as having low scientific significance.

Central Queensland Cultural Heritage Management (CQCHM) 2016

CQCHM conducted a cultural heritage assessment for Santos' Narrabri Gas Project in 2016, recording 90 Aboriginal cultural heritage sites during a survey of the Narrabri Gas project area, which covered 95,000 ha, 25 km southwest of Narrabri (approximately 40 km west of the

Modification Disturbance Footprint). The AHIMS search resulted in 268 existing sites within the Narrabri Gas project area. The Narrabri Gas project area contains a portion of the region known as 'the Piliga' and was divided into ten landform units with the results listed in **Table 5-1.**

Table 5-1: Aboriginal cultural heritage sensitivity assigned to the various landform units.

Landform Unit	% Surveyed	Place (%)	Sensitivity
Alluvium	18.1	43 (19.6%)	Low
Alluvium Terrace	22.3	44 (20.1%)	Moderate
Alluvium (AT2)	20.8	14 (6.4%)	Low
Alluvium (AT3)	1.2	1 (0.5 %)	Very Low
Gilgai	0	0	Low
Rocky Ground	3	5 (2.3%)	Moderate
Colluvial Slopes	10.2	35 (16%)	Low
Sand Monkeys	0	2 (0.9%)	Indeterminate
Soil-Mantled slopes	24.4	75 (34.2)	High
Yellow Sandsheet	0	0	Indeterminate

Sites consisted of stone artefact concentrations, grinding equipment and ground-edge tools, grinding grooves, isolated stone artefacts, scarred trees, quarries, hearths and ovens, burials, mounds, recent historic and contact sites, places of traditional and anthropological significance, rock shelters, rock art, shell middens, carved trees, and stone arrangements and earthen circles. Quartz flakes were the most common stone artefacts recorded.

5.3 ARCHAEOLOGICAL INVESTIGATIONS WITHIN THE BOGGABRI COAL MINE

ARAS 2005 & 2007

In 2004 Giles Hamm undertook an assessment of Aboriginal heritage values within the proposed Project Boundary. The assessment identified 61 Aboriginal cultural heritage sites (30 artefact scatters, 26 isolated artefacts, and five scarred trees). Most of the record (81%) was made up of exposed stone artefactual material eroding from forestry tracks with less than five artefacts per m^2 in density. It was concluded from the archaeological evidence, that Aboriginal people were using two main ecological zones within the vicinity of the Modification Disturbance Footprint; the Nagero Creek catchment and the Leard Forest. Hamm (ARAS 2007: 31–32) determined that:

Aboriginal people undoubtedly visited but rarely occupied the high sandstone and conglomerate ridges but sites are found there because the soils are shallow and ground cover is low. The intermediate zone in the landscape between the stony ridges and the top of the alluvial fans, where there is considerable fluctuation in the water availability and resource richness, is perhaps the area most often occupied. Much of the mine site and the sedimentation pond lie in this environment. It is also where the strongest development of texture contrast soils occurs, and all of the usual archaeological constraints associated with the biomantles of these soils will apply to any site. In short these are:

- *Open sites are unlikely to be stratified in a chronologically useful sense*
- *Artefacts will be confined to the biomantle*
- *Artefacts will have been subject to surface dispersion, limited down-slope movement, and differential burial or exposure by bioturbation agents and they will contribute to a stone layer between the A and B-horizon where artefacts of all ages accumulate*
- *Despite the taphonomic processes affecting artefact distribution in the soil some site use patterns, such as knapping floors, may survive in plan form but with an extended vertical distribution of their components and possible mixing with artefacts from other events*
- *Because artefactual burial is an ongoing process, surface visibility will be poor except where material has been exposed by erosion*
- *The only means of dating any sites in this landscape will be by recognition of cultural sequences of artefacts, or from the recovery of intact 'hearths' or burials. All other dates, especially those based on detrital charcoal, and including those based on thermo-luminescence, will be spurious because artefacts can move through soil material of any age.*

Insite Heritage 2010

Angela Besant conducted a field survey in the southern portion of the BCM area in 2009, identifying an additional 77 Aboriginal cultural heritage sites, of which 29 were isolated finds, 34 open artefact scatters, and 14 scarred trees. Two patches of grinding grooves on sandstone bedrock in Leard State Forest were also identified during a subsequent survey, although they were considered relatively poor examples of their site type (Insite 2010: 73). Additionally, sites identified along ridgelines within the Leard State Forest largely comprise isolated finds and low-density artefact scatters. As a result of the survey, the potential for subsurface artefacts in the Leard State Forest was assessed by Besant to be high, especially within the lower slope landforms. Additionally, it is possible that expansive sites could be located on the lower and upper slopes around the forest. The sites in the Leard State Forest were assessed by Besant as being of high scientific significance at a local level, as they are relatively rare in their regional context.

Kayandel 2011

In 2011, an additional 14 Aboriginal cultural heritage sites were recorded on BCM land during the Tarrawonga Cultural Heritage Assessment. The recorded artefact materials were comprised of quartzite, chalcedony, silt stone, volcanic, and fine-grained silicious (FGS). Most artefacts recorded were small in size. It was suggested that this provides potential evidence for flaking technology evolution, i.e. the production of geometric microliths (Kayandel 2011: 57).

Insite Heritage 2015

In 2015 Insite Heritage were commissioned to prepare an Aboriginal Cultural Heritage assessment for the Boggabri Coal Mine Modification 5. Six Aboriginal cultural heritage sites were identified across the four areas surveyed.

- Item 1: Roma Bore Hole and Pipeline: one open site (eight artefacts) in a disturbed context was located and an area of PAD identified
- Items 2 & 3: Cooboobindi Bore Hole, Pipeline, Power Line & Access: five artefacts located on access road and two artefacts located within a ploughed field
- Item 4: Victoria Park auxiliary infrastructure: one scatter of seven artefacts over an area of 50 x 50 m located on the pipeline route on disturbed ground
- Item 5: Bellevue Pipeline: artefact scatter of 100 objects over a 50 x 50 m area on ground heavily disturbed by ploughing
- Item 6: Bellevue pipeline – low density artefact scatter and three isolated finds on an unformed road and adjacent paddock.

UQ Culture & Heritage 2017

Sneddon & Whincop prepared an Aboriginal Heritage Conservation Strategy for MCCM, Tarrawonga Coal Project, BCM, and related Biodiversity Offset Areas. It was noted that a total of 67 Aboriginal cultural heritage sites are the subject of the BCM HMP (Idemitsu 2013). Of these, 21 AHIMS sites had been salvaged, and two AHIMS sites were partially salvaged in 2013. A total of nine AHIMS sites and one partial site remained to be salvaged at that date. In addition, 32 whole and two partial AHIMS sites were to be retained throughout the course of the project.

Insite Heritage 2021

The assessment objectives for MOD 8 were to review the known Aboriginal cultural sites within a 110 ha survey area and to identify any previously unrecorded sites exposed in the time interval since the area was previously inspected. Field inspection for MOD 8 was undertaken with stakeholders from the RAP group on the 28th and 29th September 2020.

The desktop assessment and visual inspection confirmed that there are no Aboriginal objects or sensitive landform elements within the MOD 8 disturbance footprint. A total of six previously unknown sites were located within the MOD 8 survey area (outside of MOD 8 disturbance footprint). In addition, 28 artefacts were recorded in 15 loci including one loci of four artefacts and a loci of 12 artefacts. These artefacts are associated with the partially salvaged site 20-4-0139. Site 20-4-0139 was salvaged by grader scrapes, and whilst some five of the artefacts are located on the creek margins which was not salvaged, the remaining 24 artefacts were exposed in the grader scrape windrows since the grader scrapes were undertaken.

5.4 LOCAL ARCHAEOLOGICAL CONTEXT

5.4.1 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any previously recorded heritage within the Modification Disturbance Footprint. The results of this search are summarised in **Table 5-2** and presented in detail in **Appendix 3**.

Table 5-2: Aboriginal cultural heritage: desktop-database search results.

Name of Database Searched	Date of Search	Type of Search	Comment
Commonwealth Heritage Listings	11/10/2024	Narrabri LGA	No places listed on either the National or Commonwealth heritage lists are located within the Modification Disturbance Footprint
National Native Title Claims Search	11/10/2024	Narrabri LGA	The Modification Disturbance Footprint is within the Gomeroi People Native Title claim area
AHIMS	11/10/2024	1 km radius of the Modification Disturbance Footprint	37 sites within a 1 km radius of the Modification Disturbance Footprint.
Local Environmental Plan (LEP)	11/10/2024	Narrabri LEP of 2012	None of the Aboriginal places noted occur near the Modification Disturbance Footprint

As per **Table 5-2**, it is noted that the Modification Disturbance Footprint includes land currently subject to Native Title claim (*Tribunal File No. NC2011/006, Federal Court No. NSD37/2019, Claimant, Gomeroi People*).

Figure 5-1 shows the location of the AHIMS sites returned within the search area while **Table 5-3** lists the AHIMS site types and frequencies.

Figure 5-2 shows sites that remain valid or have been partially destroyed within or close to the Modification Disturbance Footprint. There is one site previously recorded in the Modification Disturbance Footprint: 20-4-0220 (LFNV11), an isolated find. A further site, 20-4-0572 (TC7/15) has been subject to surface salvage and the centre point is just outside the Modification Disturbance Footprint, however, the PAD has the potential to extend into the Modification Disturbance Footprint.

The most frequently recorded site types are open artefact sites such as scatters and isolated finds which contribute 81.5% of all recorded sites in the vicinity of the Modification Disturbance Footprint. Other less frequent site types include modified trees (n=5, 13.5%), grinding grooves (n=1, 2.5%), and an artefact with PAD (n=1, 2.5%).

Sites within the search area are more commonly recorded near to water sources, and there is a distinct correlation between site frequency and topography, as shown on **Figure 5-3**. Where slopes are steeper, site recordings are less frequent than in those areas with gentler gradients.

Table 5-3: AHIMS site types and frequencies.

Site Type	Number	% Frequency
Artefact scatter	30	81.5
Modified tree	5	13.5
Artefact: grinding groove	1	2.5
Artefact & PAD	1	2.5
Total	**37**	**100**

Figure 5-1: AHIMS sites returned within the search area.

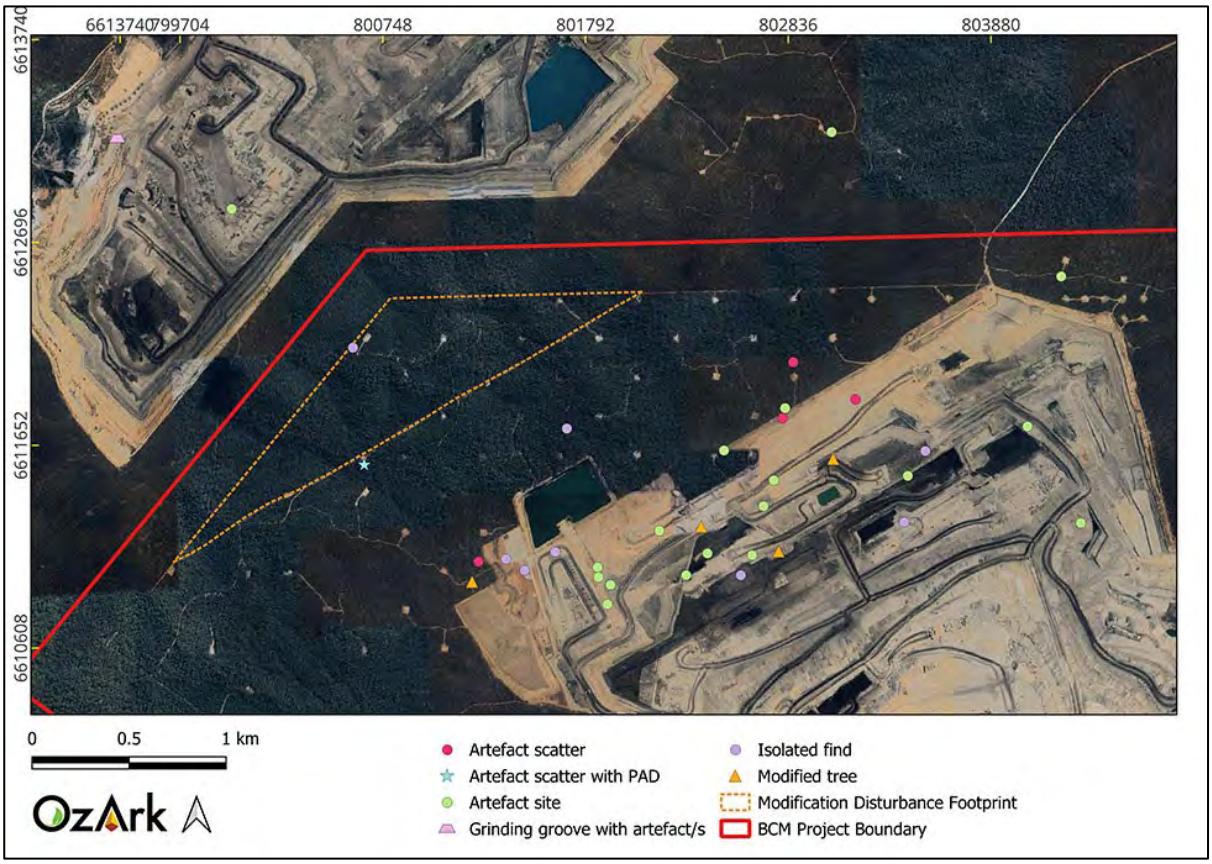


Figure 5-2: Valid and partially destroyed AHIMS sites in relation to the Modification Disturbance Footprint.

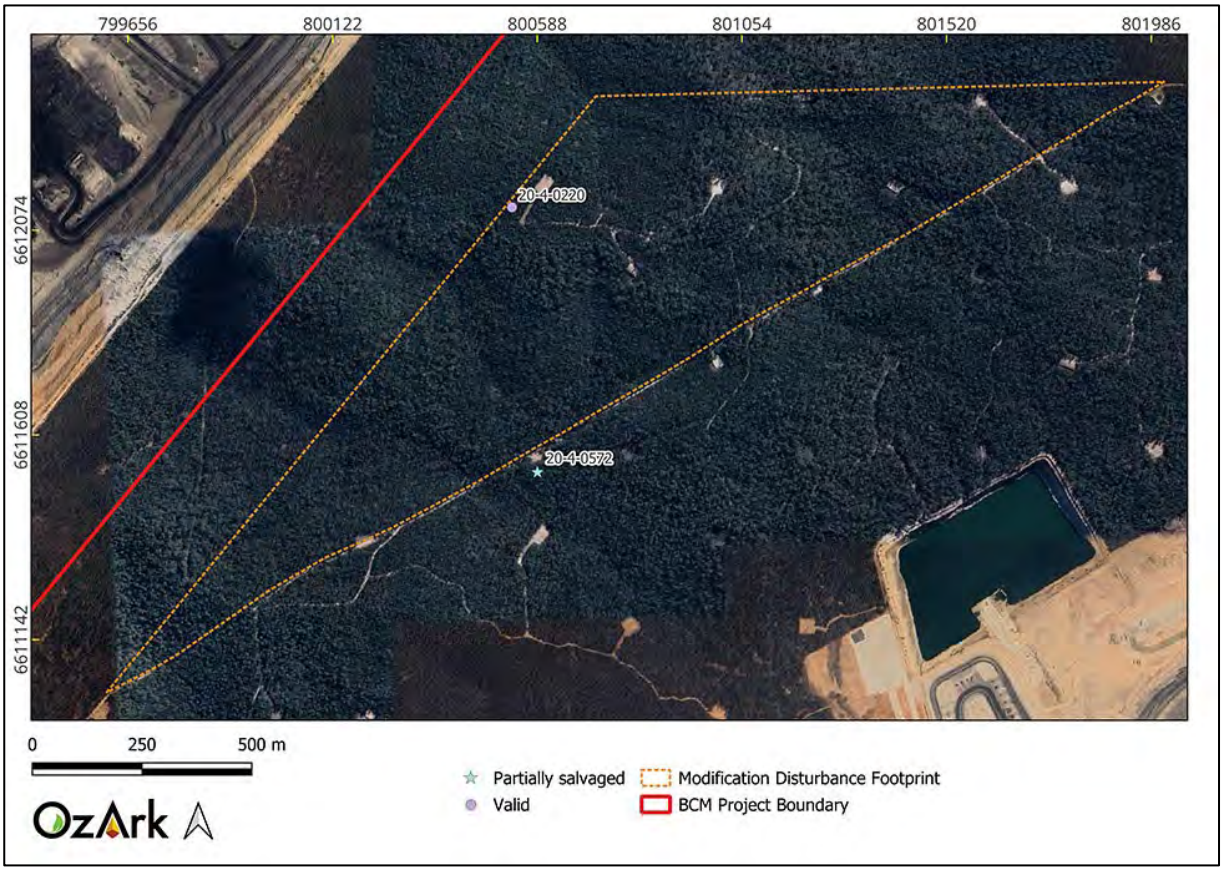
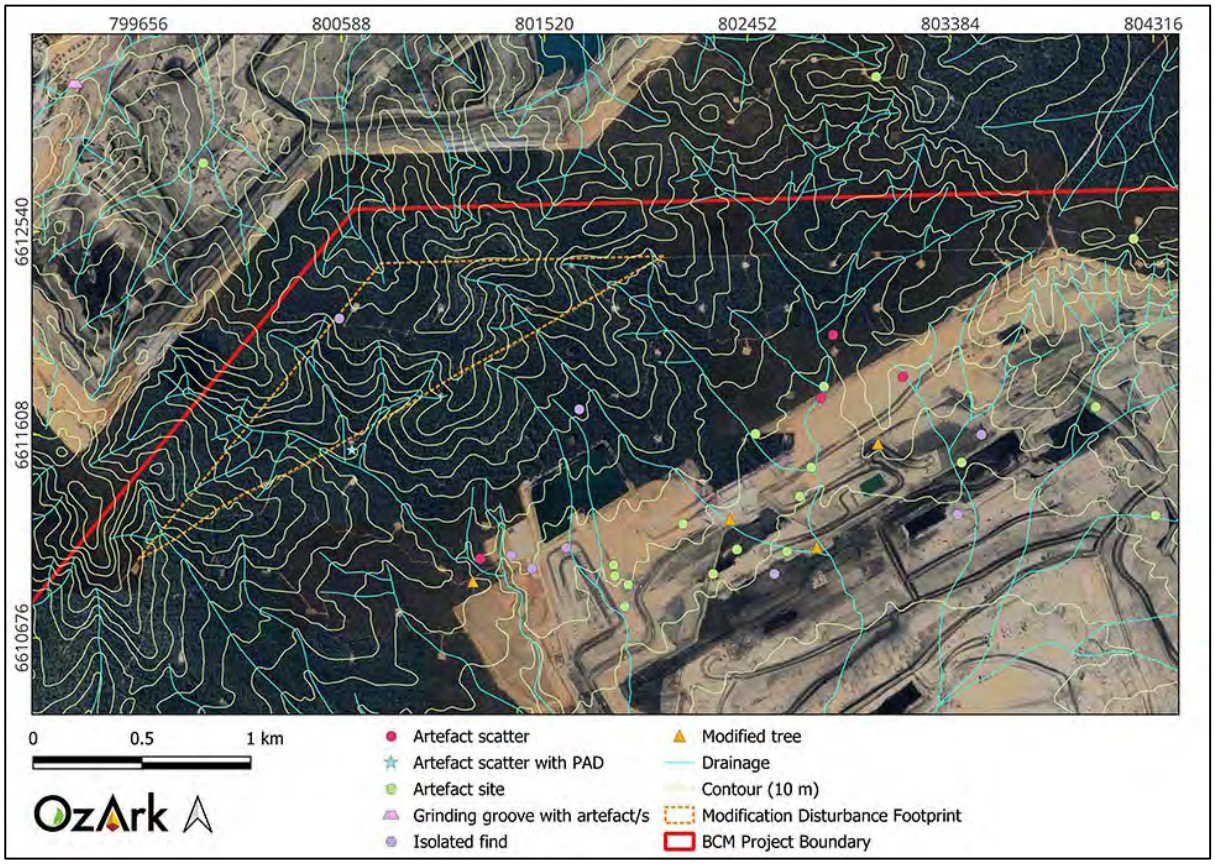


Figure 5-3: AHIMS sites in relation to topography and drainage.



5.5 PREDICTIVE MODEL FOR SITE LOCATION

Across Australia, numerous archaeological studies in widely varying environmental zones and contexts have demonstrated a high correlation between the permanence of a water source and the permanence and/or complexity of Aboriginal occupation. Site location is also affected by the availability of and/or accessibility to a range of other natural resources including plant and animal foods, stone and ochre resources and rock shelters, as well as by their general proximity to other sites/places of cultural/mythological significance. Consequently, sites tend to be found along permanent and ephemeral water sources, along access or trade routes, or in areas that have good flora/fauna resources and appropriate shelter.

In formulating a predictive model for Aboriginal archaeological site location within any landscape it is also necessary to consider post-depositional influences on Aboriginal material culture. In all but the best preservation conditions very little of the organic material culture remains of ancestral Aboriginal communities survives to the present. Generally, it is the more durable materials such as stone artefacts, stone hearths, shells, and some bones that remain preserved in the current landscape. Even these, however, may not be found in their original depositional context since these may be subject to either (a) the effects of wind and water erosion/transport, both over short- and long-time scales, or (b) the historical impacts associated with the introduction of European farming practices including grazing and cropping, land degradation, and farm related infrastructure. Scarred trees, due to their nature, may survive for up to several hundred years but rarely beyond.

5.5.1 Site types in the region of the Modification Disturbance Footprint

The site types listed in **Table 5-4** are present in the region of the Modification Disturbance Footprint. The likelihood of these sites being present in the Modification Disturbance Footprint is discussed in **Section 5.5.3**.

Table 5-4: Site types recorded in the region of the Modification Disturbance Footprint.

Site type	Site description
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, or an otherwise obscured or subsurface artefact scatter. They may occur anywhere within the landscape but are more likely to occur in topographies where open artefact scatters typically occur.
Open artefact scatters	Artefact scatters are defined as two or more artefacts, not located within a rock shelter, and located no more than 50 m away from any other constituent artefact. This site type may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting and gathering activities, short- or long-term camps, and the manufacture and maintenance of stone tools. Artefact scatters typically consist of surface scatters or sub-surface distributions of flaked stone discarded during the manufacture of tools but may also include other artefactual rock types such as hearth and anvil stones. Less commonly, artefact scatters may include archaeological stratigraphic features such as hearths and artefact concentrations which relate to activity areas. Artefact density can vary considerably between and across individual sites. Small ground exposures revealing low density scatters may be indicative of a background scatter rather than a spatially or temporally distinct artefact assemblage. These sites are classed as 'open', that is, occurring on the land surface unprotected by rock overhangs, and are sometimes referred to as 'open camp sites'. Artefact scatters are most likely to occur on level or low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands. Larger sites may be expected in association with permanent water sources.

Site type	Site description
	Topographies which afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and the valleys of creeks, will tend to contain more and larger sites, mostly camp sites evidenced by open artefact scatters.
Culturally modified trees	Aboriginal scarred trees contain evidence of the removal of bark (and sometimes wood) in the past by Aboriginal people, in the form of a scar. Bark was removed from trees for a wide range of reasons. It was a raw material used in the manufacture of various tools, vessels, and commodities such as string, water containers, roofing for shelters, shields, and canoes. Bark was also removed because of gathering food, such as collecting wood boring grubs or creating footholds to climb a tree for possum hunting. Due to the multiplicity of uses and the continuous process of occlusion (or healing) following removal, it is difficult to accurately determine the intended purpose for any example of bark removal. Scarred trees may occur anywhere old growth trees survive. The identification of scars as Aboriginal cultural heritage items can be problematical because some forms of natural trauma and European bark extraction create similar scars. Many remaining scarred trees probably date to the historic period when bark was removed by Aboriginal people for both their own purposes and for roofing on early European houses. Consequently, the distinction between European and Aboriginal scarred trees may not be clear.
Grinding grooves	Grinding grooves are the remnants of ground edge hatchet manufacture and sometimes from food preparation. The site is most likely to occur on flat outcrops of coarse-grained sandstone in the vicinity of water sources, however, grinding grooves have also been recorded on fine-grained granite and quartzite outcrops.

5.5.2 Landform modelling of archaeological potential

The large number of archaeological studies undertaken within the vicinity of the Modification Disturbance Footprint provides information to obtain a sound understanding of the nature and distribution of archaeological sites within the area. The general pattern is that sites are often present close to the drainage lines indicating that waterholes may have been present in these landforms and that the creeks acted as corridors for movement throughout the landscape. While culturally modified trees may be present, the potential for these are reduced due to the practice of selective logging by Forestry Corporation of NSW (Forestry NSW). The steep slopes and crest landforms are generally unfavourable for occupation, due to a lack of water supply and the prevalence of steep, stony surfaces.

5.5.3 Conclusion

Based on knowledge of the environmental contexts of the Modification Disturbance Footprint and a desktop review of the known local and regional archaeological record, the following predictions are made concerning the probability of landforms within the Modification Disturbance Footprint to contain Aboriginal objects (**Table 5-5**), and what types of sites may be present (**Table 5-6**).

Table 5-5: Likelihood of landforms within the Modification Disturbance Footprint to contain Aboriginal objects.

Survey Unit	Landform type	Likelihood to contain Aboriginal objects
1	Moderate to steep slopes	Slopes of a higher gradient, such as those present within the Modification Disturbance Footprint, are a degrading landform and are unsuitable for occupation. Aboriginal objects recorded in such landforms are likely to be in a secondary context. The exception is in localised flat benches, if they are present, where occupation may have been possible.
2	Ridges/crests	Ridges are a degrading landform where soil depth tend to be low. Ridges and crests may have been used as pathways in the past and there is some potential for low-density artefact scatters of isolated finds.

Table 5-6: Likelihood of certain site types being present in the Modification Disturbance Footprint.

Site type	Likelihood of being present in the Modification Disturbance Footprint
Isolated finds	As isolated finds can occur anywhere, particularly within disturbed contexts, it is predicted that this site type could be recorded within the Modification Disturbance Footprint.
Open artefact scatters	As most of the Modification Disturbance Footprint is within heavily vegetated sloping landforms distant to permanent water, this site type is not predicted to be common. It is likely that any sites associated with such landforms will have a low artefact density and a low complexity of tool types as the sites are either one-off events or only infrequently used.
Culturally modified trees	Due to the large number of trees within the Modification Disturbance Footprint, this site type is predicted to be more likely. It is also noted that this site type has been frequently recorded at a regional level. However, previous logging activities in the Modification Disturbance Footprint reduces the likelihood that any culturally modified trees remain present.
Grinding Grooves	This site type could be recorded within the Modification Disturbance Footprint should suitable outcropping rock be available. It is noted that this site type has been recorded within close proximity.

5.6 ARCHAEOLOGICAL CONTEXT: SUMMARY

The archaeological investigations surrounding the Modification Disturbance Footprint as summarised in **Sections 5.2** and **5.3** indicate that:

- Open sites consisting of stone artefact scatters, modified trees, and isolated stone artefacts are the most common site types in the region. They are most likely to occur on low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands
- Aboriginal people may have utilised the forest's creeks as 'corridors' for movement and the topographies that afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and valleys of creeks, will tend to contain more and larger sites
- Grinding grooves may occur on coarse-grained sandstone, fine-grained granite or quartzite outcrops in the vicinity of water sources
- Artefact material includes quartz, mudstone, siltstone, agate, volcanic, chalcedony, and silcrete
- Aboriginal scarred trees may be present within the landscape; however, the area was selectively logged by Forestry NSW and identification of scars as Aboriginal cultural heritage items can be problematic as European bark extraction can create similar scars. Consequently, the distinction between European and Aboriginal scarred trees may not be clear.

5.7 RESEARCH QUESTIONS

Several research questions can meaningfully be applied to the investigation of the Modification Disturbance Footprint. These research questions include:

- What resources were available to the Aboriginal people using the land within the Modification Disturbance Footprint (food, stone, and water) and what resources were transported to the area?
- How do the raw materials recorded within the Modification Disturbance Footprint compare to those in recorded in the surrounding region?
- Establish how the findings within the Modification Disturbance Footprint (if any) accord with the regional archaeological context examined in **Section 5.3**.

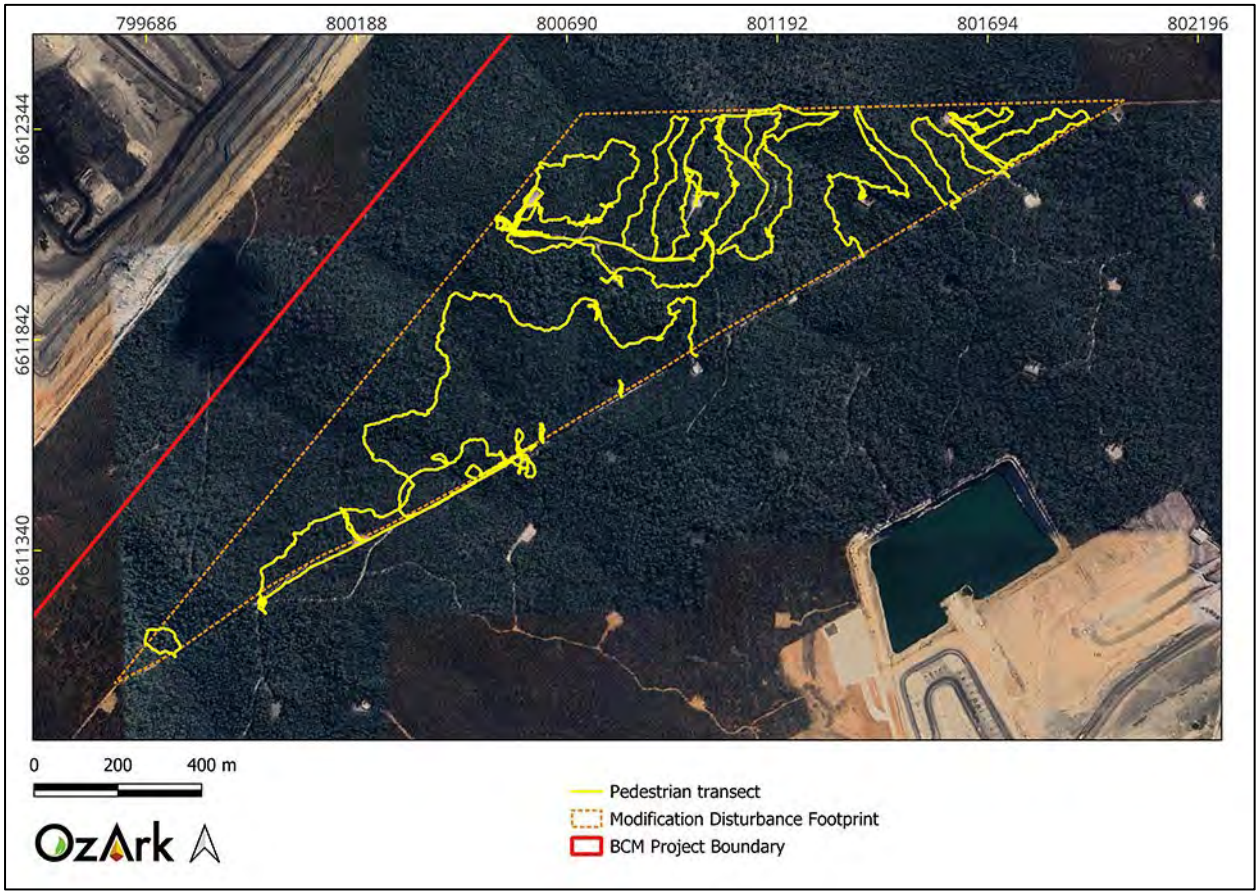
6 RESULTS OF ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

6.1 SAMPLING STRATEGY AND FIELD METHODS

Standard archaeological field survey and recording methods were employed in this study (Burke & Smith 2004).

The Modification Disturbance Footprint was inspected on foot by OzArk Project Archaeologist Tenae Robertson, and representatives from Red Chief LALC and Cacatua Aboriginal Corporation (see **Section 3.2.3**). The survey coverage is shown on **Figure 6-1**.

Figure 6-1: Aerial showing the survey coverage of the Modification Disturbance Footprint.



6.2 PROJECT CONSTRAINTS

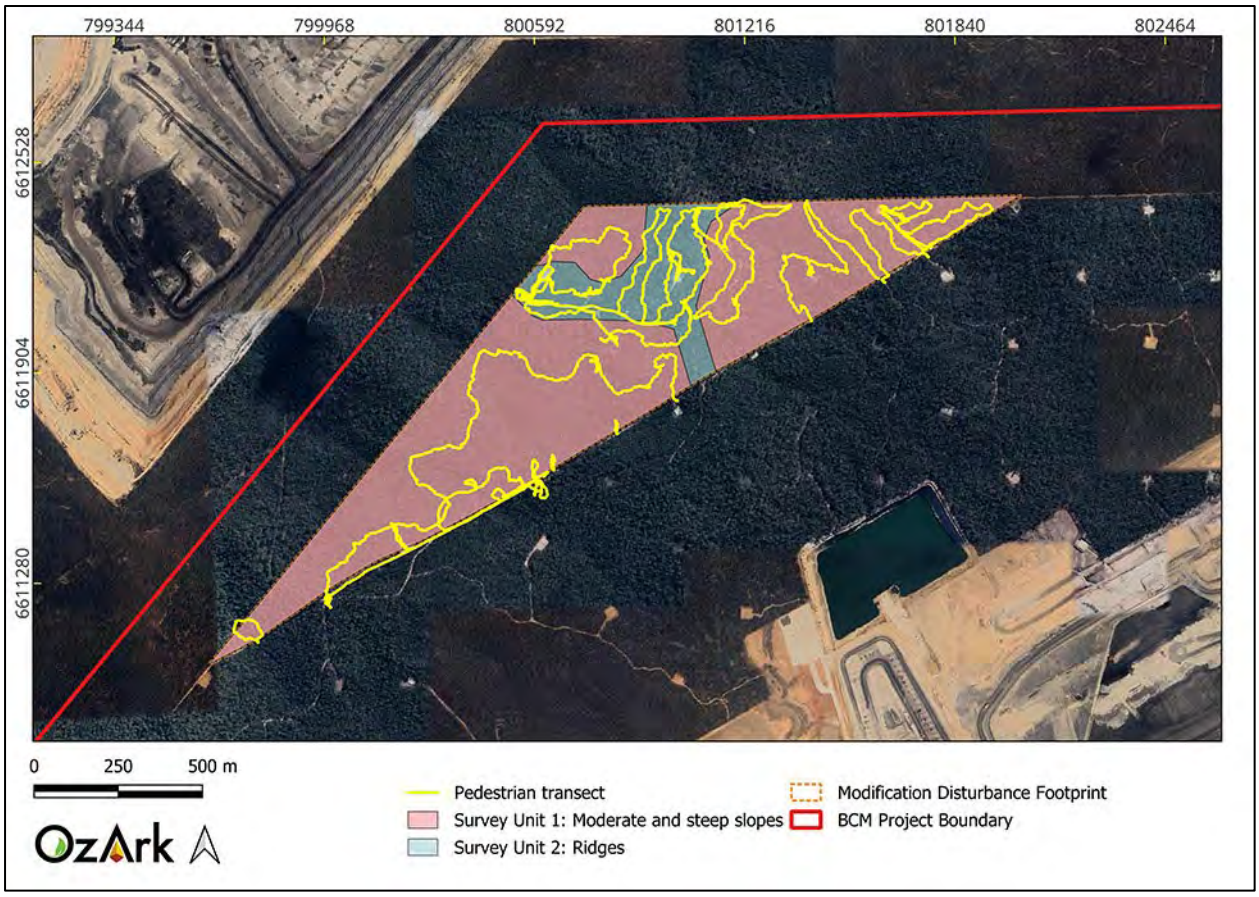
The primary constraint encountered during the survey was the dense vegetation and leaf litter throughout the Modification Disturbance Footprint which significantly inhibited both ground surface visibility (GSV) and mobility. Views of the dense vegetation and low GSV during the assessment are shown on **Figure 6-2**. Additionally, full pedestrian survey was not achieved within the western extent of the Modification Disturbance Footprint, within the moderate to steeply sloping landforms (**Figure 6-3**).

Figure 6-2: Example images of the dense vegetation within the Modification Disturbance Footprint.

1. Example of the low GSV within Survey Unit 1.

2. Example of the low GSV within Survey Unit 2.

Figure 6-3: Survey coverage within the survey units.



6.3 EFFECTIVE SURVEY COVERAGE

Two of the key factors influencing the effectiveness of archaeological survey are GSV and ground surface exposure (GSE). These factors are quantified to ensure that the survey data provides adequate evidence for the evaluation of the archaeological materials across the landscape. For

the purposes of the current assessment, these terms are used in accordance with the definitions provided in the Code of Practice.

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, stone ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals'* (DECCW 2010: 39).

GSE is defined as:

> *… different to visibility because it estimates 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 2010: 37).

Table 6-1 calculates the effective survey coverage within the Modification Disturbance Footprint. In general, **Table 6-1** presents an approximation of the amount of ground surface able to be seen at any location within specific landform units. For example, at any one location within the ridge landforms of the Modification Disturbance Footprint (Survey Unit 2), approximately 1.5% of the ground surface could be seen. Exposures in these landforms were generally afforded by areas bounded by low rocky outcrops hindering vegetation growth. While these exposures were somewhat common (comprising approximately 30% of the landform), visibility of the ground was limited due to the high amounts of rocks and pebbles which covered the ground. Within Survey Unit 1, visibility was hampered by the thick, dense scrub of the juvenile forest, as well as leaf litter and gravels.

Table 6-1: Effective survey coverage within the Modification Disturbance Footprint.

Survey Unit	Landform	Survey Unit Area (sq m)	Visibility %	Exposure %	Effective Coverage Area (sq m)	Effective Coverage %
1	Slopes	730,000	5	10	3,650	0.5
2	Ridge/Crest	130,000	5	30	1,950	1.5

6.4 RESULTS OF THE SURVEY

No previously unrecorded Aboriginal sites were identified during the survey, and the Modification Disturbance Footprint has been assessed as having low archaeological potential. The lack of Aboriginal site recordings is almost entirely due to the steeply sloping landforms and their distance to good water supplies. Views of the Modification Disturbance Footprint are shown on **Figure 6-4**.

Figure 6-4: Views of the Modification Disturbance Footprint.




6.5 PREVIOUSLY RECORDED ABORIGINAL SITES LOCATED

Two previously recorded Aboriginal sites were located during the survey (**Table 6-2**). As discussed in **Section 5.4.1**, LFVN11 is situated within the Modification Disturbance Footprint, while TC7/15 plots approximately 50 m south of the southern boundary of the Modification Disturbance Footprint, but has the possibility to extend within the project boundary.

Table 6-2: Previously recorded sites visited during the survey.

AHIMS ID	Site name	Site description	2023 results
20-4-0220	LFVN11	*Isolated chalcedony flake located on the ridgeline in the Leard Forest. The isolated find is on a track in the north-western corner of the project boundary.* *No potential PAD.* A view of the site is shown on **Figure 6-5**.	Site plots approximately 30 m northeast of an extensively cleared drill pad access route. The track noted in the site description has been obscured through extensive vegetation regrowth. No Aboriginal objects were identified at this location. It was assessed that, as the site was recorded 24 years prior to the current assessment, the object has likely been displaced through continued land use as well as natural processes. However, as there was poor GSV at the site during the visit, the absence of the object could not be confirmed, and it must be assumed that the site is still valid. Therefore, the management measures outlined in **Section 9** apply.
20-2-0572	TC7/15	*Small scatter located on rise above steep ephemeral drainage line.* *2 artefacts collected during tree clearance works. Area to the south of the tree clearance zone has been*	The site was located and coordinates accurate. The Modification Disturbance Footprint and the site are situated on opposite sides of a maintained mine access track. No Aboriginal objects were identified.

AHIMS ID	Site name	Site description	2023 results
		identified as PAD due to landform and presence of artefacts close by. Area of PAD remains extant. – BCO 2016 The site card describes the artefacts recorded as one flaked piece and one distal flake fragment, both manufactured of fine-grained silicious materials. The description of the site indicates that all recorded artefacts have been salvaged, and that the 'partial' site status is reflective of the PAD remaining intact. A view of the PAD area is shown on **Figure 6-5**.	The recorded PAD extends south of this track, and the site does not extend into the Modification Disturbance Footprint.

Figure 6-5: Views of the previously recorded sites within the Modification Disturbance Footprint.

1. LFVN11. View northwest to the approximate location of the site.

2. TC7/15. View east across the tree clearance zone.

6.6 ABORIGINAL COMMUNITY COMMENTS ON THE SURVEY

No cultural values specific to the Modification Disturbance Footprint were noted or elucidated during the survey.

6.7 SUMMARY OF SURVEY RESULTS

No previously unrecorded Aboriginal sites were identified during the survey, and the Modification Disturbance Footprint has been assessed as having low archaeological potential. While areas of low outcropping conglomerate sandstone were noted within the Modification Disturbance Footprint, none presented evidence of grinding grooves, nor was the material of the rock suitable for such practices. Similarly, while high amounts of pebbles were noted, especially within the ridge landform, the materials were not suitable for the manufacturing of stone tools.

Further, no landforms within the Modification Disturbance Footprint were assessed to have the potential for subsurface archaeological deposits of a significant or conservable nature.

Previously recorded site LFVN11 was visited, however, no objects were observed. Site TC7/15, which is located outside of the Modification Disturbance Footprint, was also located, and it was assessed that the PAD area does not extend into the Modification Disturbance Footprint.

6.7.1 Discussion

The previous studies and predictive model (**Section 5**) suggested that open artefacts sites, grinding grooves, and culturally modified trees were the most likely site types to be recorded within the Modification Disturbance Footprint, but that the steep terrain and general distance to reliable waters significantly reduced this likelihood. Rather, previous studies indicated that the landforms present within the Modification Disturbance Footprint were more likely utilised for transit activities. The results of the survey are consistent with these predictions, as no previously unrecorded Aboriginal sites were identified.

In **Section 6.2** it was noted that full pedestrian survey was not achievable across the steeply sloping landforms, however, there is confidence that further coverage would not have resulted in the identification of previously unrecorded Aboriginal sites as this landform type is unsuitable for occupation.

The lack of newly recorded sites resulting from the survey is unsurprising as the Modification Disturbance Footprint is distant from reliable water sources with which artefact scatters and PADs are often associated. The ephemeral drainages present within the Modification Disturbance Footprint are largely located at the base of steep V-shaped gullies which are unsuitable for occupation. While discreet flat areas above ephemeral run-off gullies were noted infrequently within the Modification Disturbance Footprint, they do not present a preferable or favourable location for occupation when compared to the wider areas of gentle slopes located further east, where more reliable water is accessible.

Areas of exposure and levels of GSV were low across the Modification Disturbance Footprint and the low GSV may have obscured surface artefacts. While it is possible that unrecorded artefact sites may be present within the Modification Disturbance Footprint, it is unlikely that these have a high artefact density or hold high scientific significance.

6.7.2 Responses to the research questions

The research questions as detailed in **Section 5.7** were advanced to guide the survey of the Modification Disturbance Footprint. Following the survey, responses to these research questions are set out below.

- What resources were available to the Aboriginal people using the land within the Modification Disturbance Footprint (food, stone, and water) and what resources were transported to the area?

  - No specific food resource locations were noted, and no reliable water sources were available within the Modification Disturbance Footprint. While areas of low outcropping conglomerate sandstone were present, as well areas with extensive pebble coverage, no raw materials suitable for the procurement of stone tools or for use as grinding surfaces were identified.

- How do the raw materials recorded within the Modification Disturbance Footprint compare to those in recorded in the surrounding region?
  - The Aboriginal object described in the initial recording of LVN11 consisted of one chalcedony flake. While this is consistent with the surrounding region, no further Aboriginal objects have been recorded within the Modification Disturbance Footprint, and therefore no meaningful comparisons to the raw materials of the surrounding region can be made.

- Establish how the findings within the Modification Disturbance Footprint (if any) accord with the regional archaeological context examined in **Section 5.3**.
  - The findings of the Modification Disturbance Footprint accord with the regional archaeological context. Previous assessments (Haglund 1983, Thompson 1981) indicated that landforms such as steep stony surfaces and areas at a distance to reliable waters, as are present within the Modification Disturbance Footprint, were less favourable for occupation and therefore have lesser archaeological potential. The lack of further site identification during the survey is consistent with these findings.

7 SIGNIFICANCE ASSESSMENT

7.1 INTRODUCTION TO SIGNIFICANCE ASSESSMENT

7.1.1 Identifying cultural significance

The concept of cultural significance is used in Australian heritage practice and legislation to encompass all the cultural values and meanings that might be recognised in a place. The Burra Charter's definition of cultural significance is broad and encompasses places that are significant to Indigenous cultures.

The Burra Charter definition of 'place' is also broad and encompasses Indigenous places of cultural significance. 'Place' includes locations that embody spiritual value (such as Dreaming places, sacred landscapes, and stone arrangements), social and historical value (such as massacre sites), as well as scientific value (such as archaeological sites). In fact, one place may be all these things or may embody all these values at the same time.

In some cases, the find-spot of a single artefact may constitute a 'place'. Equally, a suite of related locations may together comprise a single 'place', such as the many individual elements that make up a Songline. These more complex places are sometimes called a cultural landscape or cultural route.

The Guide notes that cultural significance is comprised of an assessment of social values, scientific values, aesthetic values, and historic values. These values are described below.

7.1.1.1 Social or cultural value

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 (Articles 1.1, 1.2, 1.12, 5, and 8–11: Burra Charter).

Places of social or cultural value have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods, or events. Communities can experience a sense of loss should a place of social or cultural value be damaged or destroyed.

There is not always consensus about a place's social or cultural value. Because people experience places and events differently, expressions of social or cultural value do vary and, in some instances, will be in direct conflict. When identifying values, it is not necessary to agree with or acknowledge the validity of each other's values, but it is necessary to document the range of values identified.

Social or cultural value can only be identified through consultation with Aboriginal people. This could involve a range of methodologies, such as cultural mapping, oral histories, archival

documentation, and specific information provided by Aboriginal people specifically for the investigation.

Cultural value involves both traditional links with specific areas, as well as an overall concern by Aboriginal people for their sites generally and the continued protection of these. This type of value may not be in accord with interpretations made by the archaeologist: a site may have low archaeological value but high social value, or vice versa.

7.1.1.2 Scientific (archaeological) value

This refers to the importance of a landscape, area, place or object because of its rarity, representativeness, and the extent to which it may contribute to further understanding and information (Articles 1.2, 5, and 8: Burra Charter).

Assessing a site in this context involves placing it into a broader regional framework, as well as assessing the site's individual merits in view of current archaeological discourse. This type of value relates to the ability of a site to answer current research questions and is also based on a site's condition (integrity), content and representativeness.

The overriding aim of cultural heritage management is to preserve a representative sample of the archaeological resource. This will ensure that future research within the discipline can be based on a valid sample of the past. Establishing whether a site can contribute to current research also involves defining 'research potential'. Questions regularly asked when determining significance are: Can this site contribute information that no other site can? Is this site representative of other sites in the region?

Information about scientific values will be gathered through any archaeological investigation undertaken. Archaeological investigations must be carried out according to Heritage NSW's Code of Practice.

Often scientific values are informed by social values that allow a contemporary understanding of the archaeological data to be understood.

7.1.1.3 Aesthetic value

This refers to the sensory, scenic, architectural, and creative aspects of the place (Articles 1.12 and 8: Burra Charter). It is often closely linked with the social values. It may consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use.

7.1.1.4 Historic value

Historic value refers to the associations of a place with a historically important person, event, phase, or activity in an Aboriginal community. Historic places do not always have physical

evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have 'shared' historic values with other (non-Aboriginal) communities (Articles 1.12–1.16: Burra Charter).

Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage. Consequently, the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives. This means it is often necessary to collect oral histories along with archival or documentary research to gain enough understanding of historic values.

7.2 ASSESSED SIGNIFICANCE OF THE RECORDED SITES

Table 7-1 presents a summary of the significance assessment of Aboriginal cultural heritage sites recorded during this assessment. Further details of each of the assessment criteria are provided below.

Social or Cultural Value

The social and cultural value of Aboriginal sites is generally determined through consultation with Aboriginal people. Generally, the Aboriginal community regard all sites as having high cultural significance. This is due to all sites, even displaced artefact sites, being able to provide a connection to their ancestors, as well as being a tangible reminder of the past Aboriginal occupation of the area.

Following the RAP review of the draft ACHAR, no further cultural values associated with the recorded sites within the Modification Disturbance Footprint or the landforms of the Modification Disturbance Footprint were identified.

Consequentially, all recorded Aboriginal sites have been assessed has having high cultural values.

Archaeological/Scientific Value

LFNV11 is a chalcedony isolated flake. This artefact type and material is not unique to the region and is commonly found in other isolated find and scatter sites in and around the Leard Forest area.

Similarly, the artefact has limited archaeological value due to its displacement from its depositional context. Past land use has disturbed the integrity of the site. The site is unstratified, displaced, and low in density, and therefore unable to yield information regarding occupation within the Modification Disturbance Footprint and allow for meaningful comparison to other similar landforms across the region.

Aesthetic Value

Isolated finds such as LFVN11 do not manifest themselves obviously in the landscape and are difficult for the layperson to appreciate. Additionally, the surrounding area has been modified in historic times (i.e. logging, tree clearance activities, drill pad construction). As such, LFVN11 is assessed as having low aesthetic value.

Historic Value

LFVN11 does not have any association with historically important persons, places, or events. Therefore, the site has no historic values.

Table 7-1: Aboriginal cultural heritage: significance assessment.

Site Name	Social or Cultural Value	Archaeological / Scientific Value	Aesthetic Value	Historic Value
LFNV11	High	Low	Low	None

7.2.1 Statement of significance

There may be places with intangible cultural significance within the Modification Disturbance Footprint, however, no specific locations have so far been identified by the Aboriginal community. Likewise, no places of historic or aesthetic values are present.

The recorded location of LFVN11 was visited, however, no Aboriginal objects were observed. The scientific value of LFNV11 is therefore considered to have a low potential to provide further information on the traditional Aboriginal use of the region due to limited representational abilities of low-density artefact sites.

Overall, the archaeological potential for the Modification Disturbance Footprint to contain significant archaeological deposits of conservation value has been assessed as low. This assessment is supported by the steeply sloping terrain and lack of reliable water within the Modification Disturbance Footprint which are landforms that do not support long-term or seasonal occupation.

8 ASSESSING HARM

8.1 AVOIDING AND MINIMISING HARM

8.1.1 Conserving significant Aboriginal cultural heritage

An object of the NPW Act is the '*conservation of objects places and features… of cultural value within the landscape, including… places, objects and features of significance to Aboriginal people*' (s.2A(1(b)(i)).

As heritage professionals, OzArk, strives for good conservation outcomes. In particular, OzArk is primarily concerned with the conservation and protection of Aboriginal cultural heritage that is of significance to Aboriginal people.

Two primary objectives when managing harm to an Aboriginal object are:

- Impacts to significant Aboriginal objects and places should always be avoided wherever possible
- Where impacts to Aboriginal objects and places cannot be avoided, proposals should be amended to reduce the extent and severity of impacts to significant Aboriginal objects and places using reasonable and feasible measures.

8.1.2 Opportunities to conserve Aboriginal cultural heritage values

The nature of the Project offers few opportunities to conserve Aboriginal archaeological sites within the Modification Disturbance Footprint. Conservation of Aboriginal heritage values will be pursued through the mitigation of the harm through the measures outlines in **Section 9.2** as well as through consultation with RAPs.

8.2 LIKELY IMPACTS TO ABORIGINAL HERITAGE FROM THE PROJECT

Table 8-1 presents a summary of potential impacts to Aboriginal cultural heritage associated with MOD 10.

Table 8-1: Aboriginal cultural heritage: impact assessment.

Site Name	Type of Harm (Direct/Indirect / None)	Degree of Harm (Total/Partial / None)	Consequence of Harm (Total/Partial/No Loss of Value)
LFNV11	Direct	Total	Toal loss of value

8.3 ECOLOGICALLY SUSTAINABLE DEVELOPMENT PRINCIPLES

Ecologically sustainable development principles (ESD) (defined in s.6 of the *Protection of the Environment Administration Act 1991*) requires the integration of economic and environmental considerations (including cultural heritage) in the decision-making process. Regarding Aboriginal cultural heritage, ESD can be achieved by applying the principle of intergenerational equity and the precautionary principle.

8.3.1 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.

In terms of Aboriginal heritage, intergenerational equity can be considered in terms of the cumulative impacts to Aboriginal objects and places in a region. If few Aboriginal objects and places remain in a region (for example, because of impacts under previous permits), fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places.

Information about the integrity, rarity or representativeness of the Aboriginal objects and places proposed to be impacted, and how they illustrate the occupation and use of land by Aboriginal people across the region, will be relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of the project.

Where there is uncertainty, the precautionary principle should also be followed.

8.3.2 The precautionary principle

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 relation to Aboriginal cultural heritage values, the precautionary principle should be applied if:

- The proposal 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.

8.3.3 Principle of Integration

The Plan of Implementation of the World Summit on Sustainable Development held in Johannesburg, 2002, noted the need to "*promote the integration of the three components of sustainable development- economic development, social development and environmental protection- as interdependent and mutually reinforcing pillars*".

The principle of integration ensures mutual respect and reciprocity between economic and environmental considerations:

- Environmental considerations are to be integrated into economic and other development plans, programs, and projects
- Development needs are to be considered in applying environmental objectives.

8.3.4 Applicability to the Project

There is a very low impact to Aboriginal cultural heritage values as only one isolated find has been recorded within the Modification Disturbance Footprint, and no intangible heritage values have been identified. The results of the surface survey indicate that significant Aboriginal cultural heritage values will not be harmed within the Modification Disturbance Footprint.

Table 8-2 examines the application of ESD principles to the proposal.

Table 8-2: Application of ESD principles to the proposal.

ESD principle	Response
Avoiding and minimising harm	**Section 9** sets out mechanisms by which to avoid and minimise harm. The undertaking of the survey has indicated that significant subsurface deposits of conservation value are unlikely to be present at the Modification Disturbance Footprint.
The integration principle	The MOD 10 assessment has considered the environmental impact of the development. While there will be harm to the Aboriginal cultural values of the Modification Disturbance Footprint, no sites with high scientific value will be harmed. The loss of cultural values will be mitigated through appropriate management of the sites in consultation with the RAPs.
The precautionary principle	The Aboriginal cultural heritage investigation has followed the precautionary principle though undertaking a robust Aboriginal cultural heritage assessment to ensure that harm to Aboriginal objects and values is well understood. The survey adopted a precautionary principle when it came to describing and assessing landforms within the survey areas.
The intergenerational equity principle	It is assessed that the proposal will not harm significant Aboriginal cultural heritage values and that there will be a manageable diminution of intergenerational equity should the sites recorded here be harmed.

9 MANAGEMENT OF ABORIGINAL CULTURAL HERITAGE SITES

9.1 GENERAL MANAGEMENT PRINCIPLES

Appropriate management of cultural heritage items is primarily determined based on their assessed significance as well as the likely impacts of the project. **Section 7.2** and **Section 8.2** describe, respectively, the significance / potential of the recorded sites and the likely impacts of the project. The following management options are general principles, in terms of best practice and desired outcomes, rather than mitigation measures against individual site disturbance.

- Avoid impact by altering the proposal to avoid impact to a recorded Aboriginal site. If this can be done, then a suitable curtilage around the site must be provided to ensure its protection both during the short-term construction phase of development and in the long-term use of the area. If plans are altered, care must be taken to ensure that impacts do not occur to areas not previously assessed.

- If impact is unavoidable then approval to disturb sites under the authority of a HMP must be sought from DPHI. Normally the management recommendations contained in the ACHAR become policies of the HMP. As the Aboriginal community have been provided the opportunity to view the draft ACHAR, the ACHAR must make it clear that a future HMP will manage Aboriginal cultural heritage within the Modification Disturbance Footprint so that the Aboriginal community can assess the management recommendations with this knowledge. The HMP policies will often stipulate that the Aboriginal community should be involved in any salvage activities and will dictate what the fate of any salvaged Aboriginal objects will be.

9.2 MANAGEMENT AND MITIGATION OF RECORDED ABORIGINAL SITES

It is noted that equivalent policies to those below are prescribed in the existing BCM HMP (Section 4). The HMP employs standard management measures for recorded Aboriginal sites and this document will be updated should MOD 10 be approved.

In the unlikely event that Aboriginal objects are noted during the proposed works, the actions outlined in Section 3.4 of the HMP, (or as modified and approved) must be followed. The HMP (Section 3.5) also contains procedures should the discovery of human skeletal remains be made during the proposed works.

9.2.1 Surface salvage

One Aboriginal site (LFVN11) is located within the Modification Disturbance Footprint and cannot be avoided. It is recommended that this site be salvaged through the recording and collection of the surface artefact prior to works proceeding. This recommendation is due to:

- The high cultural value of this site and its importance to the Aboriginal community

- The nature of the impacted sites (isolated find)
- The site being in a landform with previous disturbance
- The low archaeological value assigned to the site precludes more intensive archaeological investigations
- Sites such as this have a limited ability to further inform the community about the history and culture of the area. While any potential research questions are limited, some information can nevertheless be gained.

The recommended methodology for the salvage will be finalised after the approvals process as part of the HMP, but will include the following measures:

1. The visible artefact(s) will be flagged in the field
2. The site will be photographed after flagging and before recording
3. The following artefact information will be recorded for each artefact:
    - Location
    - Artefact class
    - Artefact type
    - Size
    - Reduction level
    - Raw material
    - Notes.
4. A selection of artefacts, particularly any formal tool types, will be photographed
5. A salvage report will be completed within 12 months of the salvage to record the results of the salvage
6. An Aboriginal Site Impact Recording Form (ASIRF) will be submitted by the archaeologist detailing the salvage process at the site.

9.2.2 Long-term management of Aboriginal objects

The existing HMP includes protocols for the long-term management of the Aboriginal site salvaged within the BCM Project Approval Area, as well as any additional artefacts discovered during construction and operation of MOD 10. Regarding stone artefacts, procedures for the storage of salvaged materials are outlined in Section 4.4.1 of the HMP.

10 RECOMMENDATIONS

Under Section 89A of the NPW Act it is mandatory that all newly recorded Aboriginal sites be registered with AHIMS. As a professional in the field of cultural heritage management it is the responsibility of OzArk to ensure this process is undertaken.

To this end it is noted that one Aboriginal site is located within the Modification Disturbance Footprint.

The following recommendations are made based on these impacts and regarding:

- Legal requirements under the terms of the NPW Act whereby it is illegal to damage, deface or destroy an Aboriginal place or object without an approved HMP
- The findings of the current investigations undertaken within the Modification Disturbance Footprint
- The interests of the Aboriginal community.

Recommendations concerning Aboriginal cultural values within the Modification Disturbance Footprint are as follows:

1. Following approval of the proposed modification, the management measures, including the unanticipated finds protocol, outlined in the existing BCM HMP (as amended and approved by DPHI) must be followed.
2. AHIMS site 20-4-0220 (LFNV11) must be salvaged prior to works commencing as per the measures outlined in **Section 9.2** and in accordance with those measures outlined in Section 4 of the BCM HMP.
3. All land disturbing activities associated with MOD 10 must be confined within the Modification Disturbance Footprint. Should the parameters of MOD 10 extend beyond this area then further archaeological assessment may be required.
4. Inductions for work crews should include a cultural heritage awareness procedure to inform workers of their responsibility to notify their supervisors if a suspected Aboriginal object is noticed. The cultural heritage awareness procedure will illustrate common artefact attributes such as those shown in **Appendix 4**.

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APPENDIX 1: ABORIGINAL COMMUNITY CONSULTATION

Appendix 1 Figure 1: Aboriginal community consultation log.

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
19.7.24	Heritage NSW	Ben Churcher (BC) requested stakeholder list for Narrabri Shire LGA from HNSW	Email
24.7.24	Heritage NSW	BC/Catherine Burrowes (CB) received updated stakeholder list	Email
26.7.24	Narrabri LALC	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Michelle Saunders	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Natasha Rodgers	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	A&K Cultural Heritage	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Red Chief LALC	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Toomelah LALC	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Wee Waa LALC	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Guda Birgingira Aboriginal Corporation	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Bill Trewlynn	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Stephen Matthews	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	Ngagga Ngagga	CB emailed Stage 1 community letters closing date 10.8.2024	Email
26.7.24	BJC Cultural Management	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Brent Mathews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Bunda Consultants	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Christine Archbold	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Clifford Matthews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Darrell Mathews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Donna Moodie	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Esther Tighe	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Gunida Gunyah	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Hazel Collins	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Heilamon Cultural Consultants	CB posted Stage 1 community letters closing date 10.8.2024	Post

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
26.7.24	Jodie Mckinnon	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	John Matthews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Joshua Matthews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Justin Matthews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	KL.KG Saunders Trading Service	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Lorraine Towney	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Luke Cameron Cultural Management	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Mavonia Welsh	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	ME Griffiths Cultural Management	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Nammoypathways Aboriginal Corporation	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Paul Moodie	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Robert Miller	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Rodney Mathews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Ron Smith	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Roslyn Smith	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Scott Smith	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Steve Saunders	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	T&G Culture Consultants	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Talcon Pty Ltd	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Tania Mathews	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Tracy Woltley	CB posted Stage 1 community letters closing date 10.8.2024	Post
26.7.24	Stephen Matthews	CB received email registering for the project	Email
31.7.24	Stephen Matthews	CB replied with thanks	Email
26.7.24	Natasha Rodgers	CB received email registering for the project	Email
31.7.24	Natasha Rodgers	CB replied with thanks	Email
26.7.24	Yvonne Rodgers	CB received email registering for the project	Email
31.7.24	Yvonne Rodgers	CB replied with thanks	Email
26.7.24	Loretta Long	CB received email registering for the project	Email

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
31.7.24	Loretta long	CB replied with thanks	Email
7.8.24	Lorraine Towney	CB received return to sender mail	Post
7.8.24	Nammoypathways Aboriginal Corporation	CB received return to sender mail	Post
7.8.24	Talcon Pty Ltd	CB received return to sender mail	Post
19.8.24	Red Chief Local Aboriginal Land Council	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Gunida Gunya	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Min Min Aboriginal Corporation	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Cacatua Cultural Consultants	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Bigundi Biame Traditional People	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Gomeroi Narrabri Aboriginal Corporation (GNAC)	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Post
19.8.24	Gloria Foley	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Gomilaroi Cultural Consultants	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Gomilaroi Cultural Consultants	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr Steve Talbott	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr Leonard Talbott	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Ms Veronica (Dolly) Talbott	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr Michael Trindall	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Deslee Talbott Consultant	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	TNL Site Trackers	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr Ronald Long	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	White Cockatoo	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr James Foley	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr Sonny Fitzroy	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Post

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
19.8.24	Mr Shannon Draper	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Cyril Sampson	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Post
19.8.24	Mr Brian Draper	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	T&G Cultural Consultants	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	T&G Cultural Consultants	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mr David Horton	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Ms Cindy Foley	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Tania Matthews	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Mooki Plains Clan	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Stephen matthews	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Natasha Rodgers	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Yvonne Rodgers	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
19.8.24	Loretta long	CB emailed Stage 2 Methodology - **closing date 16.9.24**	Email
23.8.24	Jodie Mckinnon	Return to sender mail received	Email
23.8.24	Donna Moodie	Return to sender mail received	Email
23.8.24	Tania Mathews	Return to sender mail received	Email
19.9.24	Red Chief Local Aboriginal Land Council	Eleanore Martin (EM) attempted to call and received voicemail.	phone
19.9.24	Red Chief Local Aboriginal Land Council	EM received call confirming fieldwork attendance	phone
19.9.24	Red Chief Local Aboriginal Land Council	EM received email confirming fieldwork participation and contact details.	Email
23.9.24	Red Chief Local Aboriginal Land Council	EM called office and notified that the fieldwork has been postponed as the archaeologist is sick and cannot be replaced.	phone
25.2.25	Red Chief Local Aboriginal Land Council	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.24	Gunida Gunya	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Min Min Aboriginal Corporation	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Cacatua Cultural Consultants	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
25.2.25	Bigundi Biame Traditional People	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Gomeroi Narrabri Aboriginal Corporation (GNAC)	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Post
25.2.25	Gloria Foley	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Gomilaroi Cultural Consultants	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Gomilaroi Cultural Consultants	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mr Steve Talbott	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mr Leonard Talbott	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Ms Veronica (Dolly) Talbott	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mr Michael Trindall	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Deslee Talbott Consultant	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	TNL Site Trackers	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
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25.2.25	Mr James Foley	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mr Sonny Fitzroy	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Post
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25.2.25	Cyril Sampson	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Post
25.2.25	Mr Brian Draper	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	T&G Cultural Consultants	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	T&G Cultural Consultants	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mr David Horton	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Ms Cindy Foley	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Tania Matthews	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Mooki Plains Clan	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Stephen Matthews	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email

Aboriginal Consultation Log			
Date	**Organisation**	**Comment**	**Method**
25.2.25	Natasha Rodgers	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Yvonne Rodgers	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
25.2.25	Loretta Long	CB emailed Stage 4 Draft ACHAR - closing date 25.3.25	Email
26.2.25	T&G Cultural Consultants	Ben Churcher (BC) received a call from Wayne Griffiths who wished to discuss the relationship between the Modification area and the ACH work currently happening in the approved disturbance area at Boggabri Coal. Wayne was happy with the management recommendations in the ACHAR once he realised where the Modification study area is in relation to more ACH significant sites to the south.	phone
20.3.25	Loretta Long	Ben Churcher (BC) received phone call from Yvonne (Loretta's mum). Complained about not being invited on the fieldwork. BC explained the situation but was driving and did not have details at hand. Will call her back tomorrow."	phone
21.3.25	Loretta Long	BC called Yvonne back. No answer left message.	phone
21.3.25	Loretta Long	Yvonne called still believes the 'new' RAPs should have been given the work	phone
2.4.25	Heritage NSW	CB emailed notification of RAPs	Email
2.4.25	Red Chief LALC	CB emailed notification of RAPs	Email

Appendix 1 Figure 2: Stage 1 Letter to agencies (sample).

OzArk Environment & Heritage
Dubbo | Queanbeyan
Wollongong | Newcastle
Katoomba
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enquiry@ozarkehm.com.au
www.ozarkehm.com.au
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145 Wingewarra St
PO Box 2069
DUBBO NSW 2830

19 July 2024

Heritage NSW
Department of Climate Change, Energy, the Environment and Water
heritagemailbox@environment.nsw.gov.au
Locked Bag 5020
Parramatta NSW 2124

ABORIGINAL CULTURAL HERITAGE IMPACT ASSESSMENT
BOGGABRI COAL MODIFICATION

RE: Narrabri Shire LGA stakeholder list

Dear Sir/Madam,

OzArk Environment & Heritage (OzArk) has been engaged by James Bailey and Associates (JBA) on behalf of Idemitsu Australia (the proponent) to undertake an Aboriginal Cultural Heritage Impact Assessment for the Boggabri Coal Modification (the Modification). This Modification involves the completion of the Aboriginal community consultation as per the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) (Consultation Requirements).

The Project includes -

- Disturbance to an additional 85 ha of land in the Modification Disturbance Footprint
- Extension to the life of mining operations by four years until the end of 2040
- Revisions to the Conceptual Final Landform design to reflect the additional mining area.

The Modification study area is shown on **Figure 1-1**.

These activities may result in harm to Aboriginal cultural heritage.

The proponent currently has a list of Registered Aboriginal Parties (RAPs) who are consulted in regard to Aboriginal cultural heritage management at Boggabri Coal Mine who will continue to be consulted with regarding the Modification. However, as a new Modification, OzArk seeks the latest stakeholder list for the Narrabri Shire LGA so that we can contact any groups/individuals who are not already RAPs for the Boggabri Coal Mine.

If Heritage NSW can provide the Narrabri Shire LGA list, OzArk will ensure that all interested parties are contacted.

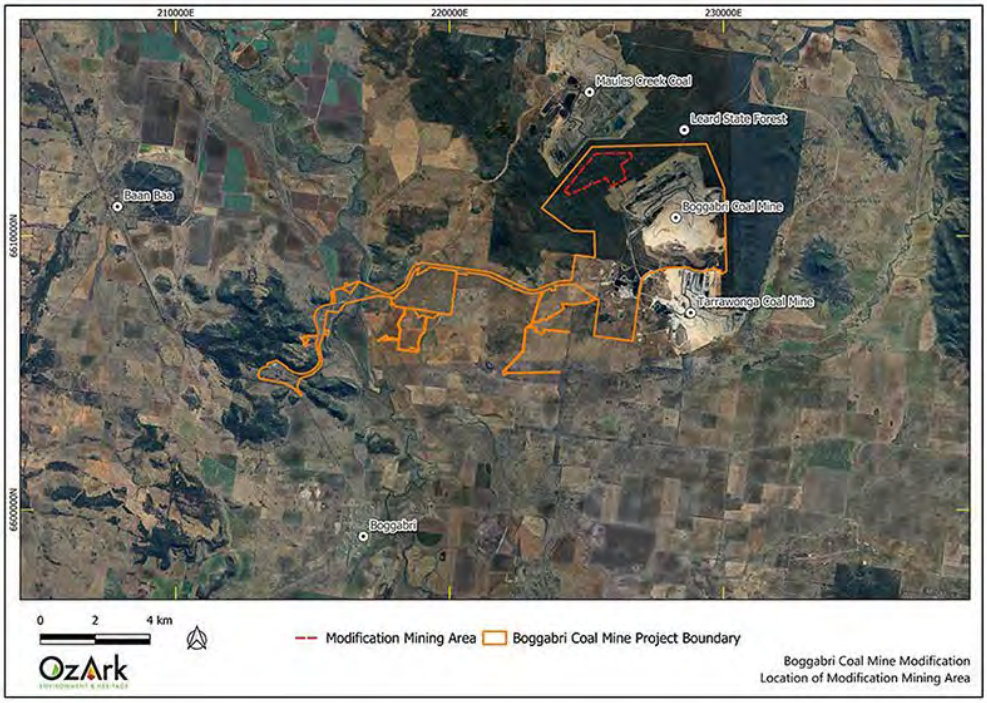
We would appreciate it if you could provide any feedback, by responding to this email catherine@ozarkehm.com.au, regarding these Aboriginal stakeholder groups by 2 August 2024 or sooner if possible.

Kind regards,

Catherine Burrowes
Office Manager/ Community Liaison

OzArk Environment & Heritage

Figure 1-1: Location of the Boggabri Modification Area.



Appendix 1 Figure 3: Stage 1 Example letter sent to Aboriginal community groups.

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ABN 29 675 720 564
145 Wingewarra St
PO Box 2069
DUBBO NSW 2830

25 July 2024

ABORIGINAL CULTURAL HERITAGE IMPACT ASSESSMENT
BOGGABRI COAL MODIFICATION

Hello Members,

OzArk Environment & Heritage (OzArk) has been engaged by James Bailey and Associates (JBA) on behalf of Idemitsu Australia (the proponent) to undertake an Aboriginal Cultural Heritage Impact Assessment for the Boggabri Coal Modification (the Modification). This Modification involves the completion of the Aboriginal community consultation as per the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) (Consultation Requirements).

The Project includes -

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The Modification study area is shown on **Figure 1-1**.

These activities may result in harm to Aboriginal cultural heritage.

The proponent currently has a list of Registered Aboriginal Parties (RAPs) who are consulted in regard to Aboriginal cultural heritage management at Boggabri Coal Mine who will continue to be consulted with regarding the Modification. However, as this is a new Modification, OzArk is contacting any groups/individuals who are not already RAPs for the Boggabri Coal Mine.

Accordingly, we are seeking Expressions of Interest from relevant Aboriginal groups and individuals in the Boggabri area, to form a consultation group. This consultation group will assist OzArk in preparing the Aboriginal Cultural Heritage Assessment Report (ACHAR) to assist Heritage NSW and the Department of Planning, Housing and Infrastructure in their consideration and determination of the project.

If you hold cultural knowledge relevant to determining the impacts to the cultural significance of this project area, should you wish to register for the project please provide the following information:

- Group or individual name
- Contact name (if registering as a group)
- Email or postal address
- Contact number

Please do this by contacting our office on (02) 6882 0118 or responding to this email catherine@ozarkehm.com.au. The closing date for expressions of interest is 10 August 2024.

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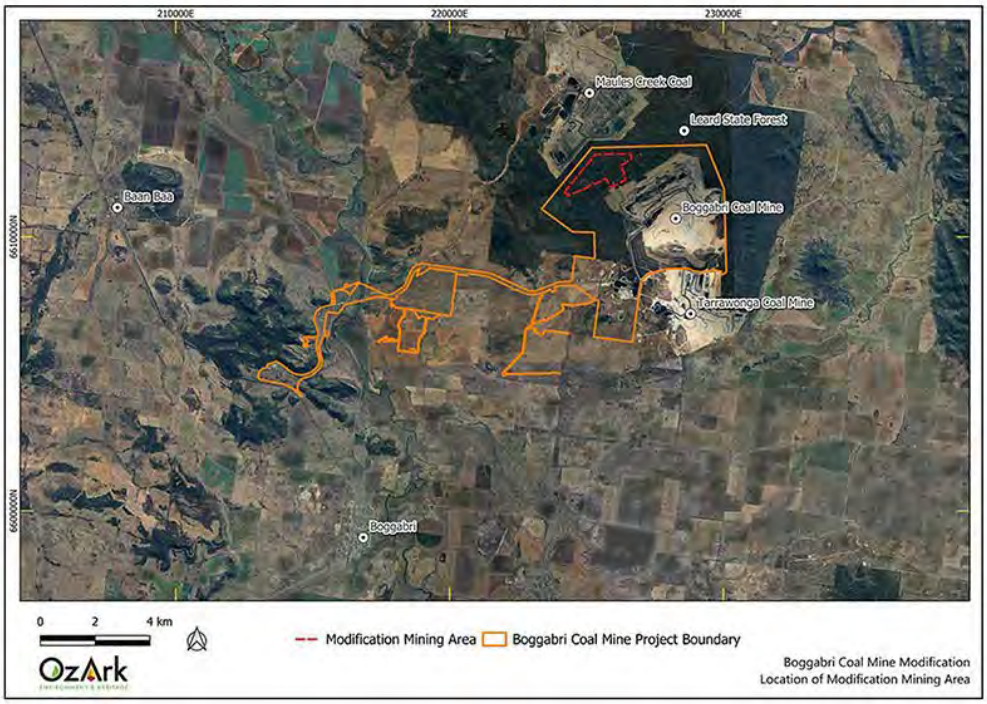
If you wish to register interest it is noteworthy that as per the Heritage NSW guidelines, we are required to provide your details to Heritage NSW and the Local Aboriginal Lands Council unless we are advised that you do not wish your details to be released.

Once relevant groups and individuals have been identified, they will form part of the formal consultation process for the project.

Kind regards,

Catherine Burrowes
Office Manager/ Community Liaison

Figure 1-1: Location of the Boggabri Modification Area.



Appendix 1 Figure 4: Stage 2/3 Cover letter.

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19 August 2024

Aboriginal Cultural Heritage Assessment Methodology:
Proposed Boggabri Coal Mine Modification

Dear Members,

Thank-you for your registration of interest to become a Registered Aboriginal Party (RAP) to be consulted regarding the proposed Boggabri Coal Mine Modification. The Project includes - disturbance to an additional 85 ha of land in the Modification Disturbance Footprint, extension to the life of mining operations by four years until the end of 2040 and revisions to the Conceptual Final Landform design to reflect the additional mining area in the Narrabri Local Government Area.

The purpose of this letter is to invite you to comment on the enclosed draft methodology for the Aboriginal cultural heritage assessment.

In addition to comments on the draft methodology, if you can share any Aboriginal cultural heritage knowledge relevant to the assessment areas, we welcome this input so as to improve our assessment outcomes and to ensure Aboriginal cultural values are considered.

OzArk Environment & Heritage is required to give you 28 days to supply feedback on the attached documents. This period closes 5pm on **Monday 16 September 2024**.

If you need any help supplying feedback or have any queries in relation to the enclosed information, please do not hesitate to contact our office.

Kind regards,

Catherine Burrowes
Customer Liaison

Appendix 1 Figure 5: Stage 4 Cover letter.

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DUBBO NSW 2830

19 August 2024

Aboriginal Cultural Heritage Assessment Methodology:
Proposed Boggabri Coal Mine Modification

Dear Members,

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In addition to comments on the draft methodology, if you can share any Aboriginal cultural heritage knowledge relevant to the assessment areas, we welcome this input so as to improve our assessment outcomes and to ensure Aboriginal cultural values are considered.

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If you need any help supplying feedback or have any queries in relation to the enclosed information, please do not hesitate to contact our office.

Kind regards,

Catherine Burrowes
Customer Liaison

APPENDIX 2: ASSESSMENT METHODOLOGY

A view of the study area.

ABORIGINAL CULTURAL HERITAGE ASSESSMENT METHODOLOGY

BOGGABRI COAL MINE MODIFICATION

BOGGABRI COAL MINE

SEPTEMBER 2024

Report prepared by

OzArk Environment & Heritage

on behalf of Boggabri Coal Operations Pty Ltd

OzArk
Environment & Heritage

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DOCUMENT CONTROLS

Proponent	Boggabri Coal Operations Pty Ltd
Client	James Bailey & Associates
Document Description	Aboriginal Cultural Heritage Assessment Methodology: Boggabri Coal Mine Modification, Boggabri Coal Mine
File Location	OzArk Job No.
Clients\James Bailey and Associates\Boggabri Coal Expansion 2023\Assessment methodology	3935

Document Status: V3.0 FINAL	Date: 19 September 2024
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Draft V2: OzArk and client edits	V.2.1 BD revisions 12/9/23 V2.2 JBA revisions 04/10/23 V2.3: BD incorporates client comments 4/10/23 V2.4: BC edit 6/10/23 V2.5: BC adds client changes 6/10/23 V2.6 BC amends with client comments 30/04/24 V2.7 BC amends with client comments 9/7/24
Final V3: Final document	V3.0 BC finalises 19/9/24
Prepared for	Prepared by
Adam Lanske Environmental Scientist James Bailey & Associates alanske@baileyassociates.com.au Ph. 02 65362999	Dr. Bernadette Drabsch OzArk Affiliate OzArk Environment & Heritage 145 Wingewarra Street (PO Box 2069) Dubbo NSW 2830 P: 02 6882 0118 bernie@ozarkehm.com.au

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Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment will take place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

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1 INTRODUCTION

OzArk Environment & Heritage (OzArk) has been engaged by James Bailey & Associates on behalf of Boggabri Coal Operations Pty Ltd (BCOPL, the proponent) to prepare an assessment methodology for the proposed Boggabri Coal Mine Modification (the Modification).

BCOPL is a wholly owned subsidiary of Idemitsu Australia Pty Limited (IA) which operates the Boggabri Coal Mine (BCM) on behalf of IA and its joint venture partners. BCM is an open cut coal mine located approximately 15 kilometres (km) northeast of Boggabri, 13 km south of Maules Creek in central northern NSW (**Figure 1-1**). The Modification is within the Narrabri Local Government Area (LGA).

This methodology is in accordance with Stage 3 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010b). The information provided here also complies with Stage 2 of the ACHCRs.

The investigation set out in this methodology aims to identify Aboriginal cultural values, both tangible and intangible, that exist within the Modification Mining Area (**Figure 1-2**). The results of this investigation will be presented in an Aboriginal Cultural Heritage Assessment Report (ACHAR).

1.1 MODIFICATION DISTURBANCE FOOTPRINT

The Modification Mining Area describes the area in which additional mining operations are proposed to occur because of the Modification. The Modification Mining Area includes areas of additional mining operations proposed within the approved Mine Disturbance Boundary as well as the Modification Disturbance Footprint which includes areas beyond the approved Mine Disturbance Boundary where additional surface impacts associated with the Modification will be located. The Modification Disturbance Footprint covers an area of approximately 85 hectares (ha) outside of the existing approved Mine Disturbance Boundary where additional mining disturbance will occur because of the Modification (**Figure 1-2**).

Figure 1-1: Location of the Modification Mining Area.

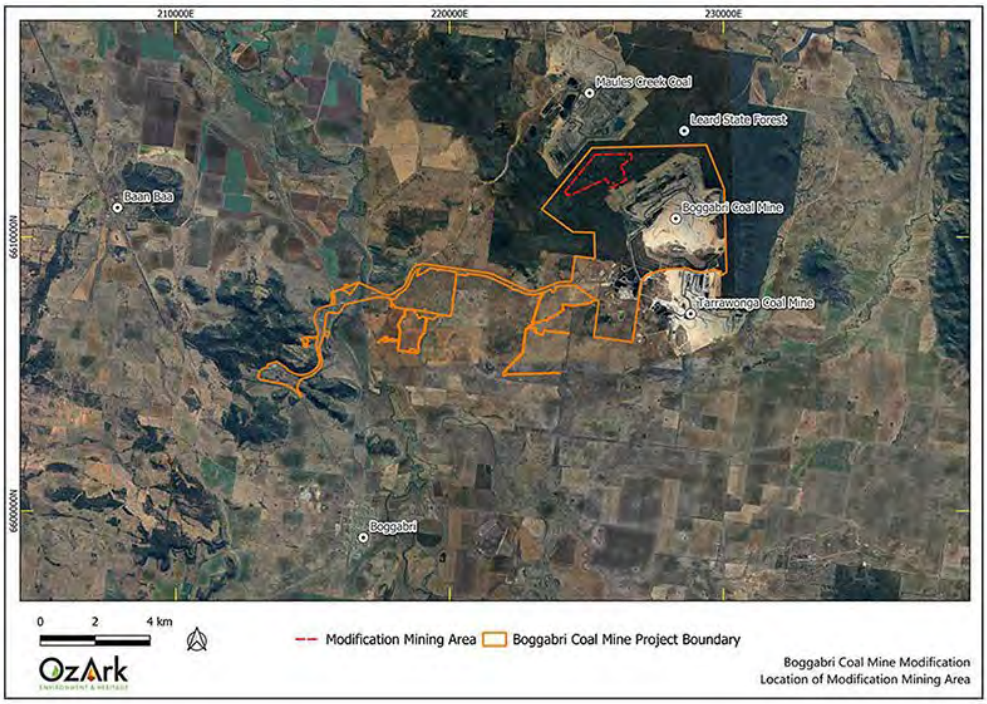

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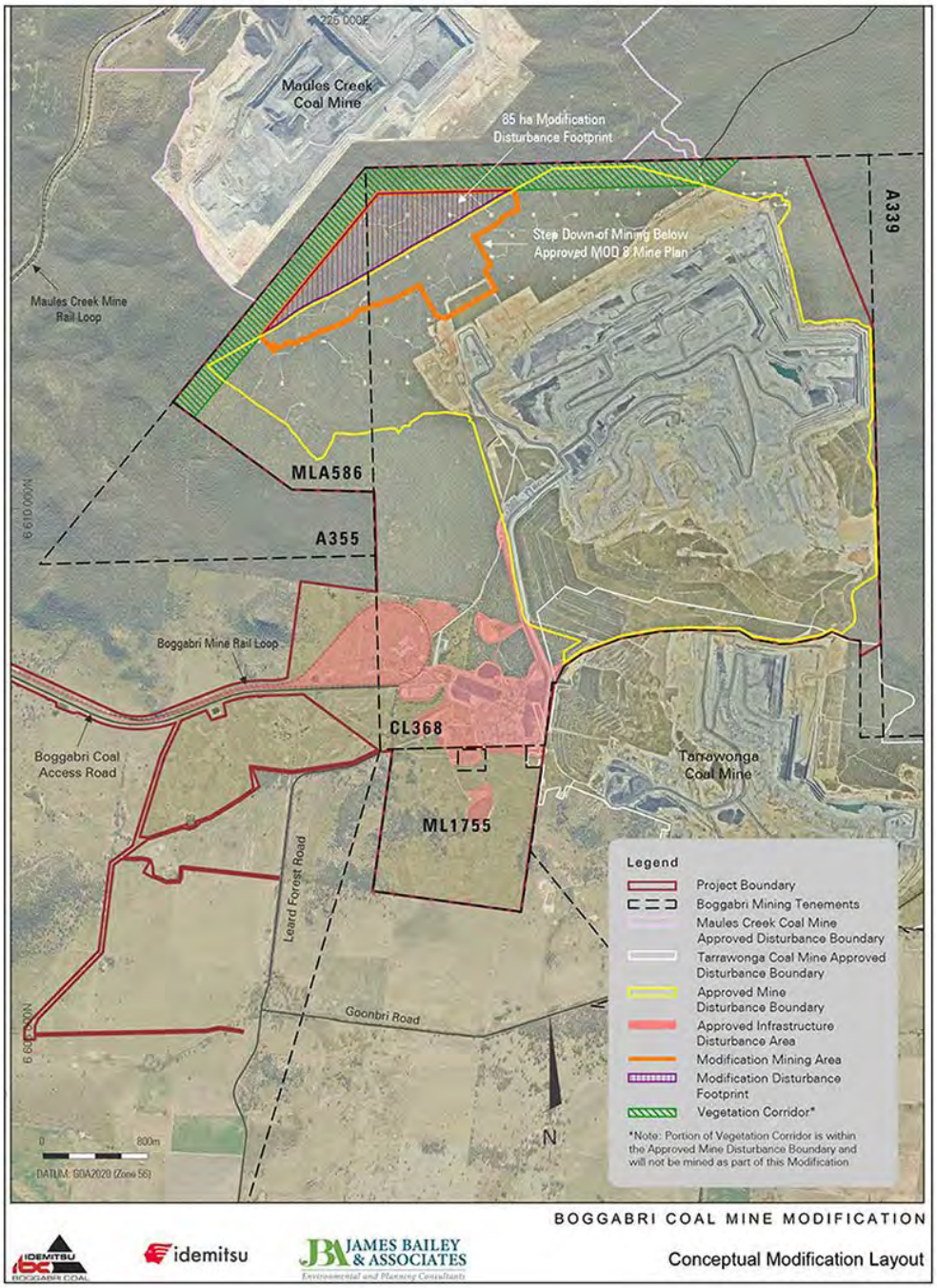
Figure 1-2: Conceptual layout showing the Modification Mining Area.



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1.2 PROJECT OVERVIEW

The Modification proposes the progression of mining operations at BCM towards the north-west beyond the currently approved Mine Disturbance Boundary, however, will remain entirely within the existing Project Boundary. The Modification is proposed to recover an additional 30 million tonnes (Mt) of Run of Mine (ROM) coal which will generate approximately 25 Mt of product coal. The Modification would involve the following:

- Disturbance to an additional 85 ha of land in the Modification Disturbance Footprint (**Figure 1-2**)
- Extension to the life of mining operations by four years until the end of 2040
- Revisions to the Conceptual Final Landform design to reflect the additional mining area.

The Modification does not seek to extend mining disturbance into the vegetation corridor between the BCM and the Maules Creek Coal Mine (MCCM) which BCOPL will retain on its side of the mining lease in accordance with the current approval requirements.

The current assessment will cover the Modification Disturbance Footprint only that encompasses approximately 85 ha as shown on **Figure 1-2**. Disturbance within the approved Mine Disturbance Boundary was previously assessed and approved under the current approval and is subject to management in accordance with the approved Aboriginal Cultural Heritage Management Plan.

1.3 CONSULTATION ON THIS METHODOLOGY

BCOPL is proposing to use the current BCM Registered Aboriginal Parties (RAPs) established through the BCM Aboriginal Stakeholder Community Forum (ASCF) rather than commencing the formal consultation process and placing an advertisement seeking expressions of interest in the Modification. This approach was utilised for previous modifications at BCM and has been accepted by the Department of Planning, Housing and Infrastructure (DPHI) to date.

To refresh the RAP list, OzArk contacted Heritage NSW to obtain the Aboriginal stakeholder list for the LGA. This allowed people not on the BCM RAP list to be identified and invited to be registered and involved in the consultation for the Modification. OzArk wrote to all those people/groups on the Heritage NSW stakeholder list who were not already on the BCM RAP list asking if they wished to be consulted. As a result, an additional four people/groups registered to be consulted. Therefore, the Modification will rely on this revised version of the existing BCM RAP list to form the RAP group for the Modification.

This assessment methodology was be distributed via email and mail for RAPs for review and comment on 19 August 2024 with a closing date for responses of 16 September 2024. At the close of the review period, no comment was received from the RAPs with regard to the assessment methodology.

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1.4 LANDSCAPE CHARACTERISTICS OF THE PROJECT AREA

The Modification Disturbance Footprint is located within the Liverpool Plains land system (Sim & Unwin 1984). The land is described as having extensive grasslands on alluvial plains with some small wooded sedimentary and volcanic hills. BCM lies at the southern edge of the Leard State Forest at about 280 metres (m) above sea level on the Nagero Creek system that drains south from the Willowtree Range to the Namoi River.

The Modification Disturbance Footprint is located within the major regional geological feature known as the Gunnedah Basin. The following geological description is sourced from a geomorphology report conducted at BCM (ARAS 2007). The underlying geology is described from Tadros 1993.

- Boggabri Volcanics: Intrusions and some inter bedded flows or sills of late Carboniferous – Early Permian rhyolite, dacite and ignimbrite with rare shale. The ignimbrites are flow banded and glassy but usually weathered and devitrified in outcrop. The Boggabri Volcanics underlay the Leard Formation
- Leard Formation: The lower part of the early Permian sequence mainly pelletoidal clay sandstone with some coal. This formation dips gently to the east. This sedimentary formation resulted from the weathering of the overlying Boggabri Volcanics
- Maules Creek Formation: Early Permian carbonaceous claystone, pelletoidal clay sandstone, upward fining cycles of sandstone, siltstone and coal, conglomerate dominant toward the top. Sediments were deposited in braided river systems on alluvial fans coming from the west. A conglomerate component found near the top of the stratigraphic sequence contains small hand sized nodules of silcrete, chalcedony, and mudstone.

A study of soils prepared by GSS Environmental in 2010 (GSSE in Hansen Bailey 2010) indicates that the greatest influence on soil development within the area has been the bedrock sandy conglomerates and throughout most soil profiles examined, textures ranged from gravely sandy clay loams to sandy clays.

The Duplex soils occur on the gently sloping terrain. Duplex soils (Yellow and Brown Solodics) predominate over lesser amounts of Lithosols and Structured Loams. The soils have a shallow profile, apart from the Structured Loams. The A-horizon of the soil profile rests upon an extremely compacted hardpan which, for the most part, marks the upper boundary of the B-horizon or C-horizon where the B-horizon is absent. Topsoil or A-horizon thickness ranges from 50 millimetres (mm) to 650 mm and averages 220 mm. They show a strong texture differentiation with an abrupt boundary (hardpan) between the A and B-horizons and a conspicuously bleached A2 horizon. The profile can be characterised as non-saline.

The second most abundant soils to be encountered are Lithosols, occupying the steeper sloping terrain and ridge top areas. These lack horizon development, apart from an occasional thin A1 horizon, their surface generally consisting of gravely material.

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The Light Brown Uniform Gravelly Sand soils are also found on the upper slopes, crests, and ridgelines within the Leard State Forest. These generally consist of light brown to brown very gravelly loamy sands throughout the profile. They are well drained soils ranging from moderately acidic to strongly acidic at depth. The soils are generally non saline with poor fertility characteristics with both topsoil and subsoil non-sodic (Hansen Baily 2010:159).

The Modification Disturbance Footprint is within the Leard State Forest and contains open forest typical of the western slope districts of NSW. The forest type is uniformly dry sclerophyll and consists mainly of mixed eucalypt/cypress pine community. Vegetation structure is generally open; however, some areas have a lower tree understorey and a dense shrub layer usually reaching 2 to 3 m in height. Ground cover may consist of dense grasses or sparse grass tussocks, with a thick layer of leaf litter up 100 mm deep.

The most common trees are White Cypress Pine (*Callitris glauca)*, preferring light textured soils, and Black Cypress Pine (*Callitris endlicheri)*, preferring steep slopes with skeletal soils and gravel ridges. Both are widespread and occur over large areas. Other species may include, Kurrajong (*Brachychiton populneum*), Narrow Leaved Ironbark (*Eucalyptus crebra)*, Blue Leaved Ironbark (*Eucalyptus fibrosa)*, White Box (*Eucalyptus albens)*, Belah (*Casuarina cristate*), Pilliga Box (*Eucalyptus pilligaensis)*, Silver Leaved Ironbark (*Eucalyptis melanophloia)* and Bimble Box (*Eucalpytus populnea)*. Selective logging has previously occurred within the Leard State Forest.

During the 2010 field surveys of BCM undertaken by Parsons Brinckerhoff (in Hansen Bailey 2010:98), 194 species of animal were recorded, including six amphibians, 129 birds, 31 mammals and 28 reptile species. Birds were the most diverse group with most species common to Grassy Woodlands, Shrubby Woodlands/Open Forest, or Riverine Woodland environments. Species included the Dusky Woodswallow, White-throated Treecreeper and Fuscous Honeyeater. The Eastern Grey Kangaroo, House Mouse and microchiropteran bats were the most abundant mammals. Amphibians recorded include Broad-palmed Frog, Long-thumbed Frog, Spotted Grass Frog, Desert Tree Frog and Peron's Tree Frog. Common reptiles include Burton's Legless Lizard, Thick-tailed Gecko, Tree Skinks, Tiger Snakes and Red-bellied Black Snakes.

The area has an annual rainfall of approximately 620 millimetres (mm) and the Namoi River is the closest permanent water course, located approximately 9 km to the west of the Modification Disturbance Footprint. The Namoi River alluvial floodplain forms a wide low-lying landform to the west of the Modification Disturbance Footprint. Seasonal climatic conditions vary throughout the year, summer months are predominantly hot and winter periods are relatively short with frequent frosts.

Regarding the landscape surrounding the Modification Disturbance Footprint and use of forest environments by Aboriginal people, research by Purcell (2000) shows the following analysis of archaeological survey and geomorphological data at the time of his study:

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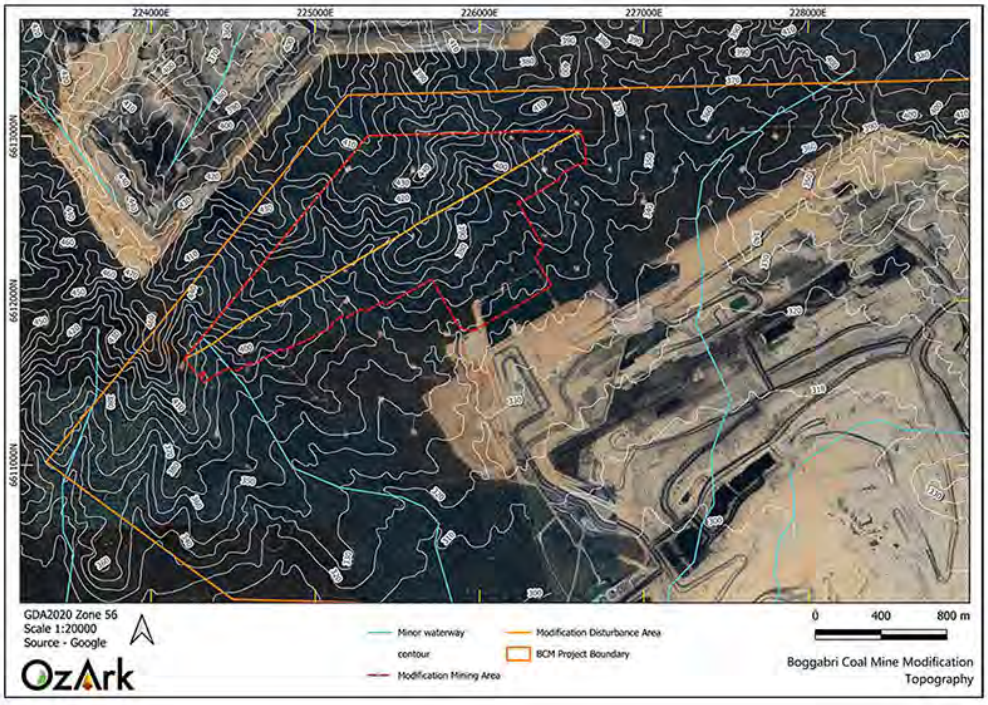
Results of the sites survey and geomorphological study indicate a different story. Aboriginal occupation may have occurred for prolonged periods under the right conditions, made possible by a different array of water features (chains of ponds) that existed prior to European usage of the forests. From what is understood, the chains of ponds and the relationship between vegetation and the morphological structure of the soils, resulted in water being available for prolonged periods. A diversity of plant foods would have been associated with these features.

Intensification of forest usage since European arrival has modified stream flow dramatically, resulting in only a few examples of chain of ponds remaining in both forests. These features would have provided Aboriginal people opportunities to exploit the diversity of resources that occurred throughout the forests. The number of cultural plants recorded, the range of vegetation types and the wide distribution of recorded Aboriginal sites, notably in areas where chains of ponds may have occurred, support this interpretation (Purcell 2000:16–26).

Figure 1-3 shows the topography and hydrology of the Modification Disturbance Footprint. This figure shows that the Modification Disturbance Footprint is in an area of steep slopes and ridges, without major waterways. Minor watercourses dissect the ridges although these would have supplied limited water resources.

Figure 1-3: Topography and drainage of the Modification Disturbance Footprint.



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2 CULTURAL VALUES

2.1 INTRODUCTION TO CULTURAL VALUES

No matter who you are, we all have culture. Each person's culture is important; it's part of what makes us who we are.

Australianstogether.org.au

Many Aboriginal people in Australia have a unique view of the world that's distinct from the mainstream. Land, family, law, ceremony, and language are five key interconnected elements of Aboriginal culture. For example, families are connected to the land through the kinship system, and this connection to land comes with specific roles and responsibilities which are enshrined in the law and observed through ceremony. In this way, the five elements combine to create a way of seeing and being in the world that is distinctly Aboriginal.

Fundamentally, culture is living and is not static:

- Culture is acquired - we learn about culture from others in our community, including our parents
- Culture is shared - culture does not exist in a vacuum, it is shared amongst a group of people
- Culture defines core values - because we have been taught our culture and share it with our cultural group, we tend to form the same core values
- Cultures resist change but are not static - culture does and can change, but change is usually slow and gradual.

2.1.1 Connection to Country

Aboriginal and Torres Strait Islander peoples are connected to Country through lines of descent (paternal and maternal), as well as clan and language groups.

Although in the past (and sometimes into the present) there have been conflicts between different tribal groups, these were rarely over land. Aboriginal and Torres Strait Islander people have such a strong sense of belonging to country; they have no desire to own the land of others.

Territory is defined by spiritual as well as physical links. Landforms have deep meaning, recorded in art, stories, songs, and dance. Songlines or Dreaming Tracks as well as kinship structures link Aboriginal peoples to the territories of other groups. In the past, these links were also used for trade.

"When we say Country we might mean homeland, or tribal or clan area and in saying so we may mean something more than just a place; somewhere on the map. We are not necessarily referring to place in a geographical sense. But we are talking about the whole of the landscape, not just the places on it."

Professor Mick Dodson AM, August 2007

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2.1.2 Managing Country

Living on this land for around 50,000 years, Aboriginal and Torres Strait Islanders established effective ways to use and sustain resources. One important aspect is the right of certain people to control the use of resources in a particular area. Aboriginal and Torres Strait Islander people don't see themselves as 'owning' land, animals, plants, or nature, but rather belonging with these things as equal parts of creation.

The rights of different groups to live in and manage certain areas of land are clear and recorded through art, stories, songs, and dance.

Deep cultural and spiritual values like totemism have also played an important part in Aboriginal and Torres Strait Islander resource management. Totemism is a belief and value system that connects human beings to other animals, plants, and aspects of nature. Groups and individuals are assigned a particular animal that they are related to and must care for. This gives them a profound sense of connection to and responsibility for the natural world.

Aboriginal and Torres Strait Islanders people have a wide range of traditional methods for gathering food including fish traps, subsistence agriculture, hunting and harvesting a wide range of natural fruits and vegetables. Some groups of people would stay in one place, while others moved around the land according to the seasons, to ensure sustainable and rich food supplies, and to fulfil their spiritual and cultural obligations.

There were complex relationships for long distance trade between Aboriginal and Torres Strait Islander communities especially for coastal shells and stone hatchets. When people from different groups met socially to share resources, for ceremonies or to settle disputes, they brought items to exchange. Items included stones for hatchets, kangaroo skins, timber for spears, ochre or clay for paint and marine shells for decoration. The exchange of objects was not motivated by a desire for wealth accumulation but a social system to build connection between people and groups.

2.1.3 Recognising lore

In much of eastern Australia, Aboriginal communities live their lives like most Australians. However, in certain crucial areas, particularly associated with family, leadership roles and caring for Country, Aboriginal lore continues, even in the most urbanised communities.

2.2 IDENTIFYING CULTURAL VALUES

A major aim of this assessment is to identify any cultural values within the landscape in which the Modification is located so that those values can be recognised and incorporated into the ACHAR's management recommendations.

OzArk Environment & Heritage

Any cultural values relating to the Modification Disturbance Footprint will be captured by the OzArk archaeologists (if such information is provided by RAPs during the survey) and included in the ACHAR.

Understanding cultural landscapes can only come from the views of a particular community, in this case, the Aboriginal community. Unless informed, OzArk will not know of the community's feelings towards the cultural landscape in which the Modification will be located. Should any RAPs have knowledge of cultural values regarding the Modification Disturbance Footprint that they wish to share or that may affect the survey methodology set out in **Section 5**, OzArk invites them to contact us so that these values can be recorded and/or responded to in the methodology.

2.2.1 Use of information collected

An ACHAR will be prepared for the project which articulates Aboriginal cultural values and associated conservation methods across the Modification Disturbance Footprint, as identified during the consultations. The ACHAR will be circulated to all RAPs for comment as is set out in the ACHCRs. The ACHAR will be available to Heritage NSW for their consideration of the Modification and the report will be publicly available.

2.2.2 Public / confidential information

Information will be treated in accordance with instructions received by information provider. Information described as confidential (culturally sensitive) will not be detailed in the publicly available report.

Confidential information will be made available to the proponent, its heritage consultants, and Heritage NSW so that significant cultural values can be conserved.

On advice from the provider of the information, a redacted ACHAR will be made available to the wider public with any identified sensitive cultural information removed from the report.

2.2.3 Copyright

Information collected for this assessment remains the property of the information provider. Without written permission from information provider, information will not be used for purposes other than those outlined above.

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3 ARCHAEOLOGICAL CONTEXT

3.1 ABORIGINAL PEOPLE OF THE MODIFICATION DISTURBANCE FOOTPRINT

The Modification Disturbance Footprint is situated within the traditional territory of people belonging to the Kamilaroi (also spelt Gomeroi, Gamilaraay) linguistic group. According to Tindale (1974), the Kamilaroi range at the time of British arrival was thought to extend to Walgett in New South Wales to Nindigully in Queensland and included areas such as Moree, Mungindi, Mogil Mogil, Narravri, Pilliga, Gunnedah, Bingara, Tamworth, Quirindi, Bundella, Barraba, Gwabegar, and Come-by-Chance on the headwater of the Hunter River. O'Rourke (1997:159) noted that social organisation amongst the Kamilaroi was based on a complex system of kinship involving two moieties, the Dhilbay ('dilb l') and Gubadhin ('kupathin').

O'Rourke estimated that there may have been up to 10,000 Kamilaroi speakers before contact with British colonists, with an additional unquantified number of dialectical sub-groups (1997:126). O'Rourke noted that the smallest residential unit within the Kamilaroi society was the 'hearth-group' which consisted of up to ten people, typically a man, his wife (or wives) and their dependent children. Larger residential groupings of 40–60 individuals, termed 'bands', were formed through the regular though temporary gathering of several 'hearth-groups'. Annual seasonal aggregations of 'bands' resulted in 'communities' of 200 or more people (O'Rourke 1997:130). These communities are estimated to have occupied territories of more than 2,500 km². The presence of up to eight communities at irregular ceremonial events such as Bora (buurra) assemblies has also been noted (O'Rourke 1997:130).

The Kamilaroi people appear to have spent summers along rivers exploiting a range of terrestrial, avian, and aquatic food resources and winters spent in the areas away from rivers hunting and/or trapping predominantly terrestrial game. Hunting and gathering 'gear' amongst the Kamilaroi is reported to have included wooden spears, boomerangs, digging sticks, nets, stone fishhooks, fibre-based fishing line, ground stone axes, and a variety of supplementary chipped stone tools (AECOM 2010:24).

O'Rourke (1997:148) hypothesised that '*summer villages with semi-permanent huts were [likely] a common feature of Aboriginal life on the plains of New South Wales*'. Observations by the early British explorers provide some support to this claim. In 1825 Cunningham recorded that he observed 14 huts with bark floors and conical roofs scattered through thick woodland to the west of Coxs Creek near Boggabri. Some of the huts were apparently large enough to accommodate up to six people and appeared to have been designed to resist months of inclement weather. Similarly, in 1839, Major Mitchell described the huts in a 'native village' to the south of Moree near the Gwydir River in a similar fashion. He notes that *'each hut was semi-circular, or circular, the roof conical, and from side a flat roof stood forward like a portico, supported by two sticks… The*

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interior of each looked clean, and to us, passing in the rain, gave some idea, not only of shelter, but even of comfort and happiness' (Mitchell 1839:76–77).

The ethno-historic account from George 'the Barber' Clarke, an escaped convict from the Hunter Valley, provides important information about everyday life with the Kamilaroi. After reaching the area around Boggabri in 1825, Clarke was befriended by a local group of Kamilaroi people and adopted their language, dress, and customs, before settling at a lagoon east of Boggabri and directly south of the Modification Disturbance Footprint. In his notes, Clarke refers to *taurai*, the traditional hunting and food gathering grounds of each group as having distinct boundaries.

Major Mitchell refers to Clarke as '*The Bushranger*' and used his carefully recorded account as the basis for his 1831 expedition. Having located 'Barber's Lagoon' Mitchell noted that the stockyard (home to Clarke's stolen cattle) was intact as well as a number of *gunyahs* (bark huts), indicating substantial encampment. He described the vegetation elsewhere along the flood plain as being rather thickly wooded with a broad-leaved eucalyptus (probably bimble box) and *Acacia pendula*. The banks of the river were said to have '*lofty blue gum-trees (river red gum) and excellent grass*' and, according to his sketch of Tangulda peak, the lower slopes were well forested in what appear to be casuarina, Callitris and eucalypts – probably box (ARAS 2007:21).

Mitchell was in the vicinity of Leard State Forest during December 1831 and commented on the extensive smoke and fire in the area, indicating that this period of the year was likely a time of fire stick farming. While he encountered frequent evidence of the local Aboriginal population's existence, such as footprints and evidence of stone axes (*mogo*), he didn't interact with any of them, apart from one elderly lady whom he startled (Mitchell 1839:49). Towards the junction of Maules Creek and the Namoi River (approximately 15 km northwest of the Modification Disturbance Footprint) he encountered a small band of approximately 30 people that were chopping trees with iron tomahawks. As Mitchell was one of the first British person to explore this area, the presence of iron axes suggests links through trade networks with neighbouring tribes with existing links to British settlements (AECOM 2010:26).

Settlement around the villages of Gunnedah and Boggabri (the name is derived from the Kamilaroi word '*Bukki-bri*' meaning place of many creeks) proceeded from the 1830s with several large sheep and cattle pastoral runs being established through the Australian Agricultural Company. By the 1850s, local Aboriginal people were employed as stock keepers and shepherds and a number of conflicts were reported between settlers and Aboriginal people near Manilla on the Namoi River (ARAS 2005:13).

3.2 REGIONAL ARCHAEOLOGICAL CONTEXT

The Aboriginal occupation of Australia begins prior to 40,000 BP (years before present) and possibly earlier than 50,000 BP. Dates exceeding 20,000 years occur in almost all parts of Australia resulting in the expectation that most areas should have a Pleistocene (>12,000 BP)

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occupational signature. However, such dates remain relatively rare due to a range of factors, both behavioural and post-depositional. These factors include a possible low density of occupation in the Pleistocene period and poor preservation of archaeological materials (particularly dateable organic materials).

There are a number of regional archaeological studies which are in general proximity to the Modification Disturbance Footprint. These studies have been summarised briefly below and presented in chronological order. Those studies closer to the Modification Disturbance Footprint are discussed in **Section 3.3.1**.

Thompson 1981

A survey was conducted between Boggabri and Gunnedah (approximately 20–70 km from the Modification Disturbance Footprint). During the survey, 29 sites and 11 isolated finds were recorded. Site types included artefact scatters, axe grinding grooves, scarred trees, and a single mythological site. A close spatial association between sites and water sources was evident.

Haglund 1983

A survey was conducted at the MCCM (approximately 1 km from the Modification Disturbance Footprint). A total of 13 sites were identified and these included six artefact scatters and seven isolated finds. Retouched flakes, cores, and flakes were the most common artefact types. It was noted that recorded sites should not be regarded as separate occurrences, but as part of a general scatter of stone artefacts on and in most flat and/or gently sloping surfaces in the vicinity of temporary water sources. Lack of sites about the 340 m contour interpreted as a product of generally unfavourable environmental conditions for occupation, including a lack of surface water and the prevalence of steep, stony surfaces.

Balme 1986

A survey of the Pilliga sand region and the Pilliga State Forests (approximately 40 km from the Modification Disturbance Footprint) was conducted in 1986. The study found that open campsites were the dominant site type, typically identified on erosion surfaces in valleys, alongside streamlines. Most sites were between 20–50 artefacts. Quartz was the dominant raw material type. Silcrete, quartzite, jasper, fine-grained volcanic, and chert were also used. It was concluded that the lack of variety of alternative resources, such as permanent waterholes, may explain why there is little evidence of intensive Aboriginal occupation in the Pilliga Forests.

Dallas 1986

A survey of the rail loop and coal haul route for the MCCM (approximately 1 km from the Modification Disturbance Footprint) was conducted in 1986. The survey identified four sites along or adjacent to the haul route and no sites were identified on the rail loop. Three of the sites were open artefact scatters, numbering 2, 11, and 14 artefacts. Artefact material included quartz,

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mudstone, siltstone, agate, volcanic, chalcedony, and silcrete. The fourth site was a rock shelter with one identified stone artefact on the floor of the shelter and three artefacts between the shelter and the creek.

Roberts 1991

A survey was conducted through the Pilliga Forests (approximately 40 km from the Modification Disturbance Footprint). As a result, 89 sites were identified, including 24 open campsites, 62 scarred trees, and three rock shelters. It was noted that quartz was the dominant raw material type. It was also noted that poor ground surface visibility away from water sources prohibits an effective assessment of the relationship between water sources and the extent of Aboriginal activities in the forest. Roberts proposed that Aboriginal people may have utilised the forests' creeks as 'corridors' for movement and suggested that the distribution of scarred trees likely reflects post-contact European land practices.

NSW National Parks and Wildlife Service (Purcell 2002)

A large-scale regional survey of the Brigalow Belt South Bioregion (approximately 40 km from the Modification Disturbance Footprint) was conducted by Philip Purcell in 2002. A total of 1940 sites were identified. Of these, 311 sites were identified in the Liverpool Plains, 303 in the Pilliga Outwash, and 609 in the Pilliga Forests. Sites frequently occurred in the Alluvial group, where 668 sites were identified in total, likely due to the association of the group with water features. The most prolific site types were open camp sites and isolated finds. 90% of the sites recorded were located within 200–300 m of water.

R.W. Corkery & Co, 2005a & b

Two surveys were conducted in East Boggabri (approximately 20 km from the Modification Disturbance Footprint) by Corkery & Co during 2005. During the first survey four Aboriginal sites were identified, including a possible scarred tree, two low density artefact scatters, and one isolated find of a basalt hatchet head made from a river cobble. The second survey identified four Aboriginal sites comprising of chipped stone artefact scatters, with artefact totals ranging from 5–20.

Archaeological Surveys and Reports 2009

A total of 121 sites were recorded during a survey in Narrabri (approximately 18 km from the Modification Disturbance Footprint) in 2009. The dominant site types were low density artefact scatters and isolated finds. Most were assessed as having low scientific significance.

3.3 LOCAL ARCHAEOLOGICAL CONTEXT

A search of the Heritage NSW administered Aboriginal Heritage Information Management System (AHIMS) database on 8 September 2023 returned 37 results for Aboriginal sites within a

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1 km radius of the Modification Disturbance Footprint (GDA Zone 56 Eastings: 223150–230350; Northings: 6611400–6613900) (see **Table 3-1** for site types and frequencies). Twenty-eight of these have been removed because of development, with nine remaining in situ (**Figure 3-1**).

There is one site previously recorded in the Modification Disturbance Footprint: 20-4-0220 (LFNV11), an isolated find. A further site, 20-4-0572 (TC7/15) has been partially salvaged and the centre point is just outside the Modification Disturbance Footprint and the site, an artefact site with potential archaeological deposit (PAD), may extend into the Modification Disturbance Footprint.

The most frequently recorded site types are open artefact sites such as scatters and isolated finds which contribute 81.5% of all recorded sites in the vicinity of the Modification Disturbance Footprint. Other less frequent site types include modified trees (n=5, 13.5%), grinding grooves (n=1, 2.5%), and an artefact with PAD (n=1, 2.5%).

Figure 3-1 shows the location of previously recorded sites in the vicinity of the Modification Disturbance Footprint.

Table 3-1: AHIMS site types and frequencies

Site Type	Number	% Frequency
Artefact scatter	30	81.5
Modified tree	5	13.5
Artefact: grinding groove	1	2.5
Artefact & PAD	1	2.5
Total	**37**	**100**

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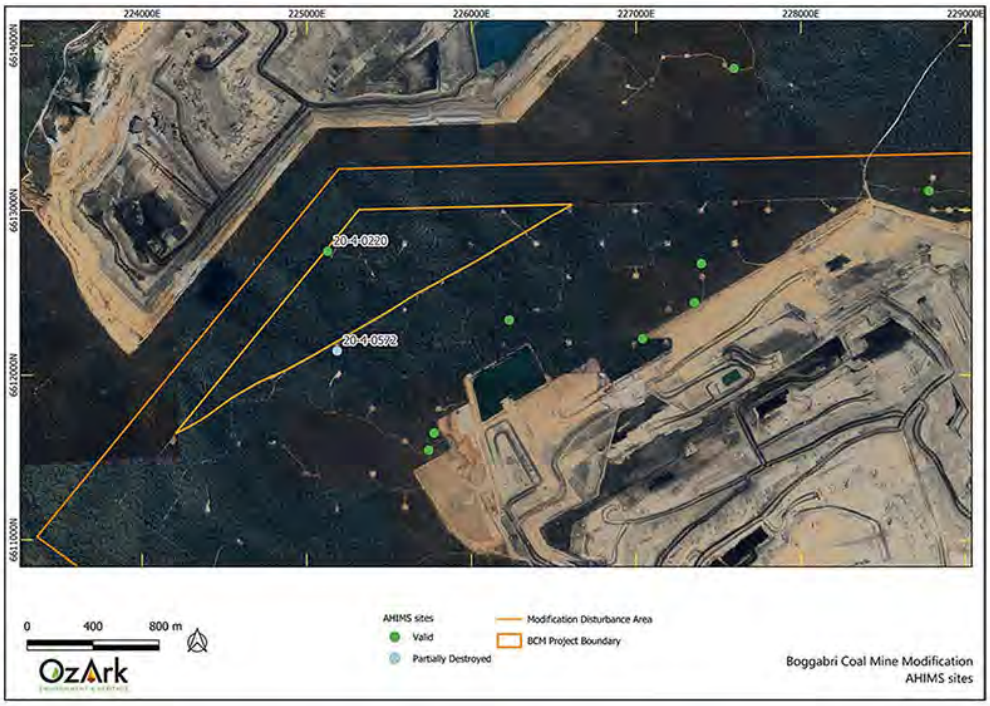
Figure 3-1. AHIMS sites in relation to the Modification Disturbance Footprint.



3.3.1 Archaeological investigations within the Boggabri Coal Mine

ARAS 2005 & 2007

In 2004 Giles Hamm undertook an assessment of Aboriginal heritage values within the proposed Project Boundary. The assessment identified 61 Aboriginal cultural heritage sites (30 artefact scatters, 26 isolated artefacts, and five scarred trees). The majority (81%) of the record were made up of exposed stone artefactual material eroding from forestry tracks with less than five artefacts per m^2 in density. It was concluded from the archaeological evidence, that Aboriginal people were using two main ecological zones within the Boggabri Coal Project area; these were the Nagero Creek catchment and Leard Forest. Hamm (ARAS 2007:31–32) determined that:

> *Aboriginal people undoubtedly visited but rarely occupied the high sandstone and conglomerate ridges but sites are found there because the soils are shallow and ground cover is low. The intermediate zone in the landscape between the stony ridges and the top of the alluvial fans, where there is considerable fluctuation in the water availability and resource richness, is perhaps the area most often occupied. Much of the mine site and the sedimentation pond lie in this environment. It is also where the strongest development of texture contrast soils occurs, and all of the usual*

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archaeological constraints associated with the biomantles of these soils will apply to any site. In short these are:

- *Open sites are unlikely to be stratified in a chronologically useful sense*
- *Artefacts will be confined to the biomantle*
- *Artefacts will have been subject to surface dispersion, limited down-slope movement, and differential burial or exposure by bioturbation agents and they will contribute to a stone layer between the A and B-horizon where artefacts of all ages accumulate*
- *Despite the taphonomic processes affecting artefact distribution in the soil some site use patterns, such as knapping floors, may survive in plan form but with an extended vertical distribution of their components and possible mixing with artefacts from other events*
- *Because artefactual burial is an ongoing process, surface visibility will be poor except where material has been exposed by erosion*
- *The only means of dating any sites in this landscape will be by recognition of cultural sequences of artefacts, or from the recovery of intact 'hearths' or burials. All other dates, especially those based on detrital charcoal, and including those based on thermo-luminescence, will be spurious because artefacts can move through soil material of any age.*

Insite Heritage 2010

Angela Besant conducted a field survey in the southern portion of the BCM area in 2009, identifying an additional 77 Aboriginal cultural heritage sites, of which 29 were isolated finds, 34 open artefact scatters, and 14 scarred trees. Two patches of grinding grooves on sandstone bedrock in Leard State Forest were also identified during a subsequent survey, although they were considered relatively poor examples of their site type (Insite 2010:73). As a result of the survey, the potential for subsurface artefacts in the Leard State Forest was assessed by Besant to be high, and it is possible that expansive sites could be located on the lower and upper slopes around the forest. The sites in the Leard State Forest were assessed by Besant as being of high scientific significance at a local level, as they are relatively rare in their regional context.

Kayandel 2011

In 2011, an additional 14 Aboriginal cultural heritage sites were recorded on BCM land during the Tarrawonga Cultural Heritage Assessment. The recorded artefact materials were comprised of quartzite, chalcedony, silt stone, volcanic, and fine-grained silicious (FGS). Most artefacts recorded were small in size. It was suggested that this provides potential evidence for flaking technology evolution, i.e. the production of geometric microliths (Kayandel 2011:57).

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Insite Heritage 2015

In 2015 Insite Heritage were commissioned to prepare an Aboriginal Cultural Heritage assessment for the Boggabri Coal Mine Modification 5. Six Aboriginal cultural heritage sites were identified across the four areas surveyed.

- Item 1: Roma Bore Hole and Pipeline: one open site (eight artefacts) in a disturbed context was located and an area of PAD identified
- Items 2 & 3: Cooboobindi Bore Hole, Pipeline, Power Line & Access: five artefacts located on access road and two artefacts located within a ploughed field
- Item 4: Victoria Park auxiliary infrastructure: one scatter of seven artefacts over an area of 50 x 50 m located on the pipeline route on disturbed ground
- Item 5: Bellevue Pipeline: artefact scatter of 100 objects over a 50 x 50 m area on ground heavily disturbed by ploughing
- Item 6: Bellevue pipeline – low density artefact scatter and three isolated finds on an unformed road and adjacent paddock.

UQ Culture & Heritage, 2017

Sneddon & Whincop prepared an Aboriginal Heritage Conservation Strategy for MCCM, Tarrawonga Coal Project, BCM, and related Biodiversity Offset Areas. It was noted that a total of 67 Aboriginal cultural heritage sites are the subject of the Boggabri Cultural Heritage Management Plan (CHMP) (Idemitsu 2013). Of those, 21 AHIMS sites had been salvaged, and two AHIMS sites were partially salvaged in 2013. A total of nine AHIMS sites and one partial site remained to be salvaged at that date. In addition, 32 whole and two partial AHIMS sites were to be retained throughout the course of the project.

3.4 ARCHAEOLOGICAL CONTEXT: CONCLUSION

The archaeological investigations surrounding the study area as summarised in **Sections 3.2** and **3.3** indicate that:

- Open sites consisting of stone artefact scatters, modified trees, and isolated stone artefacts are the most common site types in the region
- Aboriginal people may have utilised the forest's creeks as 'corridors' for movement
- The intermediate zone in the landscape between the stony ridges and the top of the alluvial fans, where there is considerable fluctuation in the water availability and resource richness, is perhaps the area most often occupied
- Artefact material includes quartz, mudstone, siltstone, agate, volcanic, chalcedony, and silcrete
- Potential for subsurface artefacts in the Leard State Forest is generally considered to be high, and it is possible that expansive sites could be located on the lower and upper slopes around the forest.

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4 PREDICTIVE MODEL

4.1 LANDFORM MODELLING

The topography of the Modification Disturbance Footprint is primarily steep slopes ranging from approximately 370 m Australian Height Datum (AHD) to 440 m AHD (**Figure 1-3**). Previous studies indicate that these slopes are unlikely to contain stone artefact scatters, modified trees, or isolated finds.

Landform mapping indicates the entire Modification Disturbance Footprint is made up of upper slopes and ridges within a broader sloping landform. The Modification Disturbance Footprint is within the Leard State Forest and has been selectively logged.

4.2 PREDICTIVE MODEL FOR THE MODIFICATION DISTURBANCE FOOTPRINT

Across Australia, numerous archaeological studies in widely varying environmental zones and contexts have demonstrated a high correlation between the permanence of a water source and the permanence and/or complexity of Aboriginal occupation. Site location is also affected by the availability of and/or accessibility to a range of other natural resources including plant and animal foods; stone and ochre resources and rock shelters, as well as by their general proximity to other sites/places of cultural/mythological significance. Consequently, sites tend to be found along permanent and ephemeral water sources, along access or trade routes, or in areas that have good flora/fauna resources and appropriate shelter.

In formulating a predictive model for Aboriginal archaeological site location within any landscape it is also necessary to consider post-depositional influences on Aboriginal material culture. In all but the best preservation conditions very little of the organic material culture remains of ancestral Aboriginal communities survives to the present. Generally, it is the more durable materials such as stone artefacts, stone hearths, shell, and some bones that remain preserved in the current landscape. Even these however may not be found in their original depositional context since these may be subject to either (a) the effects of wind and water erosion/transport—both over short- and long-time scales—or (b) the historical impacts associated with the introduction of colonial farming practices and/or (c) extensive and repeated logging of the Leard State Forest over many generations. Scarred trees, by their nature, may survive for up to several hundred years but rarely beyond.

4.2.1 Site types in the region of the Modification Disturbance Footprint

The site types listed in **Table 4-1** are present in the region of the Modification Disturbance Footprint. The likelihood of these sites being present in the Modification Disturbance Footprint is discussed in **Section 4.2.2**.

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Table 4-1: Site types recorded in the region of the Modification Disturbance Footprint.

Site type	Site description
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, or an otherwise obscured or subsurface artefact scatter. They may occur anywhere within the landscape but are more likely to occur in topographies where open artefact scatters typically occur.
Open artefact scatters	Artefact scatters are defined as two or more artefacts, not located within a rock shelter, and located no more than 50 m away from any other constituent artefact. This site type may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting and gathering activities, short- or long-term camps, and the manufacture and maintenance of stone tools. Artefact scatters typically consist of surface scatters or sub-surface distributions of flaked stone discarded during the manufacture of tools but may also include other artefactual rock types such as hearth and anvil stones. Less commonly, artefact scatters may include archaeological stratigraphic features such as hearths and artefact concentrations which relate to activity areas. Artefact density can vary considerably between and across individual sites. Small ground exposures revealing low density scatters may be indicative of a background scatter rather than a spatially or temporally distinct artefact assemblage. These sites are classed as 'open', that is, occurring on the land surface unprotected by rock overhangs, and are sometimes referred to as 'open camp sites'. Artefact scatters are most likely to occur on level or low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands. Larger sites may be expected in association with permanent water sources. Topographies which afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and the valleys of creeks, will tend to contain more and larger sites, mostly camp sites evidenced by open artefact scatters.
Culturally modified trees	Aboriginal scarred trees contain evidence of the removal of bark (and sometimes wood) in the past by Aboriginal people, in the form of a scar. Bark was removed from trees for a wide range of reasons. It was a raw material used in the manufacture of various tools, vessels, and commodities such as string, water containers, roofing for shelters, shields, and canoes. Bark was also removed because of gathering food, such as collecting wood boring grubs or creating footholds to climb a tree for possum hunting. Due to the multiplicity of uses and the continuous process of occlusion (or healing) following removal, it is difficult to accurately determine the intended purpose for any example of bark removal. Scarred trees may occur anywhere old growth trees survive. The identification of scars as Aboriginal cultural heritage items can be problematical because some forms of natural trauma and European bark extraction create similar scars. Many remaining scarred trees probably date to the historic period when bark was removed by Aboriginal people for both their own purposes and for roofing on early European houses. Consequently, the distinction between European and Aboriginal scarred trees may not be clear.
Grinding grooves	Grinding grooves are the remnants of ground edge hatchet manufacture and sometimes from food preparation. The site is most likely to occur on flat outcrops of coarse-grained sandstone in the vicinity of water sources, however, grinding grooves have also been recorded on fine-grained granite and quartzite outcrops.

4.2.2 Conclusion

Based on knowledge of the environmental contexts of the Modification Disturbance Footprint and a desktop review of the known local and regional archaeological record, the following predictions are made concerning the probability of landforms within the Modification Disturbance Footprint to contain Aboriginal objects (**Table 4-2**), and what types of sites may be present within the Modification Disturbance Footprint (**Table 4-3**). **Figure 4-1** shows the two main landform types present within the Modification Disturbance Footprint.

Table 4-2: Likelihood of landforms within the Modification Disturbance Footprint to contain Aboriginal objects.

Survey Unit	Landform type	Likelihood to contain Aboriginal objects
1	Slopes	Slopes are a degrading landform and are unsuitable for occupation. Aboriginal objects recorded in such landforms are likely to be in a secondary context. The exception is in localised flat benches, if they are present, where occupation may have been possible.
2	Ridges/crests	Ridges are a degrading landform where soil depth tend to be low. Ridges and crests may have been used as pathways in the past and there is some potential for low-density artefact scatters of isolated finds.

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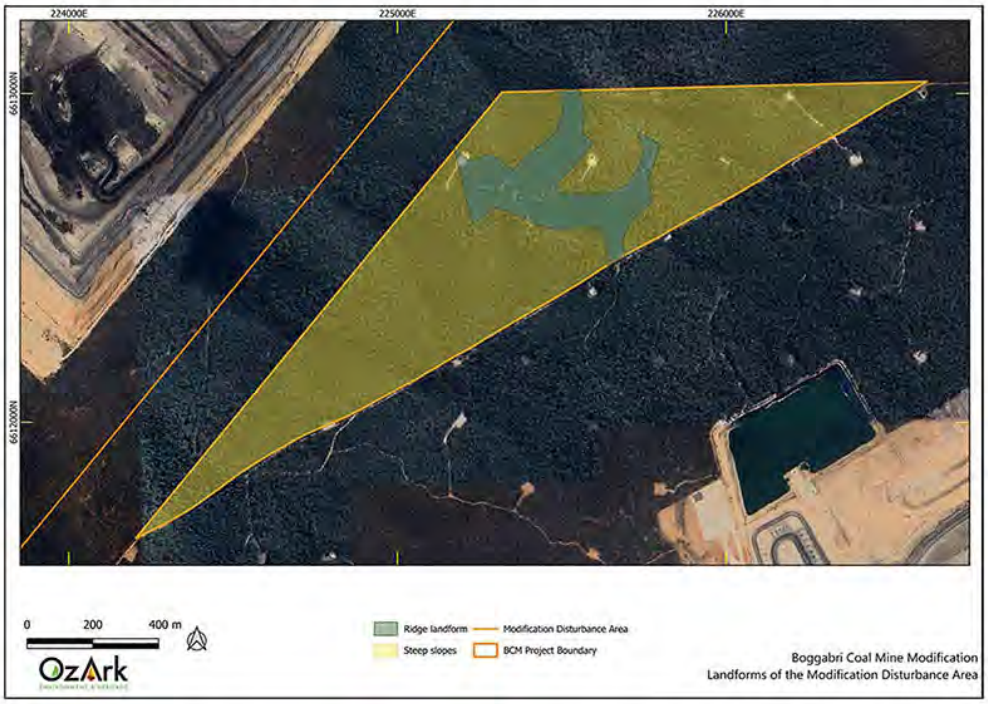
Table 4-3: Likelihood of certain site types being present in the Modification Disturbance Footprint.

Site type	Likelihood of being present in the Modification Mining Area
Isolated finds	As isolated finds can occur anywhere, particularly within disturbed contexts, it is predicted that this site type could be recorded within the Modification Disturbance Footprint.
Open artefact scatters	As most of the Modification Disturbance Footprint is within heavily vegetated sloping landforms distant to permanent water, this site type is not predicted to be common. It is likely that any sites associated with such landforms will have a low artefact density and a low complexity of tool types as the sites are either one-off events or only infrequently used.
Culturally modified trees	Due to the large number of trees within the Modification Disturbance Footprint, this site type is predicted to be more likely. It is also noted that this site type has been frequently recorded at a regional level. However, previous logging activities in the Modification Disturbance Footprint reduces the likelihood that any culturally modified trees remain present.
Grinding Grooves	This site type could be recorded within the Modification Disturbance Footprint should suitable outcropping rock be available. It is noted that this site type has been recorded within close proximity.

Figure 4-1: View of the main landforms within the Modification Disturbance Footprint.



4.3 RESEARCH QUESTIONS

Several research questions can meaningfully be applied to the investigation of the Modification Disturbance Footprint. These research questions include:

- What resources were available to the Aboriginal people using the land within the Modification Disturbance Footprint (food, stone, and water) and what resources were transported to the area?
- What tasks were Aboriginal people undertaking at the sites?

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- Are there outcropping rock materials present suitable for stone tool procurement and manufacture?
- Do the findings within the Modification Disturbance Footprint (if any) accord with the regional archaeological context examined in **Section 3.2**?
- Do the survey results support the predictive model set out in **Section 4.2.2**?

The survey methodology set out in **Section 5** will be framed to help answer these questions; should sites of sufficient significance be encountered. However, based on the results of previous assessments and past disturbances, it not expected that the land within the study area will contain sites of sufficient significance to help answer those research questions that require a robust data set.

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5 SURVEY METHODOLOGY

5.1 ASSESSMENT APPROACH

The Aboriginal cultural heritage assessment of the study area will follow the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice; DECCW 2010). The field inspection will follow the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (The Guide, OEH 2011).

Survey for Aboriginal cultural heritage values will concentrate on the Modification Disturbance Footprint where impacts related to the Modification will be located.

5.2 SURVEY AIMS

The aim of any archaeological survey is not to locate each artefact in a landscape but to undertake investigations so that the archaeological potential and archaeological characteristics of all landforms within the Modification Disturbance Footprint are known. Therefore, the aims of the survey will be to:

- Inspect all landform types in the Modification Disturbance Footprint so that their archaeological potential can be determined
- Evaluate whether the predictive model set out in **Section 4.2** is valid
- Determine if the research questions set out in **Section 4.3** can be answered
- Determine if any landforms of the Modification Disturbance Footprint require test excavation to understand the archaeological potential at a particular location
- Undertake sufficient assessment to satisfy Sections 2.2, 2.4, 2.5, 2.6, and 2.7 in the Guide
- Collect sufficient data so that the results can be presented in an ACHAR as set out in Section 3 in the Guide
- Undertake survey and record keeping satisfying Requirements 1–13 of the Code of Practice.

5.3 SURVEY METHODOLOGY

Standard archaeological field survey and recording methods will be employed in this assessment (Burke & Smith 2004) and will follow the Code of Practice.

As highlighted in **Sections 3** and **4**, greater Aboriginal archaeological potential tends to exist on landforms within 200 m of permanent and ephemeral water sources, along access or trade routes, and areas with suitable flora/fauna and shelter. Archaeological potential is generally reduced on landforms disturbed by erosion and historical impacts (e.g., farming and infrastructure installation).

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'Full pedestrian survey' refers to systematic transects walked by surveyors spaced approximately 20 m apart throughout the landform or area being surveyed. While full pedestrian survey will take place over the 85 ha Modification Disturbance Footprint, some landforms may be too steep to safely access. As the terrain is rugged with poor vehicle access, RAPs employed to assist with the field surveys must be fit and able to navigate the steeply sloping terrain. Any landforms not directly surveyed will be discussed with the RAPs present.

If any slopes are omitted from the survey coverage it will be because these slopes have a very low archaeological potential.

As such, the field assessment will include:

- A full pedestrian survey which will generally occur across the entire Modification Disturbance Footprint
- A representative sample of trees deemed to be of sufficient maturity to contain cultural modification will be inspected, as well as any areas with outcropping rock
- Some areas may not be physically surveyed if the RAPs and OzArk staff agree they are too disturbed or possess a very low likelihood of sites.

In the field, OzArk staff will identify, record, and evaluate physical (i.e., archaeological) evidence. Site recording will capture all the information required to complete current AHIMS site recording forms (e.g., site location, site boundary, site plan, representative photographs, artefact recording and feature recording).

RAPs will participate in the survey, identifying Aboriginal objects, determining the cultural significance of Aboriginal objects, and identifying cultural places or non-physical site types within the Modification Disturbance Footprint.

OzArk staff understand that cultural knowledge may not be provided in some instances due to cultural sensitivities. Under these circumstances, to assess the potential impacts, OzArk staff will need to be told, only in general terms, why a particular place is important, and what the significance of the impact will be.

OzArk staff will liaise with RAPs on a case-by-case basis to determine how to record the location in a culturally sensitive manner.

5.4 TEST EXCAVATION

It is possible that the survey may identify landforms where test excavation under the Code of Practice (Requirements 14–17) is required. Given the terrain of the Modification Disturbance Footprint, it is considered unlikely that suitable landforms will be present, however, should such landforms be identified during the survey, the test excavation methodology will be prepared as a separate document that will be circulated to all RAPs for review and comment.

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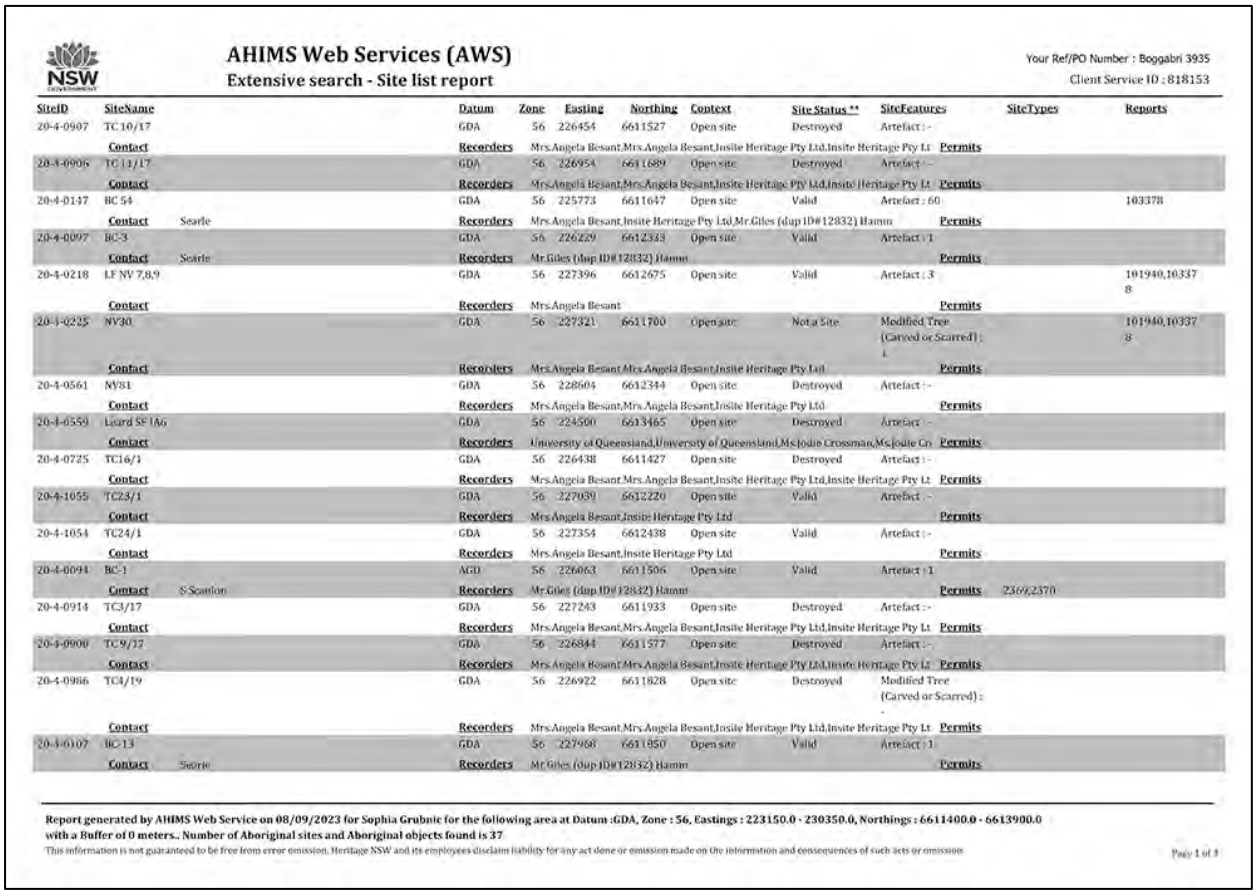
APPENDIX 3: AHIMS SEARCH RESULTS

Appendix 2 Figure 1: AHIMS Search Results



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

Your Ref/PO Number : Boggabri 3935
Client Service ID : 818153

SiteID	SiteName		Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
20-4-0907	TC 10/17		GDA	56	226454	6611527	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0906	TC 13/17		GDA	56	226954	6611689	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0147	BC 54		GDA	56	225773	6611647	Open site	Valid	Artefact : 60		103378
	Contact	Searle	Recorders	Mrs.Angela Besant,Insite Heritage Pty Ltd,Mr.Giles (dup ID#12832) Hamm					Permits		
20-4-0097	BC-3		GDA	56	226229	6612333	Open site	Valid	Artefact : 1		
	Contact	Searle	Recorders	Mr.Giles (dup ID#12832) Hamm					Permits		
20-4-0218	LF NV 7,8,9		GDA	56	227396	6612675	Open site	Valid	Artefact : 3		101940,10337 8
	Contact		Recorders	Mrs.Angela Besant					Permits		
20-4-0225	NV30		GDA	56	227321	6611700	Open site	Not a Site	Modified Tree (Carved or Scarred) : 1		101940,10337 8
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0561	NV81		GDA	56	228604	6612344	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0559	Lizard SF 1A6		GDA	56	224500	6613465	Open site	Destroyed	Artefact : -		
	Contact		Recorders	University of Queensland,University of Queensland,Ms.Jodie Crossman,Ms.Jodie Cr					Permits		
20-4-0725	TC16/1		GDA	56	226438	6611427	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-1055	TC23/1		GDA	56	227039	6612220	Open site	Valid	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-1054	TC24/1		GDA	56	227354	6612438	Open site	Valid	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0094	BC-1		AGD	56	226063	6611506	Open site	Valid	Artefact : 1		
	Contact	S Scanlon	Recorders	Mr.Giles (dup ID#12832) Hamm					Permits	2369,2370	
20-4-0914	TC3/17		GDA	56	227243	6611933	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0900	TC 9/17		GDA	56	226844	6611577	Open site	Destroyed	Artefact : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0986	TC4/19		GDA	56	226922	6611828	Open site	Destroyed	Modified Tree (Carved or Scarred) : -		
	Contact		Recorders	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0107	BC-13		GDA	56	227968	6611850	Open site	Valid	Artefact : 1		
	Contact	Searle	Recorders	Mr.Giles (dup ID#12832) Hamm					Permits		

Report generated by AHIMS Web Service on 08/09/2023 for Sophia Grubnic for the following area at Datum :GDA, Zone : 56, Eastings : 223150.0 - 230350.0, Northings : 6611400.0 - 6613900.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 37

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Boggabri 3935
Client Service ID : 818153

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
20-4-0220	LFNV11	GDA	56	225126	6612750	Open site	Valid	Artefact : 1		101940,10337 8
Contact		Recorders	Mrs Angela Besant					Permits		
20-4-0219	NV10	GDA	56	227341	6612386	Open site	Destroyed	Artefact : 4		101940,10337 8
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0217	NV16	GDA	56	227717	6612483	Open site	Destroyed	Artefact : 9		101940,10337 8
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,In					Permits		
20-4-0915	TC2/17	GDA	56	227987	6612089	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0911	TC 6/17	GDA	56	226387	6611618	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0572	TC7/15	GDA	56	225184	6612146	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
Contact		Recorders	Ms Taryn Gooley					Permits		
20-4-0128	BC34	GDA	56	225915	6611661	Open site	Destroyed	Artefact : 1		103378
Contact	Searle	Recorders	Mrs Angela Besant,Insite Heritage Pty Ltd,Mr Giles (dup ID#12832) Hamm					Permits		
20-4-0223	NV31	GDA	56	227602	6612176	Open site	Not a Site	Modified Tree (Carved or Scarred) : 3		101940,10337 8
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0909	TC 8/17	GDA	56	227186	6611680	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0912	TC 5/17	GDA	56	227296	6612066	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0987	TC19	GDA	56	226706	6611806	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0877	Leard SF IA11	GDA	56	227594	6613861	Open site	Valid	Artefact : -		
Contact		Recorders	Doctor Matthew Whincop,Whincop Archaeology Pty Ltd					Permits		
20-4-0707	Teston GG4	GDA	56	223910	6613828	Open site	Destroyed	Artefact : -, Grinding Groove : -		
Contact		Recorders	University of Queensland,University of Queensland,Mr Reiner Mantei,Mr Reiner Ma					Permits		
20-4-0568	TC3/15	GDA	56	228879	6611846	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant					Permits		
20-4-0205	HRNV34	GDA	56	227321	6611700	Open site	Valid	Modified Tree (Carved or Scarred) : 1		101940,10337 8
Contact		Recorders	Mrs Angela Besant					Permits		

Report generated by AHIMS Web Service on 08/09/2023 for Sophia Grubnic for the following area at Datum :GDA, Zone : 56, Eastings : 223150.0 - 230350.0, Northings : 6611400.0 - 6613900.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 37

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Boggabri 3935
Client Service ID : 818153

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
20-4-0910	TC 7/17	GDA	56	226392	6611567	Open site	Destroyed	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Mrs Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					Permits		
20-4-0106	BC-12	GDA	56	228078	6612217	Open site	Valid	Artefact : 1		
Contact	Searle	Recorders	Mr Giles (dup ID#12832) Hamm					Permits		
20-4-0984	DS CL368	GDA	56	228778	6613117	Open site	Valid	Artefact : -		
Contact		Recorders	Mrs Angela Besant,Insite Heritage Pty Ltd					Permits		
20-4-0226	LFNV32	GDA	56	225740	6611543	Open site	Valid	Modified Tree (Carved or Scarred) : 1		101940,10337 8
Contact		Recorders	Mrs Angela Besant					Permits		
20-4-0096	BC-2	GDA	56	226011	6611602	Open site	Valid	Artefact : 1		
Contact	Searle	Recorders	Giles Hamm,Archaeology					Permits		
20-4-0098	BC-4	GDA	56	227126	6611577	Open site	Valid	Artefact : 1		
Contact	Searle	Recorders	Mr Giles (dup ID#12832) Hamm					Permits		

** Site Status
Valid - The site has been recorded and accepted onto the system as valid
Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 08/09/2023 for Sophia Grubnic for the following area at Datum :GDA, Zone : 56, Eastings : 223150.0 - 230350.0, Northings : 6611400.0 - 6613900.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 37

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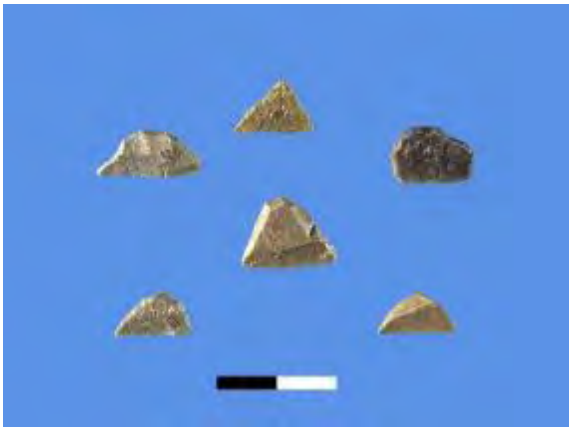
APPENDIX 4: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION

A retouched silcrete flake

A quartz flake



Microliths (scale = 1 cm)

Volcanic flakes

Flake characteristics (scale = 1 cm)

A mudstone/tuff core from which flakes have been removed