hdb Planning, Design, Development

M

27 to 31 Metford Rd, Tenambit

LGA: Maitland

Archaeological Due Diligence Assessment

17 May 2024

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MCCARDLE

CULTURAL HERITAGE

Report No: J202421 DD	
Approved by:	Penny McCardle
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EXECUTIVE SUMMARY

McCardle Cultural Heritage Pty Ltd (MCH) has been engaged by hdb Planning, Design, Development (to undertake an Archaeological Due Diligence Assessment for the proposed manufactured home estate (MHE) located at 27-31 Metford Road, Tenambit.

The far eastern portion of the project area consists of Permian Topmoga Coal Measures of the Maitland Group, characterized by shale, mudstone, sandstone, tuff, and coal. The rest of the project area is composed of Quaternary deposits, including gravel, sand, silt, clay, Waterloo Rosk, marine, and freshwater deposits. The project area features gentle slopes and includes the Beresfield residual soil landscape, which comprises an upper soil Horizon A and an underlying B (referred to as duplex soils). Unit A is interpreted as Holocene in age, while Unit B is interpreted as Pleistocene. Sites in the region are typically found on or within soil Horizon A, or at the interface between the A and B horizons.

The project area is situated approximately 400 meters south of a 1st order drainage line and 180 meters north of a 2nd order creek. Stony Creek (4th order) is located approximately 660 meters to the south. A low-lying landform prone to flooding is also present within 20 meters of the far southern boundary of the project area. This landform is associated with manmade sewerage settlement ponds, which result in the flooding of Four Mile Creek in the immediate vicinity. Prior to European settlement and the establishment of the settlement ponds, the project area would have been unsuitable for camping due to the lack of accessible freshwater sources necessary for survival.

In relation to land uses and impacts to the landscape and archaeological record, the project area has been completely cleared, likely to have been used for pastoral purposes (grazing), involving the wholesale clearance of native vegetation, the introduction of pasture grass (ploughing), the construction of a large dam in the north east, a large structure and car park in the north east (along with the associated infrastructure and utilities), housing and sheds along the western border, fencing, numerous tracks and associated infrastructure (water, electricity, telephone).

A search of the AHIMS register identified 34 known Aboriginal sites within two kilometres of the project area and include 22 artefact sites (AFT), 2 PADs, 9 artefact and Pads (AFT/PAD) and one hearth/non-human bone and organic material/PAD and shell (HTH/BOM/PAD/SHL). No sites or Aboriginal Places are located in the project area. Based on AHIMS results, local and regional archaeological investigations, and the environmental context, the absence of reliable fresh water in the project area suggests that it was likely used for hunting and gathering rather than large-scale long-term camping. Evidence of such past Aboriginal land uses manifest in the archaeological record as low-density artefact scatters and isolated artefacts.

The survey revealed that the area had previously been cleared and ploughed, as indicated by the presence of eroded ridges and furrows. In terms of structures, the Regal Inn was situated in the north eastern section of the project area, with a house found in the southern paddock and another in the western paddock. The open paddocks consisted mainly of grass, with scattered trees, while the north western paddock was currently being used for grazing. However, visibility was hindered by the presence of structures and grass cover, and there were also tracks and signs of erosion in the area.

No sites or PADs were identified during the survey and as such there are no impacts on the archaeological record and the following recommendations are provided:

1) The persons responsible for the management of onsite works will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Regulation 2019, under the National Parks and Wildlife Act 1974;

2) An Unexpected Finds Procedure (Appendix B) will be implemented during all works,

3) Should any Aboriginal objects be uncovered during works, all work will cease in that location immediately, the Unexpected Finds Procedure followed and the Environmental Line contacted.

GLOSSARY

Aboriginal Place: are locations that have been recognised by the Minister (and gazetted under the *National Parks and Wildlife Act 1974*) as having special cultural significance to the Aboriginal community. An Aboriginal Place may or may not include archaeological materials.

Aboriginal Site: an Aboriginal site is the location of one or more Aboriginal archaeological objects, including flaked stone artefacts, midden shell, grinding grooves, archaeological deposits, scarred trees etc.

Artefact: any object that is physically modified by humans.

Artefact scatter: a collection of artefacts scattered across the surface of the ground (also referred to as open camp sites).

Assemblage: a collection of artefacts associated by a particular place or time, assumed generated by a single group of people, and can comprise different artefact types.

Backed artefact: a stone tool where the margin of a flake is retouched at a steep angle and that margin is opposite a sharp edge.

Background scatter: a term used to describe low density scatter of isolated finds that are distributed across the landscape without any obvious focal point.

Core: a chunk of stone from which flakes are removed and will have one or more negative flake scars but no positive flake scars. The core itself can be shaped into a tool or used as a source of flakes to be formed into tools.

Debitage: small pieces of stone debris that break off during the manufacturing of stone tools. These are usually considered waste and are the by-product of production (also referred to as flake piece).

Flake: any piece of stone struck off a core and has a number of characteristics including ring cracks showing where the hammer hit the core and a bulb of percussion. May be used as a tool with no further working, may be retouched or serve as a platform for further reduction.

Flaked piece/waste flake: an unmodified and unused flake, usually the by-product of tool manufacture or core preparation (also referred to as debitage).

Harm: is defined as an act that may destroy, deface or damage an Aboriginal object or place. In relation to an object, this means the movement or removal of an object from the land in which it has been situated

In situ: archaeological items are said to be "in situ" when they are found in the location where they were last deposited.

Retouched flake: a flake that has been flaked again in a manner that modified the edge for the purpose of resharpening that edge.

Typology: the systematic organization of artefacts into types on the basis of shared attributes.

ACRONYMS

ACHA	Aboriginal Cultural Heritage Assessment
ACHMP	Aboriginal Cultural Heritage Management Plan
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit

AHIMS SITE ACRONYMS

ACD	Aboriginal ceremonial and dreaming
AFT	Artefact (stone, bone, shell, glass, ceramic and metal)
ARG	Aboriginal resource and gathering
ART	Art (pigment or engraving)
BOM	Non-human bone and organic material
BUR	Burial
CFT	Conflict site
CMR	Ceremonial ring (stone or earth)
ETM	Earth mound
FSH	Fish trap
GDG	Grinding groove
HAB	Habitation structure
HTH	Hearth
OCQ	Ochre quarry
PAD	Potential archaeological deposit.
SHL	Shell
STA	Stone arrangement
STQ	Stone quarry
TRE	Modified tree (carved or scarred)
WTR	Water hole

1 INTRODUCTION

1.1 INTRODUCTION

McCardle Cultural Heritage Pty Ltd (MCH) has been engaged by hdb Planning, Design, Development (to undertake an Archaeological Due Diligence Assessment for the proposed manufactured home estate (MHE) located at 27-31 Metford Road, Tenambit.

The assessment has been undertaken to meet the Heritage NSW, Department of Premier & Cabinet Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW and the brief. The purpose of a due diligence assessment is to assist proponents to exercise due diligence when carrying out activities that may harm Aboriginal objects or Aboriginal places and to determine whether that should apply for a consent to harm Aboriginal objects or Places through an Aboriginal Heritage Impact Assessment (AHIP).

The purpose of this due diligence report is to demonstrate that all reasonable and practicable measures have been undertaken to prevent harm to any Aboriginal objects and/or place within the project area. This report has met the Heritage NSW Due Diligence requirements and considered the relevant environmental and archaeological information, the project land condition, the nature of the proposed development activity and impacts, as well as preparing appropriate recommendations.

1.2 THE PROJECT AREA

The project area is located at 27-31 Metford Road, Tenambit. Including the Lots listed in Table 1.1, the location of the project area is shown in Figures 1.1 and 1.2.

Table 1.1 Lots included in the project area

Street address	Lot	DP	Site area
27 Metford Road, Tenambit	7	810442	2.559ha (25,590m^2)
29 Metford Road, Tenambit	8	810442	2.043ha (20,430m^2)
33 Metford Road, Tenambit	11	597659	2.023ha (20,230m^2)

Figure 1.2 Location of the project area

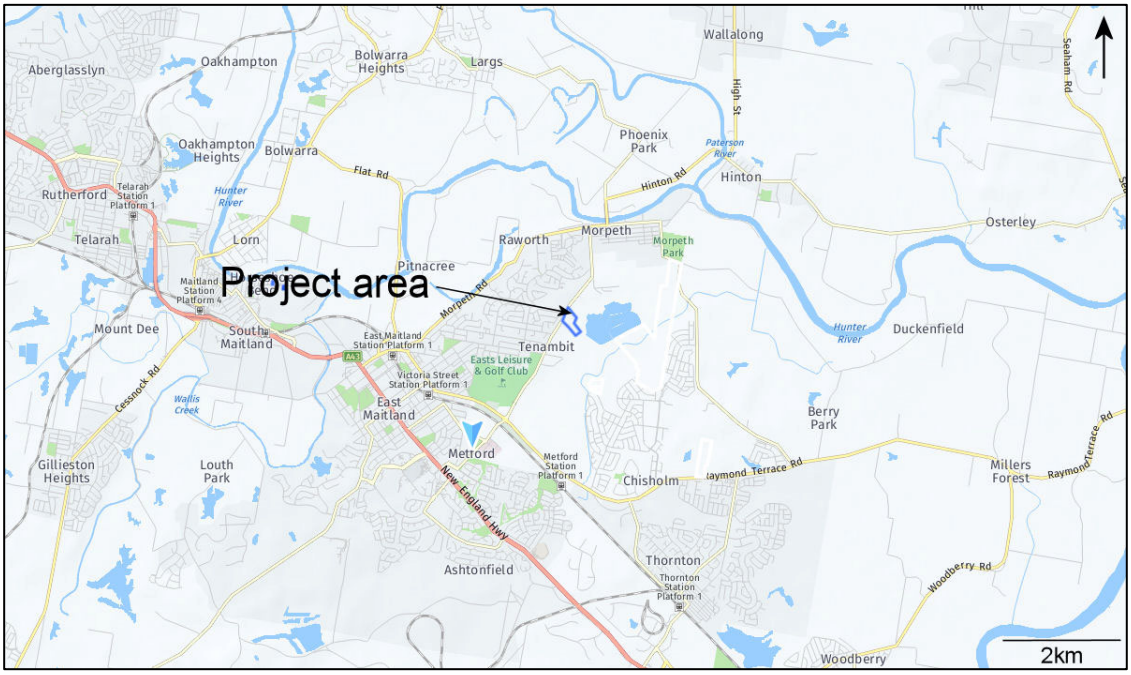
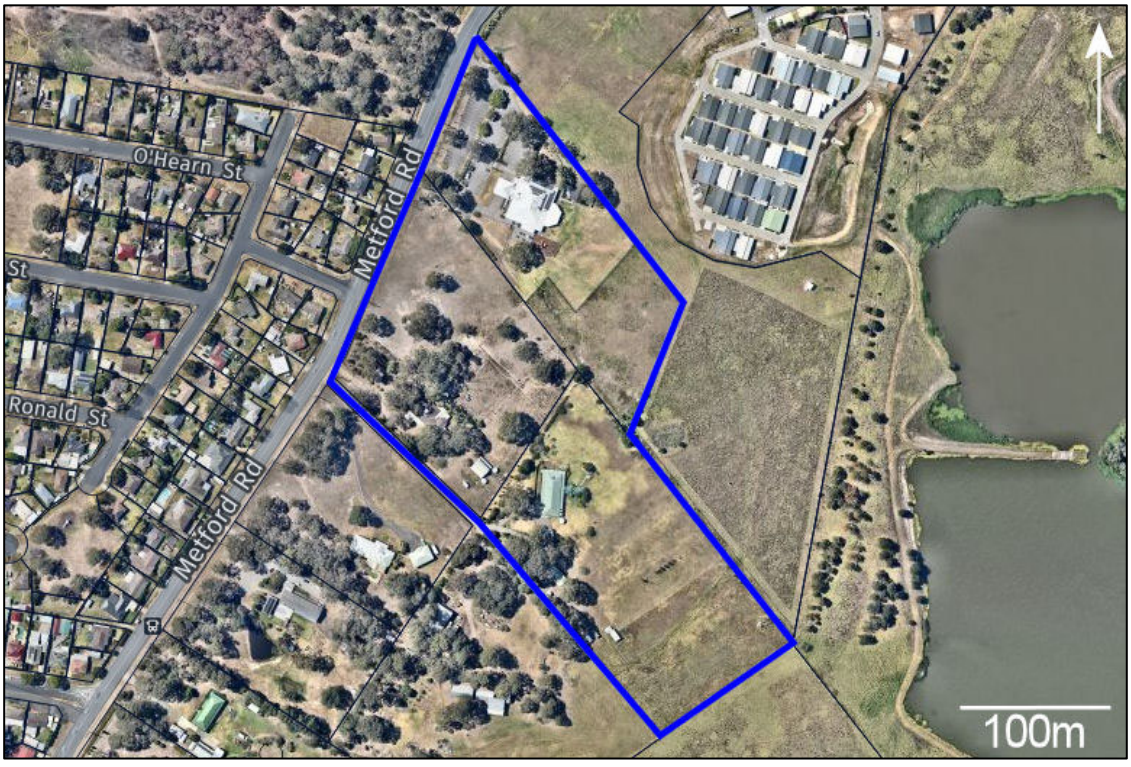


Figure 1.1 Aerial photograph of the project area (Nearmap 2023)

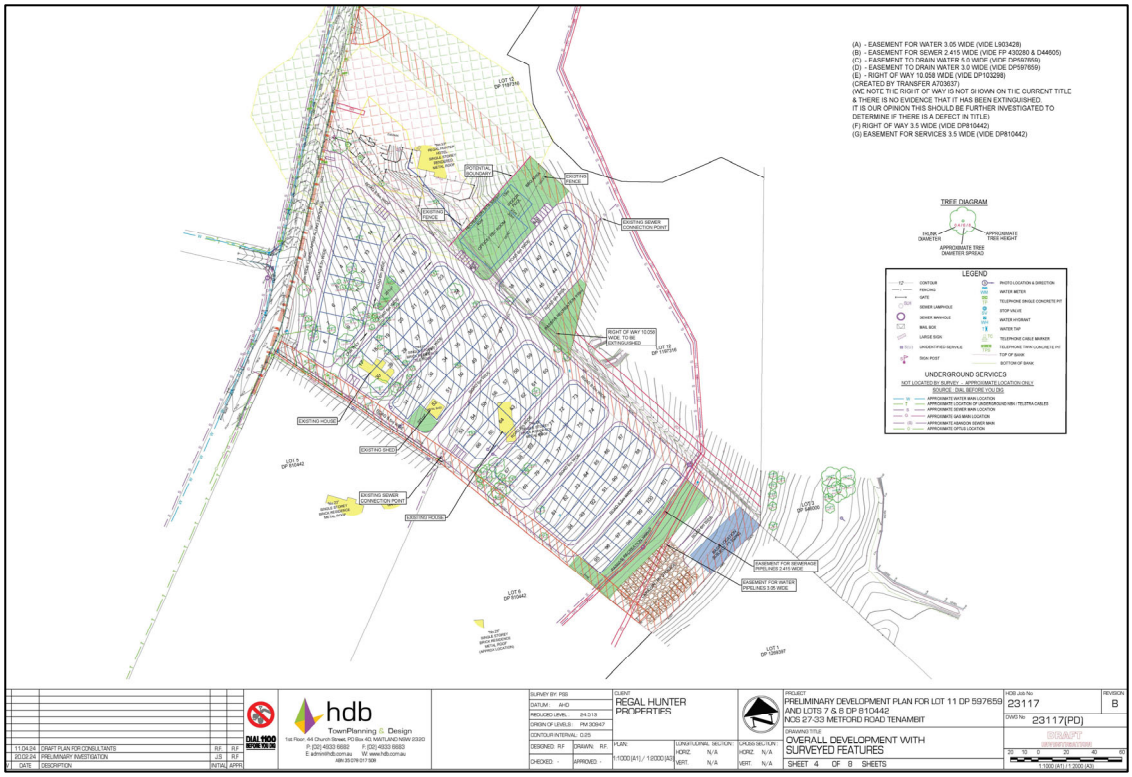


1.3 PROPOSED DEVELOPMENT

The first stage of the development will be to sever the Tavern, on Lot 11 DP 597659, from the remainder of the site. That is to adjust the boundaries so the Tavern will be on a separate Lot. The second stage will be the development will be the manufactured home estate. The development of the manufactured home estate will include (Refer to Figure 1.3):

- Demolition of the existing dwellings to create a vacant site.
- Create 101 manufactured home sites.
- Provide an entry to the site approximately 40m from Ribee Street.
- Create perimeter roads around the northern and eastern sections of the site.
- Provide an office/administration building and associated parking at the Metford Road frontage, in the northern corner of the site, near the tavern.
- Provide landscaping along the road frontage and around the Tavern site.
- Provide a combined water quality and onsite detention basin to the rear of the site.

Figure 1.3 Proposed layout



1.4 OBJECTIVES OF THE DUE DILIIGENCE ASSESSMENT

The objectives and primary tasks of this due diligence assessment were to:

- undertake a search of the Aboriginal Heritage Management System (AHIMS) and other relative registers;
- undertake research into the environmental and archaeological contexts of the project area;
- develop a predictive model of site location for the project area;
- undertake a field survey of the project area;
- assess the potential impacts of the proposed development on any identified Aboriginal sites or potential archaeological deposits (PADs) identified within the project area;
- assess the significance of any identified Aboriginal objects or sites identified within the project area;
- complete and submit site cards to AHIMS for any Aboriginal sites identified; and
- provide appropriate recommendations.

1.5 LEGISLATIVE CONTEXT

The following overview of the legislative framework, is provided solely for information purposes for the client, and should not be interpreted as legal advice. MCH will not be liable for any actions taken by any person, body or group as a result of this general overview and MCH recommends that specific legal advice be obtained from a qualified legal practitioner prior to any action being taken as a result of the general summary below.

Land managers are required to consider the effects of their activities or proposed development on the environment under several pieces of legislation. Although there are a number of Acts and regulations protecting Aboriginal heritage, including places, sites and objects, within NSW, the three main ones include:

- National Parks and Wildlife Act (1974, as amended)
- National Parks and Wildlife Regulation (2019)
- Environmental Planning and Assessment Act (1979)

1.5.1 NATIONAL PARKS AND WILDLIFE ACT (1974, AS AMENDED)

The National Parks and Wildlife Act (1974), Amended 2019, is the primary legislation for the protection of Aboriginal cultural heritage in New South Wales. The NPW Act protects Aboriginal heritage (places, sites and objects) within NSW and the protection of Aboriginal heritage is outlined in s86 of the Act, as follows:

- "A person must not harm or desecrate an object that the person knows is an Aboriginal object" s86(1)
- "A person must not harm an Aboriginal object" s86(2)
- "A person must not harm or desecrate an Aboriginal place" s86(4)

Penalties apply for harming an Aboriginal object, site or place. The penalty for knowingly harming an Aboriginal object (s86[1]) and/or an Aboriginal place (s86[4]) is up to $550,000 for an individual and/or imprisonment for 2 years; and in the case of a corporation the penalty is up to $1.1 million. The penalty for a strict liability offence (s86[2]) is up to $110,000 for an individual and $220,000 for a corporation.

Harm under the National Parks and Wildlife Act (1974, as amended) is defined as any act that destroys defaces or damages the object, moves the object from the land on which it has been situated, causes or permits the object to be harmed. However, it is a defence from prosecution if the proponent can demonstrate that;

1) harm was authorised under an Aboriginal Heritage Impact Permit (AHIP) (and the permit was properly followed), or
2) the proponent exercised due diligence in respect to Aboriginal heritage.

The 'due diligence' defence (s87[2]), states that if a person or company has applied due diligence to determine that no Aboriginal object, site or place was likely to be harmed as a result of the activities proposed for the Project Area, then liability from prosecution under the NPW Act 1974 will be removed or mitigated if it later transpires that an Aboriginal object, site or place was harmed. If any Aboriginal objects are identified during the activity, then works should cease in that area and Heritage NSW, Department of Premier & Cabinet notified (DECCW 2010:13). The due diligence defence does not allow for continuing harm or as defence to s.86(1) or (4).

The archaeological due diligence assessment and report has been carried out in compliance with the Heritage NSW (DECCW 2010) Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.

1.5.2 NATIONAL PARKS AND WILDLIFE REGULATION (2019)

The National Parks and Wildlife Regulation 2019 provides a framework for undertaking activities and exercising due diligence in respect to Aboriginal heritage. The Regulation (201909) recognises various due diligence codes of practice, including the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW, but it also outlines procedures for Aboriginal Heritage Impact Permit (AHIP) applications and Aboriginal Cultural Heritage Consultation Requirements (ACHCRs); amongst other regulatory processes.

1.5.3 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979 (EP&A ACT)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the statutory framework for planning and environmental assessment in NSW and the implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils. The EP&A Act sets up a planning structure that requires developers (individuals or companies) to consider the environmental impacts of new projects. Under this Act, cultural heritage is considered to be a part of the environment. It provides for the identification, protection and management of heritage items through inclusion of these items into schedules off planning instruments, such as Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). This Act requires that Aboriginal cultural heritage and the possible impacts to Aboriginal heritage that development may have, are formally considered in land-use planning and development approval processes.

This Act has three main parts of direct relevance to Aboriginal cultural heritage. Namely, Part 3 which governs the preparation of planning instruments, Part 4 which relates to development assessment provisions for local government (consent) authorities and Part 5 which relates to activity approvals by governing (determining) authorities. Planning decisions within Local Government Areas (LGAs) are guided by Local Environmental Plans (LEPs). Each LGA is required to develop and maintain an LEP that includes Aboriginal and historical heritage items which are protected under the EP&A Act and the NPW Act. The Project Area is located within the Maitland LGA and falls under the 2011 LEP.

1.5.4 LOCAL ENVIRONMENTAL PLAN

The project area is located within the Maitland LGA. Schedule 5.10 of the LEP 2011 details the included environmental heritage items covered by the plan. No Aboriginal sites or places are identified within proximity to the project area.

1.6 ABORIGINAL COMMUNITY CONSULTATION

A due diligence assessment relates to the physical identification of Aboriginal objects, sites and places. Community consultation is only required once Aboriginal objects, sites or places have been identified and an Aboriginal Heritage Impact Permit (AHIP) is deemed necessary. Section 5.2 of the Heritage NSW (DECCW 2010) Due Diligence Code of Practice for the protection of Aboriginal Objects in NSW specifically states that;

> *'consultation with the Aboriginal community is not a formal requirement of the due diligence process' (2010:8).*

1.7 QUALIFICATIONS OF THE INVESTIGATOR

Dr. Penny McCardle: Principal Archaeologist & Forensic Anthropologist has 22 years experience in Indigenous archaeological assessments, excavation, research, reporting, analysis and consultation and 19 years in skeletal identification, biological profiling and skeletal trauma identification for NPWS, NSW Police and the NSW Department of Forensic Medicine.

- BA (Archaeology and Palaeoanthropology): Indigenous archaeology, University of New England 1999
- Hons (Archaeology and Palaeoanthropology): Physical Anthropology, University of New England 2001
- Forensic Anthropology Course, University of New England 2003
- Armed Forces Institute of Pathology Forensic Anthropology Course, Ashburn, VA 2008
- Analysis of Bone trauma and Pseudo-Trauma in Suspected Violent Death Course, Erie College, Pennsylvania, 2009
- Documenting Scenes of War and Human Rights Violations. Institute for International Criminal Investigations, 2018
- PhD, University of Newcastle, 2019

1.8 REPORT STRUCTURE

The report includes Section 1 which outlines the project, Section 2 presents the environmental and archaeological context, Section 3 provides the results and discussion and Section 4 presents the Impact Assessment, Section 5 discusses the mitigation measures and Section 6 provides the management recommendations.

2 ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXT

The archaeological due diligence process and assessment requires that the available knowledge and information in relation to the environmental and archaeological contexts are considered. The purpose of this is to assist in identifying whether Aboriginal objects, sites or places are likely to be present within the project area based on archaeological predictive modelling and in what condition they may be found in given the environmental impacts, both natural and anthropogenic.

2.1 LOCAL ENVIRONMENT

Past site location and land use are closely linked to the environment including the landform, geology, geomorphology, soils, waterways and associated resources. The environmental context is important to identify potential factors relating to past Aboriginal land use patterns.

Story et al (1963) divided the Hunter Valley into eight main sub-regions including the Southern Mountains, Central Goulburn Valley, Merriwa Plateau, Liverpool and Mt Royal Ranges, Barrington tops, North-Eastern Mountains, Central lowlands and the Coastal Zone. The project area is situated the in the Central Lowlands (a broad lowland belt of lowlands approximately 15 kilometres wide) which lies at the centre of the region extending from Murrurundi to Newcastle.

The far eastern portion of the project area includes the Permian Topmoga Coal Measures of the Maitland group and consists of shale, mudstone, sandstone, tuff and coal. The remainder of the project area consists of Quaternary deposits (gravel, sand, silt, clay, Waterloo Rosk, marine and freshwater deposits) (Newcastle 1:250,000 Geological Map Series, 1966). The presence of mudstone and tuff within the geology of the eastern portion of the project area indicates that stone materials suitable for manufacturing stone artefacts may occur in various locations throughout the project area.

Consisting of a gentle slope, the project area includes the Beresfield residual soil landscape that includes a friable brownish black loam (topsoil - A_1 horizon; 5-15cm in depth). The A_2 horizon underlies this and consists of hard setting dull yellowish brown sandy loam (5-30cm in depth). The B horizon may consist of either a reddish-brown plastic pedal clay or a greyed 'puggy' silty clay. Erosion across the area ranges from low to high (Matthei 1995: 30 – 33).

The geomorphology of the Hunter Valley is complex and include texture contrast soils that mantle the undulating to hilly landscapes on Permian and Carboniferous rocks and the older alluvial terraces and valley fills. These soils consist of an upper soil Horizon A and underlying B (referred to as duplex soils (Galloway 1963; Hughes 1984). Unit A and Unit B are interpreted as being Holocene and Pleistocene in age respectively. Within the region, sites tend to occur on or within soil Horizon A or are often present at the interface of the A and B horizons. Within the A horizon the lowermost (in terms of vertical positioning) artefact assemblages tend to contain artefacts that are typically attributed to the mid-Holocene, as characterised by an increase in the number of backed artefacts.

In terms of fresh water sources, the project area is located approximately 400 meters south of a 1st order drainage line, 180 metres north of 2nd order creek and Stony Creek (4th order) is located approximately 660 metres south. A low-lying landform subject to flooding is also located within 20 metres of the far southern boundary of the project area that is associated with manmade sewerage settlement ponds and subsequent flooding of Four Mile Creek in the immediate area. In the absence of the manmade settlement ponds and associated flooding (prior to European settlement)) the project area would not have been suitable for camping due to a lack of fresh water that is necessary for survival.

In relation to land uses and associated impacts, Heritage NSW (DECCW 2010) defines disturbed lands as land that has been the subject of human activity that has changed the lands' surface and, or

subsurface, these changes being changes that remain clear and observable. This definition is based on the types of disturbances classified in The Australian Soil and Land Survey Field Handbook (CSIRO 2010) and Table 2.1 provides a scale formulated by the CSIRO of the levels of disturbances and their classification, which will assist in determining the level of disturbance across the project area and its impact on potential cultural material that may be present.

Table 2.1 Land use scale (CSIRO 2010)

Minor disturbance		Moderate disturbance		Major disturbance	
Cleared and/or grazed at some time, but apparently never ploughed		Cleared and/or grazed at some time, with ploughing also attested		Severe disturbance to natural soil profiles; complete-to-near complete topsoil loss/disturbance	
0	No effective disturbance; natural	3	Extensive clearing (e.g., poisoning and ringbarking	6	Cultivation: grain fed
1	No effective disturbance other than grazed by hoofed animals	4	Complete clearing: pasture native or improved, but never cultivated	7	Cultivation: irrigated, past and present
2	Limited clearing (e.g., selected logging)	5	Complete clearing: pasture native or improved, cultivated at some stage	8	Highly disturbed: e.g., quarry, road works, mining, landfill, urban

Regionally, following European settlement of the area in the 1820s, the regional landscape has been subjected to a range of different modifactory activities including extensive logging and clearing, agricultural cultivation (ploughing), pastoral grazing, residential developments and other construction works. The associated high degree of landscape disturbance has resulted in the alteration of large tracts of land and the cultural materials contained within these areas.

Based on historic aerial photography (Historical Imagery NSW Government) and Nearmap, the current project area has been subject to a range of both moderate and high landuses disturbances and impacts. The project area has been cleared by 1954 (Figure 2.1) with few remaining trees and by 1966 some of those trees appear to have been removed and tracks are present (Figure 2.2).

Figure 2.1 1954 aerial photograph of the project area

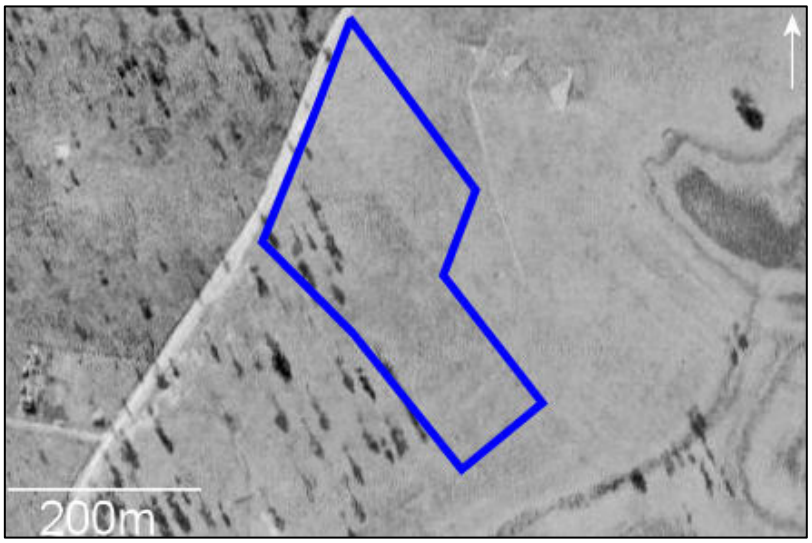
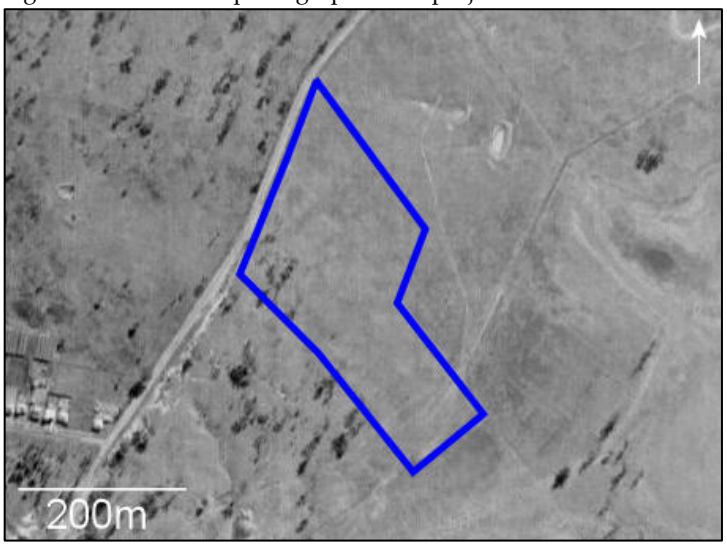


Figure 2.2 1966 aerial photograph of the project area



As shown in Figure 2.3, by 1974 a large dam is located in the north east along with a additional tracks from the dam heading south.

Figure 2.3 1974 aerial photograph of the project area

By 1984, a large section of the north eastern paddock has been cleared and excavation works have commenced for a large structure (Figure 2.4). These works continue and by 1993 (Figure 2.5) a large structure and large car park appear to be complete. Additionally, houses are well established in the remaining two properties (along the western border). As shown in the 1998 aerial photograph (Figure 2.6), gardens appear to be established along with what appears to be preparations for separated paddocks in the south.

Figure 2.4 1984 aerial photograph of the project area

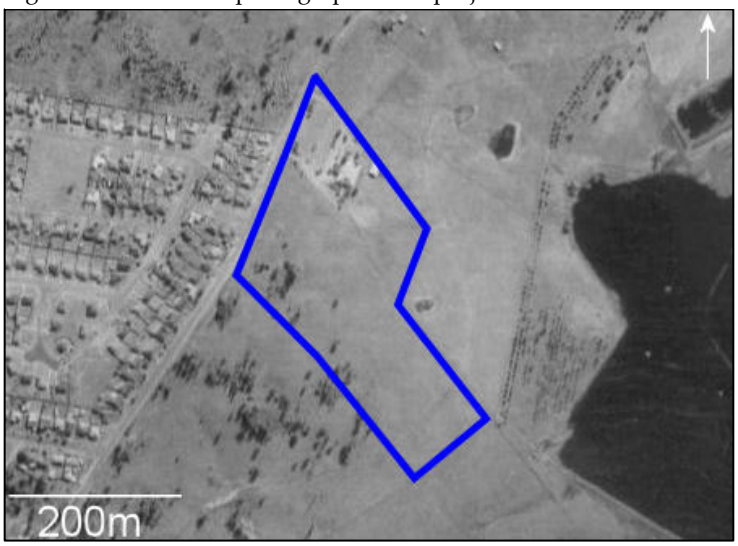


Figure 2.5 1993 aerial photograph of the project area

Figure 2.6 1998 aerial photograph of the project area

Additional structures are present in association with the residential houses along the western border by 2010 and what appears to be excavation disturbances immediately south of the large structure in the north east (Figure 2.7). The historical imagery shows no additional major impacts since 2010 but minor impacts such as additional gardening (?) in the southern paddocks has occurred.

Figure 2.7 2010 aerial photograph of the project area

In summary, the project area has been completely cleared, likely to have been used for pastoral purposes (grazing), involving the wholesale clearance of native vegetation, the introduction of pasture grass (ploughing), the construction of a large dam in the north east, a large structure and car park in the north east (along with the associated infrastructure and utilities), housing and sheds along the western border, fencing, numerous tracks and associated infrastructure (water, electricity, telephone). These landuses and how they impact on the landscape and deposits are discussed below.

Early vegetation clearing included the uprooting of trees by chaining which disturbed or destroyed that may be present near, or underneath trees and vegetation (Wood 1982). Alternatively, timber was harvested manually, using axes and hand saws and generally, only the trees that were wanted for timber were felled (selective logging). However, after the 1950s, there was an increase in mechanisation in the logging industry, and clear-felling became widely practised whereby the best logs were removed for processing, but nearly every other tree was bulldozed and burnt, and had increased impacts to the landscape.

Farming and agricultural activities also disturbed the landscape. Pastoralism activities result in disturbances due to vegetation clearance and the trampling and compaction of grazed areas which accelerate the natural processes of sheet and gully erosion, which in turn can cause the horizontal and lateral displacement of artefacts. Furthermore, grazing by hoofed animals can affect the archaeological record due to the displacement and breakage of artefacts resulting from trampling (Yorston et al 1990). Pastoral land uses are also closely linked to alterations in the landscape due to the construction of dams, fence lines and associated structures. As a sub-set of agricultural land use, ploughing typically disturbs the top 10-35 centimetres of topsoil (Koettig 1986, Personal obs.) depending on the method and machinery used during the process. Ploughing increases the occurrence of erosion and can also result in the direct horizontal (up to 18 metres per plough run) and vertical movement of artefacts, thus causing artificial changes in artefact densities and distributions (e.g., Roper 1976; Odell and Cowan 1987; Lewarch and O'Brien 1981). Ploughing activities are typically evidenced through 'ridges and furrows' however a lengthy cessation in ploughing activities dictates that these features may no longer be apparent on the surface.

Excavation works required for developments, including but not limited to business, residential, industrial, works depos and associated infrastructure and utilities, require excavation, cut and fill methods. These direct impacts to the land and associated cultural materials that may be present are easy to see and understand. Any form of construction or resource exploitation that involves the removal of, relocation of or compaction or soils sediments or minerals, requires the modification of the topography, thus displacing and/or destroying any cultural materials that may have been present (Wood 1982). Theses significant disturbances have results in none of the original topsoils remining in situ.

In terms of everyday land uses, vehicular movements on sites have been well documented and based on several experiments (DeBloois, Green and Wylie 1974, Gallagher 1978), have shown that vehicle movements over an archaeological site are extremely destructive to the site through compaction and movement, thus altering the spatial relationship and location of the artefacts. Based on general observations it is expected that the creation of dirt tracks for vehicle access would also result in the loss of vegetation and therefore will enhance erosion and the associated relocation of cultural materials.

Additional disturbances would have derived from natural processes. The patterns of deposition and erosion within a locality can influence the formation and/or destruction of archaeological sites. Within an environment where the rate of erosion is generally high, artefacts deposited in such an environment will be eroded downslope after being abandoned (Waters 2000; Waters and Kuehn 1996). If erosion occurs after cultural material is deposited, it will disturb or destroy sections, or all of, archaeological sites even if they were initially in a good state of preservation. The more frequent and severe the episodes of erosional events the more likely it is that the archaeological record in that area will be disturbed or destroyed.

Additionally, bioturbation processes such as the redistribution and mixing of cultural deposits occurs as a result of burrowing and mounding by earthworms, ants and other species of burrowing animals. Artefacts can move downwards through root holes as well as through sorting and settling due to gravity, and translocation can also occur as a result of tree falls (Balek 2002; Peacock and Fant 2002; Canti 2003; Stein 2003:). Experiments to assess the degree that bioturbation can affect material have been undertaken. In abandoned cultivated fields in South Carolina, Michie (summarised in Balek 2002:42-43) found that over a 100-year period 35% of shell fragments that had been previously used to fertilise the fields were found between 15 and 60 centimetres below the surface, inferred to be as a result of bioturbation and gravity. The ways in which earthworms can affect cultural deposits includes: creating false artefact concentrations and stratigraphy (for example biomantles) by moving artefacts downwards through the soil; indirectly displacing larger artefacts as they burrow through the soil; burying artefacts through the deposition of faecal material on the surface; and blurring natural and cultural boundaries. They can also destroy remains of seeds and organic materials as they eat them (Fowler et al. 2004:462; Stein 1983:280-281).

The project area is located within an environment that provided limited resources. Without a reliable fresh water supply to enable camping, the project area may have been utilised for more transitory activities such as travel and hunting and gathering on the way to reliable water and associated subsistence resources. Such past Aboriginal land uses are manifest in the archaeological record as a background scatter of discarded artefacts (such as isolated artefacts and/or very low-density artefact scatters). In relation to modern alterations to the landscape, the previous large-scale clearing, ploughing, grazing, dam construction, the construction of structures and associated infrastructure and tracks can be expected to have had moderate to high impacts upon the archaeological record at those locations.

2.2 ARCHAEOLOGICAL CONTEXT

A review of the archaeological literature of the region, and more specifically the local area and the results of an AHIMS search provide essential contextual information for the current assessment. While the Aboriginal occupation of Australia is currently accepted as beginning approximately 65,000 years ago (Clarkson et al. 2017), the Aboriginal occupation of the Hunter Valley has been dated to approximately 20,000 years (Brayshaw 1987:100). Radiocarbon dates obtained from charcoal at a site in Glennies Creek, north of Singleton, found that artefacts within the deposit dated to approximately 20,200 years before present (BP). Despite this Pleistocene period site, most of the archaeology in the Hunter region has been dated to the Holocene period.

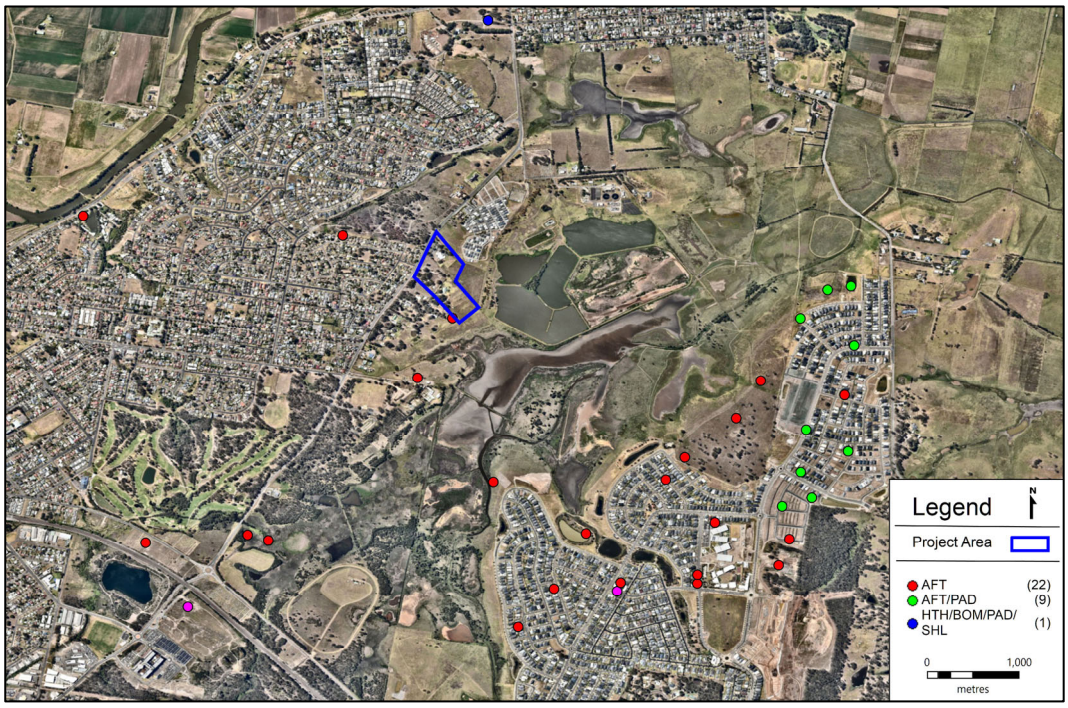
There are many types of evidence past Aboriginal occupation across the landscape which form the archaeological record of a region. Places which show evidence of Aboriginal occupation of an area are archaeological sites. These sites contain numerous site features, and some contain more than one features. The Aboriginal heritage information management system (AHIMS) provides information of the known archaeological sites in NSW.

2.2.1 ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM (AHIMS)

It must be noted that there are many limitations with an AHIMS search including incorrect site coordinates due to errors and changing of computer systems at AHIMS over the years that failed to correctly translate old coordinate systems to new systems. Secondly, AHIMS will only provide up to 110 sites per search, thus limiting the search area surrounding the project area and limiting a more comprehensive analysis and finally, few sites have been updated on the AHIMS register to notify if they have been subject to a s87 or s90 and as such what sites remain in the local area and what sites have been destroyed, to assist in determining the cumulative impacts, is unknown.

A search of the AHIMS register (Appendix A) has identified 34 known Aboriginal sites currently recorded within two kilometres of the project area and include 22 artefact sites (AFT), 2 PADs, 9 artefact and Pads (AFT/PAD) and one hearth/non-human bone and organic material/PAD and shell (HTH/BOM/PAD/SHL) (Figure 2.8).

Figure 2.8 Location of AHIMS sites



Although it appears a site is located in the project area (AHIMS 38-4-0396), examination of the site card and maps show that this site is located south east of the project area and within the bounds of the Morpeth Sewerage Treatment Plant boundary. There are no sites or Aboriginal places in the project area

2.2.2 HERITAGE REGISTER LISTINGS

The National Heritage List, the Commonwealth Heritage List, the Australian Heritage Database, Australia's National Heritage List, The National Trust Heritage Register State Heritage Inventory the and the relevant Local Environmental Plan have no Aboriginal objects, sites or places listed.

2.2.3 SUMMARY OF THE REGIONAL ARCHAEOLOGICAL CONTEXT

The majority of archaeological surveys and excavations throughout the region have been undertaken in relation to environmental assessments for various developments, including but not limited to, residential and industrial, infrastructure, utilities, mining and quarrying. A review of the of the most relevant investigations (Davidson et al 1993; Dean-Jones and Mitchell 1993; Koettig and Hughes 1984; McDonald 1997; Haglund 1999; Kuskie 2000; HLA-Envirosciences 2002; AMBS 2002; MCH 2004a, b) provides a regional archaeological context in terms of site location and distribution.

Based on the available information it is possible to identify a number of trends in site location and patterning within the regional area. Open campsites are by far the most common site type with isolated finds also comparatively well represented. A variety of other site types have been identified in far lower concentrations and include grinding grooves, scarred trees, rock shelters, shelters with art and burials. The high representation of sites containing stone artefacts is to be expected due to the durability of stone in comparison to other raw materials. Raw materials used for tool manufacture include mudstone (also called tuff by some) which is the most common lithic artefactual material found in the region, followed by silcrete and in lesser quantities chert, quartz, quartzite, petrified wood, porcellanite, basalt, limestone, sandstone, rhyolite, basalt, European glass and other non-specific lithic types also occur in smaller quantities. The most common stone artefacts include flakes, flake fragments and flaked pieces. Cores, edge ground axes, millstones, grindstones, hammer stones and backed artefacts including backed blades, bondi points, geometric microliths and eloueras also occur though in lower frequencies. In general, the stone artefact assemblage in the area has been relatively dated to what was previously known as the Small Tool Tradition (10,000 years BP). On the basis of stone tool technology, the overwhelming majority of Aboriginal open sites within the region are attributed to the Holocene period. However, at Glennies Creek, north of Singleton, based on radiocarbon dated charcoal and geomorphological evidence it is suggested that artefacts found in the B-horizon may have been deposited between 10,000 and 13,000 BP (Koettig 1986a, 1986b).

2.2.4 SUMMARY OF THE LOCAL ARCHAEOLOGICAL CONTEXT

All archaeological surveys throughout the local area have been undertaken in relation to environmental assessments for developments. The most relevant investigations indicate differing results and observations based on surface visibility and exposure, alterations to the landscape, proximity to water sources and geomorphology.

Previous assessments of the local area (Dallas 1996, Kuskie 2007, 2015, Insite Heritage 2007, MCH 2019, 2021, 2022a, b, 2023a, b) have identified that artefact scatters and isolated finds are the most prominent site type. These assessments have also identified that both landform and distance to water were important factors in past Aboriginal land use with elevated landforms within 50 metres of reliable water to have been the most favoured. The higher the stream order (and more reliable water

source) the higher the numbers of sites and site densities, and both decrease with distance from the water source, and a decrease in stream order. A number of sites were also found on slopes; however, it is likely they were eroded down slope and not found in their original location. All sites were noted to have been disturbed through past landuses including but not limited to clearing, agricultural and pastoral activities, residential developments, utilities, infrastructure and erosion.

The following is a summary of the previous investigations and it is noted that there are various factors which will have skewed the results. Therefore, the summary provides an indication of what may be expected in terms of site location and distribution.

- a wide variety of site types are represented in the project area with open campsites and isolated artefacts by far the most common;
- lithic artefacts are primarily manufactured from mudstone and silcrete with a variety of other raw materials also utilised but in smaller proportions;
- sites in proximity to ephemeral water sources or located in the vicinity of headwaters of upper tributaries (1st order streams) have a sparse distribution and density and contain little more than a background scatter;
- sites located in the vicinity of the upper reaches of minor tributaries (2nd order streams) also have a relatively sparse distribution and density and may represent evidence of localised one-off behaviour;
- sites located in the vicinity of the lower reaches of tributaries (3rd order creeks) have an increased distribution and density and contain evidence that may represent repeated occupation or concentration of activity;
- sites located in the vicinity of major tributaries (4th and 5th order streams/rivers) have the highest distribution and densities. These sites tend to be extensive and complex in landscapes with permanent and reliable water and contain evidence representative of concentrated activity; and
- sites located within close vicinity at the confluence of any order stream may be a focus of activity and may contain a relatively higher artefact distribution and density.

These findings are consistent with models developed for the area.

2.3 SYNTHESIS OF ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXTS

When assessing sites in terms of distance to water, in the Hunter Valley there is a clear pattern of past land uses whereby the majority of high-density sites are situated within 50 metres of reliable fresh water (high order) and reduce in both numbers and densities with a decrease in stream order. Thus, it is apparent that open campsites/isolated finds are most concentrated in number and size within 50 metres of reliable fresh water.

As is to be expected, the majority of sites within 50 metres of water are present on elevated landforms in association with creek lines whilst slopes and crest/ridge formations are also common site locations, although with an absence of reliable fresh water, were used for more transitory activities. The frequent presence of sites on crest/ridges and slopes is also noticeable for sites located over 50 metres from water. Due to the importance of water in the grinding process, it is not surprising that sites of this type are situated close to water. Based on information gained from previous studies, both regionally and locally, and the environmental context, within a two-kilometre radius of our project area, it can be expected that:

- the likelihood of locating sites increases with proximity to available water;

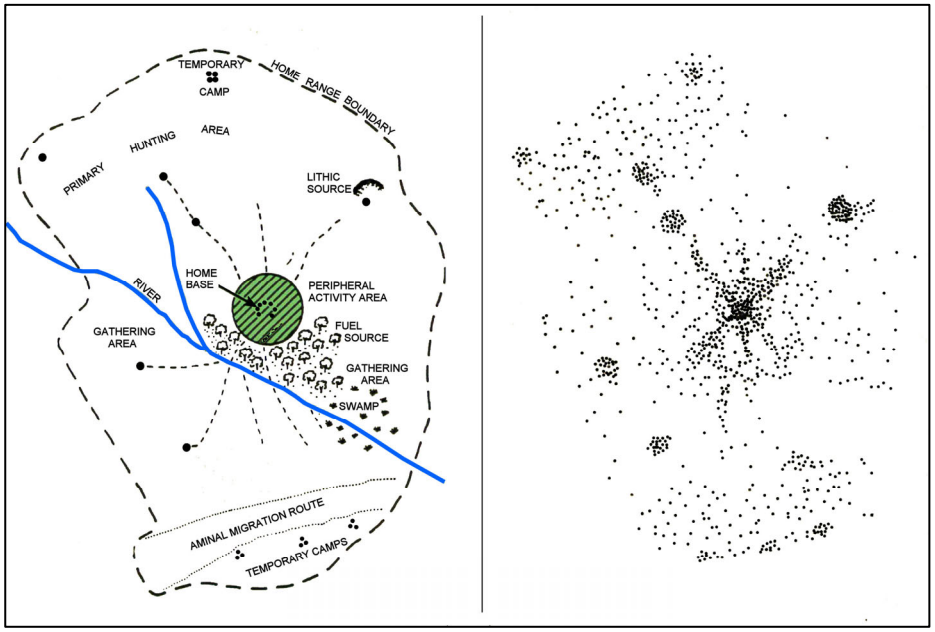
- the likelihood of finding large sites of high densities increases markedly with proximity to reliable water and decreases with a reduction in stream order;
- grinding grooves may be located along or near water sources within sandstone formations;
- a variety of stone artefact types will be located though the majority will be flakes, flaked pieces and debitage;
- a variety of raw materials utilised in stone tool manufacture will be represented, though the majority of sites will be predominated by mudstone and silcrete;
- the likelihood of finding scarred trees is dependent on the level of clearing in an area; and
- the majority of sites will be subject to disturbances including human and natural.

2.4 MODELS OF PAST ABORIGINAL LAND USE

The main aim of this project is to attempt to define both the nature and extent of occupation across the area. As a result, the nature of the analysis will focus on both the landform units and sites. The purpose of this strategy is to highlight any variations between sites and associated assemblages, landforms and resources across the area treating assemblages as a continuous scatter of cultural material across the landscape. In doing this, it is possible to identify variation across the landscape, landforms and assemblages that correspond with variation in the general patterns of landscape use and occupation. Thus, the nature of activities and occupation can be identified through the analysis of stone artefact distributions across a landscape. A general model of forager settlement patterning in the archaeological record has been established by Foley (1981). This model distinguishes the residential 'home base' site with peripheral "activity locations".

Basically, the home base is the focus of attention and many activities and the activity locations are situated away from the home base and are the focus of specific activities (such as tool manufacturing). This pattern is illustrated in Figure 2.9. Home base sites generally occur in areas with good access to a wide range of resources (reliable water, raw materials etc). The degree of environmental reliability, such as reliable water and subsistence resources, may influence the rate of return to sites and hence the complexity of evidence. Home base sites generally show a greater diversity of artefacts and raw material types (which represent a greater array of activities performed at the site and immediate area). Activity locations occur within the foraging radius of a home base camp (approximately 10 km); (Renfrew and Bahn 1991).

Figure 2.9 Foley's model (L) and its manifestation in the archaeological record (R), (Foley 1981).



2.5 MODEL OF OCCUPATION FOR THE LOCAL AREA

Work throughout NSW has aimed to understand the nature of Aboriginal occupation and to identify the nature of past Aboriginal land uses. This theme often aims to identify and explain archaeological patterning in site type, content and distribution. General theories have been developed outlining the relationship between land use patterns and the resulting archaeological evidence. A number of models developed for the region have been reviewed (McBryde 1976; Koettig 1994; Dean-Jones and Mitchell 1993; Rich 1995; Kuskie and Kamminga 2000). All models state that the primary requirements for repeated, concentrated or permanent occupation is access to reliable fresh water. Brief and possible repeated occupation may be represented in areas that have unreliable access to ephemeral water sources, however, these areas will not contain high archaeological evidence or potential (Goodwin 1999).

Kuskie and Kamminga (2000) established a general model of occupation strategies based primarily upon ethnographic research. Used as a starting point, it makes a general set of factors that are consistent with other studies (e.g., McDonald and White 2010, Nelson 1991). The model distinguishes between short-term or extended long-term occupation and makes some predictions about the likely location of different foraging and settlement activities. Combining this information with a review of assemblage contents from a sample of excavated sites within the region, a baseline of settlement activities may be determined (Barton 2001).

The model provides a number of archaeological expectations that may be tested. For example, the presence of features requiring a considerable labour investment (e.g., stone-lined ovens or heat-treatment pits) are likely to occur at places where occupation occurred for extended periods of time. The presence of grindstones is also a reliable indicator of low mobility and extended occupation as seed grinding requires a large investment of time and effort (Cane 1989). In most ethnographic examples, seed grinding is an activity that takes place over an entire day to provide adequate energetic returns (Cane 1989; Edwards and O'Connell 1995).

Where group mobility was high and campsites frequently shifted throughout the landscape, artefact assemblages are not expected to contain elements such as grindstones, heat-treatment pits, ovens and the diversity of implements frequently discarded at places of extended residential occupation. It may also have been the case that the location of particular activities could not be predicted by tool

users, adding to the increased low-density scattering of artefacts over the landscape. Also, if individuals were opting to carry a number of stone tools during hunting and gathering activities and maintaining these tools rather than manufacturing new tools at each task location, the ratio of used tools to unworn flakes in these assemblages should be high. Table 2.2 has been adapted from Kuskie and Kamminga (2000).

Table 2.2 Site descriptions (Kuskie & Kamminga 2000).

Occupation Pattern	Activity Location	Proximity to water	Proximity to food	Archaeological expectations
Transitory movement	all landscape zones	not important	not important	• assemblages of low density & diversity • evidence of tool maintenance & repair • evidence for stone knapping
Hunting &/or gathering without camping	all landscape zones	not important	near food resources	• assemblages of low density & diversity • evidence of tool maintenance & repair • evidence for stone knapping • high frequency of used tools
Camping by small groups	associated with permanent & temporary water	near (within 100m)	near food resources	• assemblages of moderate density & diversity • evidence of tool maintenance & repair • evidence for stone knapping & hearths
Nuclear family base camp	level or gently undulating ground	near reliable source (within 50m)	near food resources	• assemblages of high density &diversity • evidence of tool maintenance, repair, casual knapping • evidence for stone knapping • heat treatment pits, stone lined ovens • grindstones
Community base camp	level or gently undulating ground	near reliable source (within 50m)	near food resources	• assemblages of high density & diversity • evidence of tool maintenance, repair, casual knapping • evidence for stone knapping • heat treatment pits, stone lined ovens • grindstones & ochre • large area >100sqm with isolated camp sites

2.6 PREDICTIVE MODEL FOR THE PROJECT AREA

An archaeological predictive model is established to identify areas of archaeological sensitivity so it can be used as a basis for the planning and management of Aboriginal heritage. It involves reviewing existing literature to identify basic site distribution patters. These patterns are then modified according to the specific environment of the project area to form a predictive model for site location within the current project area. A sampling strategy is then used to test the model and the results of the survey used to confirm, refute or modify the model.

Land-systems and environmental factors are commonly used factors in predictive modelling based on the assumption that they provide distinctive sets of constraints and opportunities that influenced past Aboriginal land use patterns. As land use patterns may differ between zones (due to different environmental conditions), this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence. The predictive model presented here is based on landform units, previous archaeological assessments conducted within the region, distribution of known sites and site densities and traditional Aboriginal land use patterns. Also taken into consideration are land use impacts (both natural and anthropomorphic) that may have resulted in a disturbed landscape and associated archaeological record.

Considering the AHIMS results, local and regional archaeological investigations as well as the environmental context, given that fresh water was necessary for survival and the project area is located over 600 metres from a semi reliable water source, the absence reliable of fresh water indicates the project area and immediate surrounds may have been used no more than hunting and gathering opportunities rather that large-scale long-term camping. Evidence of such past Aboriginal land uses manifest in the archaeological record as low-density artefact scatters and isolated artefacts.

Non-indigenous settlement and land uses have significantly impacted the investigation area, most noticeably from complete clearing, at least one ploughing event for improved pasture and excavation works associated with the construction of structures, car park and houses. These land uses would have impacted on the archaeological record by removing any cultural materials that may have been present in the project area.

The presence of past Aboriginal people and their use of the landscape are undeniable and evidence is seen in the cultural materials that have survived both natural and human landuses since colonisation of the area in the 1800's. Whilst it is clear Aboriginal people lived across the landscape, the evidence will have been impacted and/or destroyed through such land uses.

The site types that may have been be present within the project area include very low-density artefact scatters and, or isolated artefacts, both of which are described below.

- **Artefact scatters**

Also described as open campsites, artefact scatters and open sites, these deposits have been defined at two or more stone artefacts within 50 metres of each other and will include archaeological remains such as stone artefacts and may be found in association with camping where other evidence may be present such as shell, hearths, stone lined fire places and/or heat treatment pits. These sites are usually identified as surface scatters of artefacts in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing, grazing) and access ways can also expose surface campsites. Artefact scatters may represent evidence of;

- Large camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of such tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;
- Medium/small camp sites, where activities such as minimal tool manufacturing occurred;
- Hunting and/or gathering events;
- Other events spatially separated from a camp site, or
- Transitory movement through the landscape.

Artefact scatters are a common site type in the locality and the broader region. There is potential for artefact scatters to occur within the project area. However, there is also the potential for such sites to be impacted on through past land uses.

- **Isolated finds**

Isolated artefacts are usually identified in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface artefacts. Isolated finds may represent evidence of;

- Hunting and/or gathering events; or
- Transitory movement through the landscape.

Isolated finds are a common site type in the locality and the broarder region. There is potential for isolated artefacts to occur across the project area and across all landforms. There is also the potential for such sites to be impacted on through past land uses.

3 RESULTS AND DISCUSSION

To comply with the due diligence requirement that a visual inspection of the project area be undertaken, an archaeological survey across the project area was undertaken by MCH archaeologist Dr. Penny McCardle on 19th January 2024. The survey focused on areas of high ground surface visibility and exposures (erosional features, tracks, cleared areas).

3.1 SURVEY UNITS

The project area, consisting a gentle slope was surveyed as one survey unit based on landform elements (following McDonald *et al* 1984). The survey identified that the project area had been previously cleared and ploughed as evidenced by the presence of eroded ridges and furrows. Additionally, The Regal Inn was located in the north eastern section of the project area, a house in the southern paddock and another in the western paddock. The open paddocks consisted of grass with some tees scattered and the north western paddock currently used or grazing. Visibility was hindered by structures and grass cover and exposures included tracks and erosion. Examples of the project area are provided in Figures 3.1 to 3.6.

Figure 3.1 Southern paddock (facing south)

Figure 3.2 Southern house (facing north)

Figure 3.3 Southern end of the western paddock (facing north west)

Figure 3.4 Eastern side of the western paddock (facing west)

Figure 3.5 Western side of the eastern paddock (facing east)

Figure 3.6 Middle of the eastern paddock (facing north)

The effectiveness of the survey for both obtrusive and unobtrusive archaeological sites, is determined though ground surface visibility and exposures across the project area. Ground surface visibility is used to define the degree to which the surface of the ground can be observed and can be influenced by natural processes, such as the nature and type of vegetation cover, erosion, or land use practices (e.g., ploughing or grading). Existing exposures (visible at the time of the survey) are described in terms of the natural erosion processes responsible for its creation and any other contributing or primary processes (e.g., ploughing, stocking, machinery cutting, vehicle tracks, any ground disturbances). As shown in Table 3.1 the total effective coverage for the project area is 14,007 m^2, or 21% reflecting the low to moderate surface visibility due to vegetation and structures.

Table 3.1 Effective coverage for the investigation area

SU	Landform	Area (m2)	Vis. %	Exp. %	Exposure type	Previous disturbances	Present disturbances	Limiting visibility factors	Effective coverage (m2)
1	slope	66,700	35%	60%	erosion, tracks	clearing, excavation/ construction, ploughing	residential, business, grazing	vegetation, structures, car park	14,007
Totals		**66,700**							**14,007**
								Effective coverage %	**21.00%**

The level and nature of the effective survey coverage is considered satisfactory to provide an effective assessment of the project area. The coverage was comprehensive for obtrusive site types (e.g., grinding grooves and scarred trees) but somewhat limited for the less obtrusive surface stone artefact sites by surface visibility constraints that included vegetation cover and minimal exposures.

In relation to land uses and the associated impacts on the landscape and any cultural materials that may have been present, the project area has been subject to complete clearing, at least one p[ploughing event for grazing, construction works for the Taven and car park in the north east as well as housing and structures along the western border and the associated infrastructure (access, driveways, gardens) and utilities and as indicated in Table 3.2, these disturbances range from minor to high.

Table 3.2 Land use scale (CSIRO 2010) and land uses in the project area

Minor disturbance		Project area	Moderate disturbance		Project area	Major disturbance		Project area
0	No effective disturbance; natural		3	Extensive clearing (e.g., poisoning and ringbarking		6	Cultivation: grain fed	
1	No effective disturbance other than grazed by hoofed animals		4	Complete clearing: pasture native or improved, but never cultivated	whole	7	Cultivation: irrigated, past and present	
2	Limited clearing (e.g., selected logging)		5	Complete clearing: pasture native or improved, cultivated at some stage		8	Highly disturbed: e.g., quarry, road works, mining, landfill, urban	part

3.2 ARCHAEOLOGICAL SITES AND ARCHAEOLOGICAL SENSITIVITY

No sites or areas of potential archaeological sensitivity were identified in the project area. This lack of identification is attributed to previous land uses, such as clearing, ploughing, grazing, and the construction of structures, which have impacted the project area. Furthermore, the project area's distance from reliable fresh water and resources suggests that it may have been primarily used for transient activities rather than long-term camping. Past Aboriginal land use is indicated by a scattered presence of discarded artifacts in the archaeological record, which have likely been disturbed or destroyed by previous land uses.

Based on the results obtained from predictive modelling, effective coverage, and disturbance rating, the survey provides a valid basis for determining the probable impacts of the proposal and formulating recommendations for the project. The absence of Aboriginal objects within the project area aligns with findings from other studies conducted in similar environmental contexts in the local area.

3.3 CONCLUSION

The presence of water has been widely recognized as a key factor in the past occupation of the area, as evidenced by the significant decrease in the number of sites located further away from water sources. Most sites were found within a 50-meter proximity to tributaries. The project area is located approximately 660 metres from a 4th order creek and associated subsistence resources. The project area was unsuitable for sustained camping but may have been utilised for transitory movement or hunting/gathering activities only.

Regarding modern landscape alterations, it is expected that previous extensive clearing, at least one ploughing event for grazing purposes, and construction activities associated with structures, infrastructure, and utilities have had moderate to high impacts on the archaeological record. Additionally, natural factors like erosion have also played a role in displacing cultural materials. As a result, the likelihood of finding cultural materials in their original location (in situ) is very low.

4 ASSESSMENT OF IMPACTS

The archaeological record is a non-renewable resource that is affected by many processes and activities. As outlined in Section 2 and Section 3, the various natural processes and human activities have impacted on archaeological deposits through both site formation and taphonomic processes.

4.1 IMPACTS

The Heritage NSW Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (2010:21) describes impacts to be rated as follows:

1) Type of harm: is either direct, indirect or none
2) Degree of harm is defined as either total, partial or none
3) Consequence of harm is defined as either total loss, partial loss, or no loss of value

As no sites or PADs were identified, there are no impacts on the archaeological record.

5 MITIGATION AND MANAGEMENT STRATEGIES

Specific strategies, as outlined through the Heritage NSW Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010b), the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011), and the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW 2010c), are considered below for the management of the identified site(s) within the project area.

5.1 CONSERVATION/PROTECTION

Conservation is the first avenue and is suitable for all sites, especially those considered high archaeological significance and/or cultural significance. Conservation includes the processes of looking after an indigenous site or place so as to retain its significance and managed in a way that is consistent with the nature of peoples' attachment to them.

As no sites or PADs were identified conservation/protection is not required.

5.2 FURTHER INVESTIGATION

An Aboriginal Heritage Impact Permit (AHIP) is no longer required to undertake test excavations (providing the excavations are in accordance with the Code of Practice for Archaeological Investigations in NSW). Subsurface testing is appropriate when a PAD has been identified, and it can be demonstrated that sub-surface Aboriginal objects with potential conservation value have a high probability of being present, and that the area cannot be substantially avoided by the proposed activity.

As no sites or PADs were identified further investigations are not justified.

5.3 AHIP

If harm will occur to an Aboriginal object or Place, then an AHIP should be sought from Heritage NSW, Department of Premier & Cabinet as a defence to that harm. If a systematic excavation of the known site could provide benefits and information for the Aboriginal community and/or archaeological study of past Aboriginal occupation, a salvage program, and, or community collection, may be an appropriate strategy to enable the salvage of cultural objects.

As no sites or PADs were identified an AHIP is not required.

6 RECOMMENDATIONS

6.1 GENERAL

1) The persons responsible for the management of onsite works will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Regulation 2019, under the National Parks and Wildlife Act 1974;

2) An Unexpected Finds Procedure (Appendix B) will be implemented during all works,

3) Should any Aboriginal objects be uncovered during works, all work will cease in that location immediately, the Unexpected Finds Procedure followed and the Environmental Line contacted.

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APPENDIX A

AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Tenambit

Client Service ID : 854438

Penny Mccardle

Po Box 166

Adamstown New South Wales 2289

Attention: Penny Mccardle

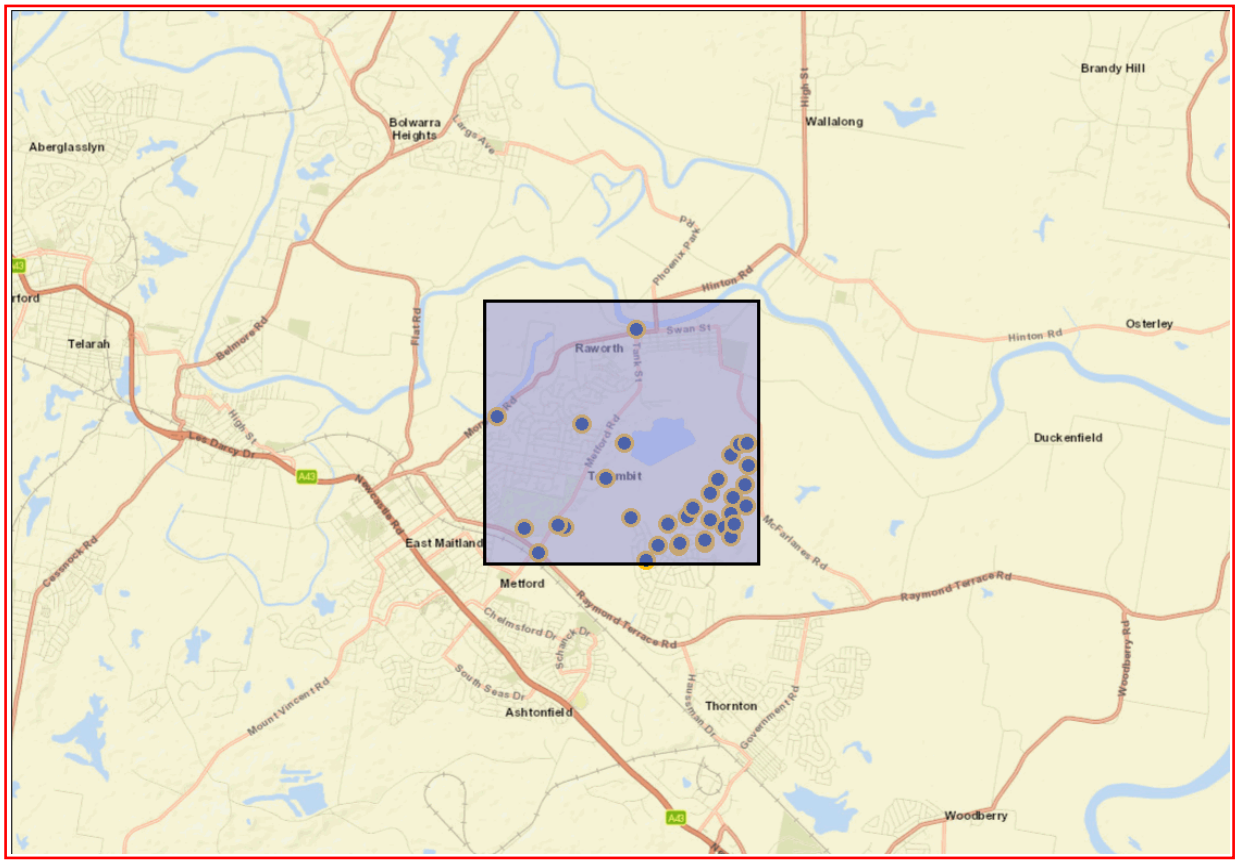
Email: penny@mcheritage.com.au

Date: 15 January 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 368800.0 - 372800.0, Northings : 6374900.0 - 6378800.0 with a Buffer of 0 meters, conducted by Penny Mccardle on 15 January 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

34	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Tenambit

Client Service ID : 854438

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-4-1730	TB22	GDA	56	372463	6375885	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	South East Archaeology					**Permits**	3875	
38-4-1054	TV1 (Thornton Vets 1)	GDA	56	372240	6376160	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Peter Kuskie					**Permits**		
38-4-1734	TB14	GDA	56	372353	6375445	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Peter Kuskie,South East Archaeology					**Permits**	3875	
38-4-0884	Thornton North 2 (TN2)	AGD	56	371950	6375000	Open site	Valid	Artefact : 1		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2880,2881,3341	
38-4-0943	Thornton North 3 (TN3)	AGD	56	371950	6375050	Open site	Valid	Artefact : 3		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2880,2881,3341	
38-4-1959	MET/2	GDA	56	370587	6376155	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	MCH - McCardle Cultural Heritage Pty Ltd,MCH - McCardle Cultural Heritage Pty Lt					**Permits**		
38-4-1052	TV5 (Thornton Vets 5)	GDA	56	371790	6375590	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Peter Kuskie					**Permits**		
38-4-0803	Thornton North 8 - TN 8	AGD	56	372030	6375350	Open site	Valid	Artefact : -		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2113,2509,2880,2881,3341	
45-7-0375	RPS CHISHOLM PAD01	GDA	56	372666	6375765	Open site	Destroyed	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	RPS AAP Consulting Pty Ltd - Hamilton,RPS AAP Consulting Pty Ltd - Hamilton,RPS					**Permits**	4546	
38-4-0396	Morpeth STW Camp Site;	AGD	56	370750	6376500	Open site	Valid	Artefact : -	Open Camp Site	3835
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists (MDCA)					**Permits**		
38-4-0944	Thornton North 13 (TN13)	AGD	56	371090	6374740	Open site	Valid	Artefact : 18		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2468,2592,2880,2881,3341,3642	
38-4-1053	TV3 (Thornton Vets 3)	GDA	56	371880	6375720	Open site	Valid	Artefact : 2		
	Contact	**Recorders**	Mr.Peter Kuskie					**Permits**		
38-4-1957	RPS CHISHOLM AS01	GDA	56	372645	6376085	Open site	Destroyed	Artefact : 1		
	Contact	**Recorders**	RPS AAP Consulting Pty Ltd - Hamilton,RPS AAP Consulting Pty Ltd - Hamilton,RPS					**Permits**	4546	
38-4-1731	TB21	GDA	56	372688	6376367	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Peter Kuskie,South East Archaeology					**Permits**	3875	
38-4-0364	Tenambit 3;	AGD	56	369880	6375220	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Ms.Jill Ruig					**Permits**		

Report generated by AHIMS Web Service on 15/01/2024 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 368800.0 - 372800.0, Northings : 6374900.0 - 6378800.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 34

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Tenambit

Client Service ID : 854438

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
38-4-1727	TB23	GDA	56	372427	6376520	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Peter Kuskie,South East Archaeology					**Permits**	3875	
38-4-1728	TB25	GDA	56	372556	6376682	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	South East Archaeology					**Permits**	3875	
38-4-0978	Thornton North PAD 1	AGD	56	371564	6374950	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact Searle	**Recorders**	Ms.Penny Mccardle					**Permits**	2509	
38-4-0363	Tenambit_2;	AGD	56	369780	6375250	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Ms.Jill Ruig					**Permits**		
38-4-1137	Metford Road 1	GDA	56	370216	6376964	Open site	Valid	Artefact : 1		101247
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**	3018	
38-4-1040	linuwel 1	GDA	56	368964	6377060	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
38-4-2285	CH/1	GDA	56	372125	6375947	Open site	Valid	Artefact : -		
	Contact	**Recorders**	MCH - McCardle Cultural Heritage Pty Ltd,Ms.Penny Mccardle					**Permits**		
38-4-0886	Thornton Beechwood 15	AGD	56	372390	6375260	Open site	Valid	Artefact : 1		103380
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	3875	
38-4-1732	TB17	GDA	56	372440	6375642	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Peter Kuskie,South East Archaeology					**Permits**	3875	
38-4-1729	TB26	GDA	56	372668	6376705	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	South East Archaeology					**Permits**	3875	
38-4-0688	Metford Road PAD	AGD	56	369498	6374833	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Ms.Meaghan Russell					**Permits**	1679,1971,2004	
38-4-0988	Hunter River Morpeth	AGD	56	370900	6378200	Open site	Valid	Hearth : -, Non-Human Bone and Organic Material : -, Potential Archaeological Deposit (PAD) : -, Shell : -		

Report generated by AHIMS Web Service on 15/01/2024 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 368800.0 - 372800.0, Northings : 6374900.0 - 6378800.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 34

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Tenambit

Client Service ID : 854438

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact T Russell	**Recorders**	Rebecca Simon					**Permits**		
38-4-0942	Thornton North 7 (TN7)	AGD	56	371410	6375280	Open site	Valid	Artefact : 20		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2509,2880,2881,3341	
38-4-0887	Thornton Beechwood 11	AGD	56	372340	6375110	Open site	Valid	Artefact : 1		103380
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	3875	
38-4-1733	TB16	GDA	56	372495	6375495	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Jason Barr					**Permits**	3875	
38-4-0362	Tenambit;	AGD	56	369290	6375200	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Ms.Jill Ruig					**Permits**		
38-4-1844	MET/1	GDA	56	370960	6375567	Open site	Valid	Artefact : -		
	Contact	**Recorders**	MCH - McCardle Cultural Heritage Pty Ltd,Ms.Penny Mccardle					**Permits**	4389	
38-4-0945	Thornton North 12 (TN12)	AGD	56	371260	6374960	Open site	Valid	Artefact : -		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2880,2881,3341	
38-4-0804	Thornton North 9 - TN9	AGD	56	371580	6375000	Open site	Valid	Artefact : -		100914
	Contact T Russell	**Recorders**	Mr.Peter Kuskie					**Permits**	2113,2509,2880,2881,3341	

**** 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 15/01/2024 for Penny Mccardle for the following area at Datum :GDA, Zone : 56, Eastings : 368800.0 - 372800.0, Northings : 6374900.0 - 6378800.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 34

APPENDIX B

Unexpected finds procedure

Unexpected finds procedures

Unexpected find protocols have been developed to provide procedures for unexpected finds including Aboriginal objects and the discovery of human remains. These protocols must be followed throughout all stages of the development.

Unexpected Aboriginal objects

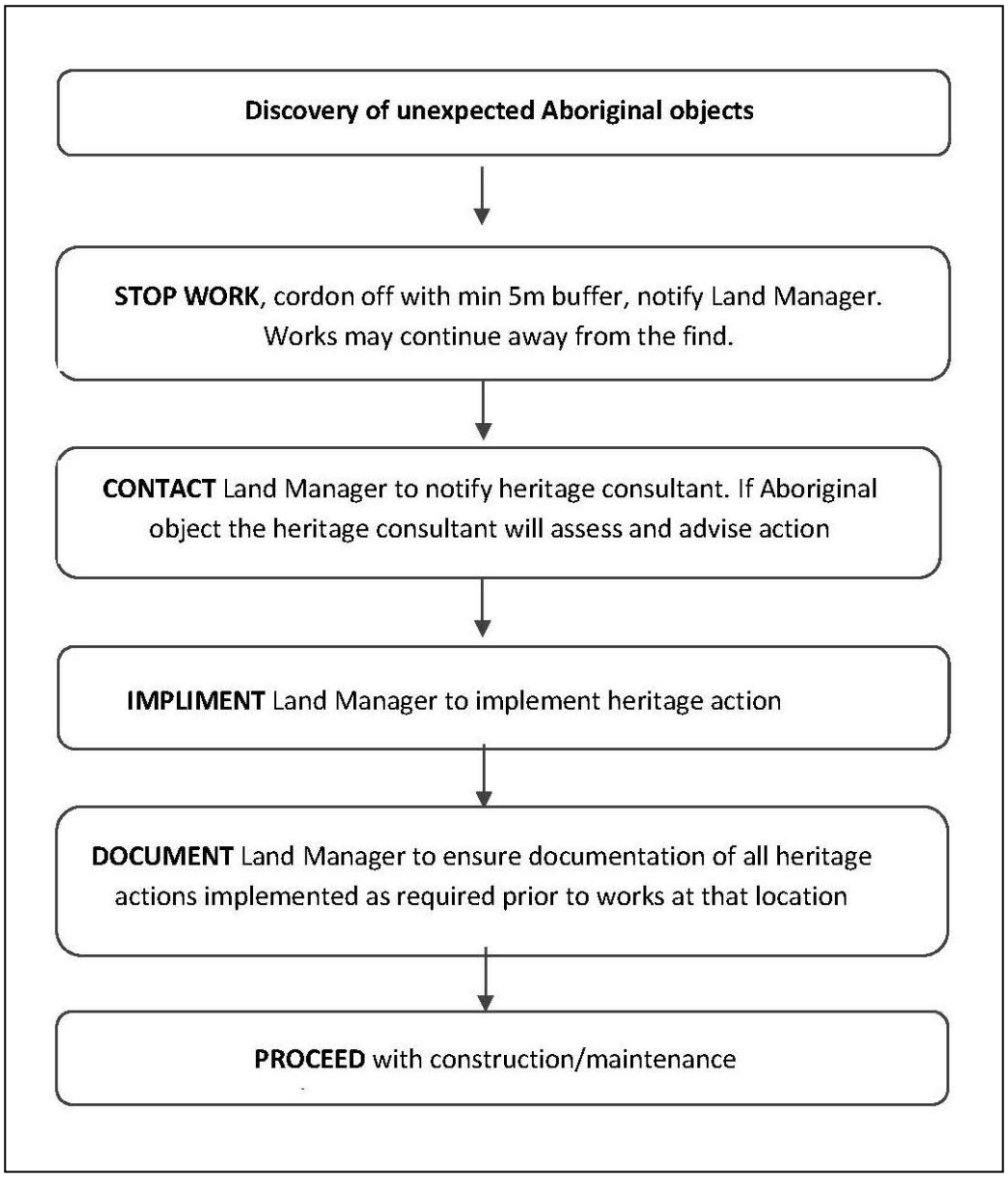
Should unexpected Aboriginal objects be uncovered during any stage of the development, Figure 1 illustrates the protocols. Unexpected Aboriginal objects may include, but not limited to, isolated artefacts, artefact scatters, scarred trees, hearths and shell middens (descriptions of such objects are provided).

Work must stop immediately in that location, the objects cordoned off with at least a 5m perimeter surrounding the object(s) with high visibility fencing/barrier and the Land Manager notified immediately. The Land Manager will then contact the heritage consultant who will assess the object(s) and recommend appropriate mitigation measures, inlcuding contacting the Environmental Line if required. The Land Manager is to implement all reasonable mitigation measures recommended by the heritage consultant and in accordance with Heritage NSW regulations and the NSW NPW Act.

If additional works are required, such as an Aboriginal Cultural Heritage Assessment (ACHA) with or without est excavations) or an Aboriginal Heritage Impact Permit (AHIP) (with collection or salvage excavations), the Land Manager is to arrange for the heritage consultant to undertake those works in accordance with all Heritage NSW requirements, procedures and Code of Practice. The methodology for undertaking additional works will be dependant on a number of factors including, but not limited to, site/object type and disturbances. Due to the unknown nature of unexpected objects, methodologies for furthe investigatiosn (if required) of unexpected Aboriginal objects will be determined during consultation with Heritage NSW.

Provided these heritage unexpected finds protocols have been followed, construction/maintenance works in that location may proceed.

Figure 1. Unexpected finds protocol flow chart



Discovery of human remains

Human skeletal remains are of the highest significance and importance to Aboriginal people, and all care, respect and dignity will be extended by all parties should human remains be uncovered.

If human remains or unidentified bone are uncovered during any stage of the development and maintenance activities, the appropriate State legislation will be followed. All human remains fall under the *Coroners Act 2009* in the first instance. If they are identified as Aboriginal and older than 100 years old, they will fall under the *NSW NPWS Act 1974* (as amended). If they are identified as Aboriginal and 100 years or less, they will remain under Police derestriction under the *Coroners Act 2009*. Figure 2 outlines the required protocols should human remains be uncovered.

Should any human remains or unidentifiable bone be found, work is to stop in that area immediately and an area of 15m cordoned off surrounding the remains/bone in high visibility fencing. The Land Manager is to be notified immediately.

The Land Manager will contact the heritage consultant and local NSW Police immediately, who will then contact the NSW Forensic Services who will determine if they are:

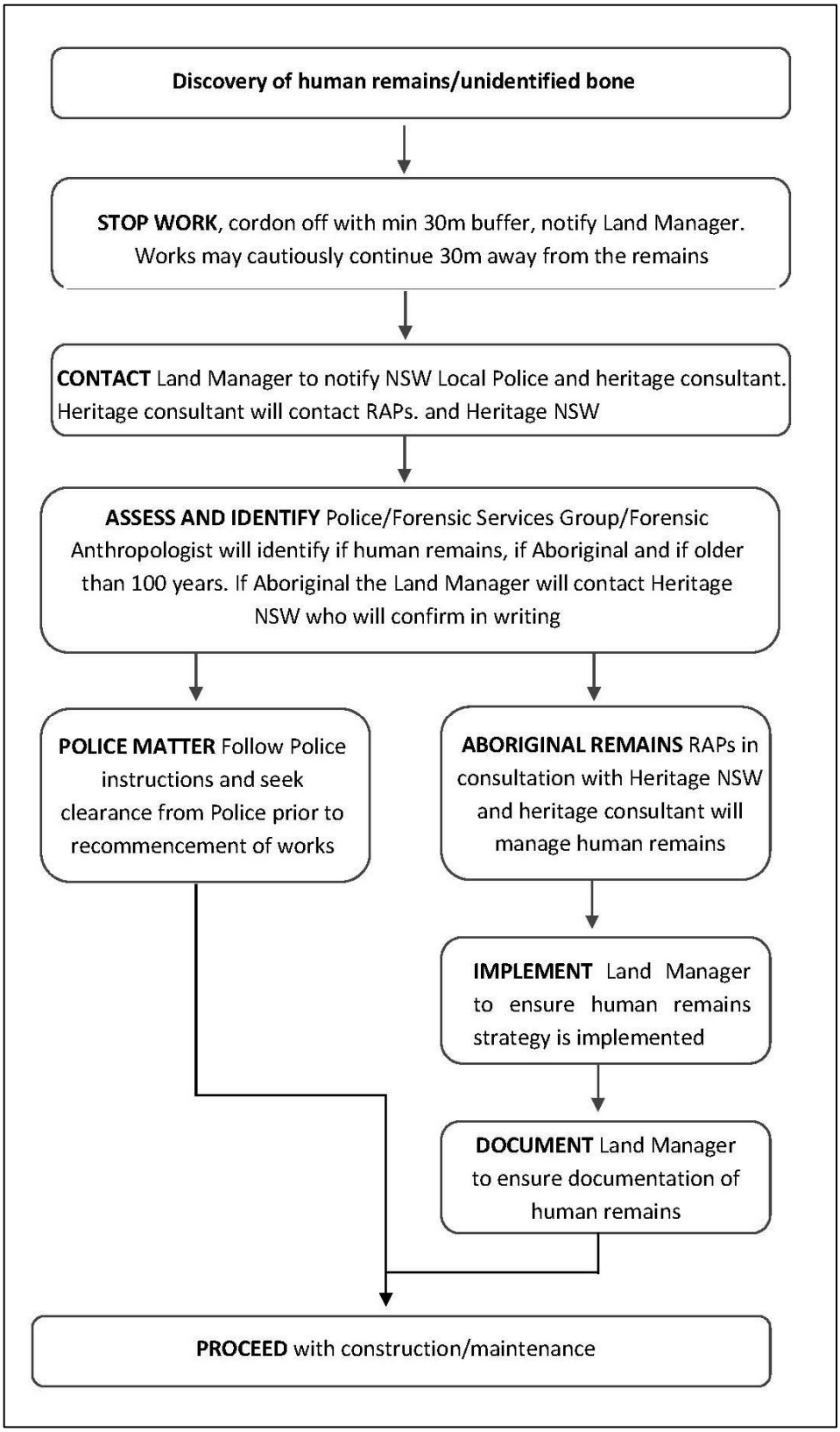
1) Human;
2) Aboriginal or non-Aboriginal;
3) If Aboriginal, determine antiquity (older or younger than 100 years)

If it is determined the remains are Aboriginal and older than 100 years old, the Police will notify the Land Manager who must contact the Environmnetal Line and Heritage NSW immediately. Heritage NSW, in consultation with the relevant Aboriginal community and the heritage consultant will develop a human remains management strategy and the Land Manager is to ensure this strategy is implemented. The Land Manager must also document the human remains management strategy and the heritage consultant will provide a letter of clearance prior to any works recommencing at that location.

If the remains are determined to be a Police matter, Police instructions will be followed and clearance to recommence works should be sought from the Police.

Provided the human skeletal protocols have been followed and documented, and a clearance letter from the heritage consultant has been obtained, construction/maintenance works may proceed in that location.

Figure 2 Human remains protocol flow chart



Verification of all Aboriginal objects (sites)

All potential Aboriginal sites will be verified by the heritage consultant in the first instance, and Heritage NSW if required.

The purpose of the verification process is to determine whether or not the objects in question are in fact Aboriginal objects to ensure appropriate management measures be implemented.

The verification process will include the following provisions:

1. A heritage consultant may assess the scientific status of the Aboriginal object (site) and provide evidence and justification for significance;
2. If it is an Aboriginal object the Environmental Line will be contacted and the site reported;
3. An AHIMS site card will be completed for each Aboriginal object (site); and
4. Management recommendations specific to each Aboriginal object (site), will be determined by Heritage NSW.

Surface Artefact scatters

Also described as open campsites, artefact scatters and open sites, these deposits have been defined at two or more stone artefacts within 50 or 200 metres of each other and may include archaeological remains such as stone artefacts, shell, and sometimes hearths, stone lined fire places and heat treatment pits. These sites are usually identified as surface scatters of artefacts in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface campsites. Artefact scatters may represent evidence of;

- Camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of such tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;
- Hunting and/or gathering events;
- Other events spatially separated from a camp site, or
- Transitory movement through the landscape.

If a potential artefact scatter has been identified, the Unexpected Finds Protocol must be followed immediately.

Examples of artefact scatters (MCH)

Surface Isolated finds

Isolated artefacts are usually identified in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface artefacts. Isolated finds may represent evidence of;

- Hunting and/or gathering events; or
- Transitory movement through the landscape.

If a potential isolated find has been identified, the Unexpected Finds Protocol must be followed immediately.

Examples of isolated artefacts (MCH)