Oakdale East: 224-398 Burley Road, Horsley Park

Archaeological Survey Report

Report to Goodman Group

Fairfield Local Government Area

March 2019

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EXECUTIVE SUMMARY

Brickworks Land & Development (Austral Bricks Co Pty Ltd) are proposing to develop a portion of 224-398 Burley Road, Horsley Park. The proposal is to construct a masonry plant and five warehouses for generic and distribution uses at its existing facility. The proposal is designated development under Part 4, Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*. Secretary's Environmental Assessment Requirements (SEARs) (1255) have been issued for the preparation of an Environmental Impact Statement (EIS).

The requirements in the SEARs are to assess the potential Aboriginal and non-Aboriginal heritage within the project area, to assess potential impacts of the proposed development and develop appropriate measures to avoid, minimise, mitigate and or manage the potential impacts, if required.

Artefact Heritage Services Pty Ltd (Artefact Heritage) have been engaged by Goodman Property Services (Australia) Pty Limited (Goodman), c/o Brickworks Land & development, to undertake an Aboriginal Heritage Assessment (ASR) for the proposed development. This report will identify any likely impacts to potential Aboriginal archaeology and proposed management and mitigation measures. A Heritage Impact Statement (HIS) will be provided separately to meet the remaining heritage requirements.

Overview of findings

- No Aboriginal archaeological site or areas of PAD are located within the area to be impacted by the proposed development.
- One Aboriginal site (OE AS1) (AHIMS ID pending) containing an artefact scatter and potential archaeological deposit was identified adjacent to Reedy Creek on the eastern boundary of the study area.

Recommendations

- No further investigation is required for the proposed development area as it is considered to be of nil to low archaeological sensitivity.
- If changes are made to the concept design that may result in impacts to the identified aboriginal site (OE AS1) (AHIMS ID pending) and area of archaeological sensitivity along the Reedy Creek corridor then further archaeological assessment and investigations would be required. This would require test excavations to investigate the archaeological potential and an Aboriginal Cultural Heritage Assessment and consultation with the Aboriginal community to address the cultural values and to support the application for an Aboriginal Heritage Impact Permit (AHIP).
- Where changes to the scope of the proposal result in impacts beyond the extent of the study area, further archaeological survey and addendum ASR reporting may be required
- An unexpected finds policy should be implemented, with the following conditions:
  - Stop work within the affected area, protect the potential archaeological find, and inform environment staff or supervisor.
  - Contact a suitable qualified archaeologist to assess the potential archaeological find.

  - If Aboriginal archaeological material is identified, works in the affected area should cease, and the OEH should be informed. Further archaeological mitigation may be required prior to works recommencing.
- If human remains are found or disturbed in, on or under the land, you must:
  - not further disturb or move these remains
  - immediately cease all work at the particular location
  - notify NSW Police
  - notify OEH (formerly DECCW's) Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location
  - not recommence any work at the particular location unless authorised in writing by OEH.

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ABBREVIATIONS

ACHAR	Aboriginal Cultural Heritage Assessment Report
AHC	Australian Heritage Council
AHIP	Aboriginal Heritage Impact Permit
AHIMS	Aboriginal Heritage Information Management Systems
ALR	*Aboriginal Land Rights Act 1983*)
Artefact Heritage	Artefact Heritage Services Pty Ltd
ASR	Archaeological Survey Report
ATSIHP Act	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
BP	Before Present (that is 1950)
Code of Practice	Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales
CHL	Commonwealth Heritage List
Consultation Requirements	Aboriginal cultural heritage consultation requirements for proponents 2010
DA	Development Application
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water (now OEH)
Due Diligence Code of Practice	Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales
EPA	Environmental Protection Agency
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Diversity Conservation Act 1999*
EIS	Environmental Impact Statement
GPS	Global Positioning System
Guide	Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW
ha	hectares
HIS	Heritage Impact Statement
km	kilometres
LALC	Local Aboriginal Land Council

LEP	Local Environmental Plan
LGA	Local Government Area
m	metres
mm	millimetres
NHL	National Heritage List
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
RNE	Register of the National Estate
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SU	Survey Unit

1.0 INTRODUCTION

1.1 Background

Brickworks Land & Development (Austral Bricks Co Pty Ltd) are proposing to develop a portion of 224-398 Burley Road, Horsley Park. The proposal is to construct a masonry plant and five warehouses for generic and distribution uses at its existing facility. The proposal is both Designated Development and Integrated Development under Part 4, of the *Environmental Planning and Assessment Act 1979* and an Environmental Impact Statement (EIS) is required to be prepared for the development application (DA).

Secretary's Environmental Assessment Requirements (SEARs) (1255) have been issued for the preparation of the EIS and stipulate that it must include:

> *an assessment of the potential impacts of the proposed development on the existing environment) and develop appropriate measures to avoid, minimise, mitigate and or manage these potential impacts.*

The existing environment includes Aboriginal and non-Aboriginal heritage cultural heritage.

Goodman Group (Goodman) (the proponent) has been engaged to assist in meeting the requirements for the EIS. Goodman engaged Artefact Heritage Services Pty Ltd (Artefact Heritage) to prepare an assessment of the potential Aboriginal and non-Aboriginal cultural heritage values for the proposal.

This Archaeological Survey Report (ASR) has been prepared to support the EIS for the proposed development at 224-398 Burley Road, Horsley Park (the study area). The Heritage Impact Statement (HIS) will be provided in separate reports to meet the remaining heritage requirements of SEARs 1255.

1.2 Study area

The Oakdale East study area is approximately 30 hectares, consisting of land contained within Lot 1 DP843901 within the Fairfield Local Government Area (LGA). The study area is located within the suburb of Horsley Park, in the Parish of Melville and County of Cumberland. The study area is bound by Old Wallgrove Road to the west, Burley Road to the south, Reedy Creek to the east and the remainder of Lot 1 DP 843901 to the north (Figure 1.1).

1.3 Description of works

The proposal is for designated development for the construction and operation of a masonry plant (Concrete Works) and five warehouses for generic and distribution uses at its existing facility. The development has production capacity of 220,000 tonnes per annum.

The proposal involves the development of the western portion of 224-398 Burley Road, Horsley Park. The concept design (Figure 1.2) includes the following:

- Initial bulk earthworks: to create broad, flat, developable hardstand areas.
- Civil works: including internal access roads, parking areas, basins, retaining walls and services.
- Building works: Construction of five warehouses within new subdivision area.

1.4 Study scope and objectives

This ASR has been prepared in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (Code of Practice) (Department of Environment, Climate Change & Water [DECCW] 2010a).The scope of this project is to undertake an Aboriginal archaeological survey in conjunction with representatives from Deerubbin Local Aboriginal Land Council (Deerubbin LALC) to locate and identify Aboriginal sites and objects or areas of potential archaeological deposit (PAD) and provide recommendations in an ASR for mitigation to Aboriginal archaeological and cultural heritage values or where required recommendations for further assessment.

The objectives of this study are to provide an ASR which:

- Assesses the Aboriginal cultural heritage values of the study area in accordance with the Code of Practice
- Identifies Aboriginal archaeological and cultural heritage values that may be impacted by the proposed works
- Identifies any further investigations, and mitigation and management measures that may be required, should the project proceed.

This report includes:

- A description of the project and the extent of the study area
- An archaeological significance assessment of the study area
- A description of the statutory requirements for the protection of Aboriginal heritage
- An impact assessment for recorded Aboriginal sites and areas of archaeological potential
- Provision of measures to avoid, minimise, and if necessary, offset the predicted impacts on Aboriginal heritage values.

1.5 Consultation

Consultation with Deerubbin LALC has been conducted throughout preparation of this report. Steven Randall (Aboriginal Site Officer, Deerubbin LALC) took part in the archaeological survey of the study area.

Consultation was conducted in accordance with the requirements of the SEARs (1255), with the identified relevant government agencies. The Office of Environment & Heritage (OEH) and Environmental Protection Agency (EPA). A record of consultation is summarised in Table 1.1:

Table 1.1 Consultation requirements for SEARs

Agency	Consultation
Environment Protection Authority	The EPA was contacted on the 16 August 2018 by the Department of Planning and Environment. The purpose was to request requirements for the Environmental assessment (EA) regarding the proposal for the study area. A response was sent by the EPA on the 30 August 2018: *'…this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage.'*
Office of Environment & Heritage	The OEH, Greater Sydney Region Planning Unit was contacted on the 16 August 2018 by the Department of Planning and Environment. The purpose was to request requirements for the Environmental assessment (EA) regarding the proposal for the study area. A response was sent by the OEH on the 31 August 2018: *'…Please be advised that the Greater Sydney Planning Team, OEH has no comments at this stage.'* Following the completion of the survey the OEH was contacted by Artefact Heritage on the 31 October 2018. Information was provided to them of the findings of the assessment and provided them the opportunity to comment on the assessment's findings. No response has yet been received.

1.6 Limitations

Only the area within the provided disturbance boundary was surveyed for Aboriginal objects and sites. Areas outside the study area were not assessed for Aboriginal objects or archaeological potential.

1.7 Authorship

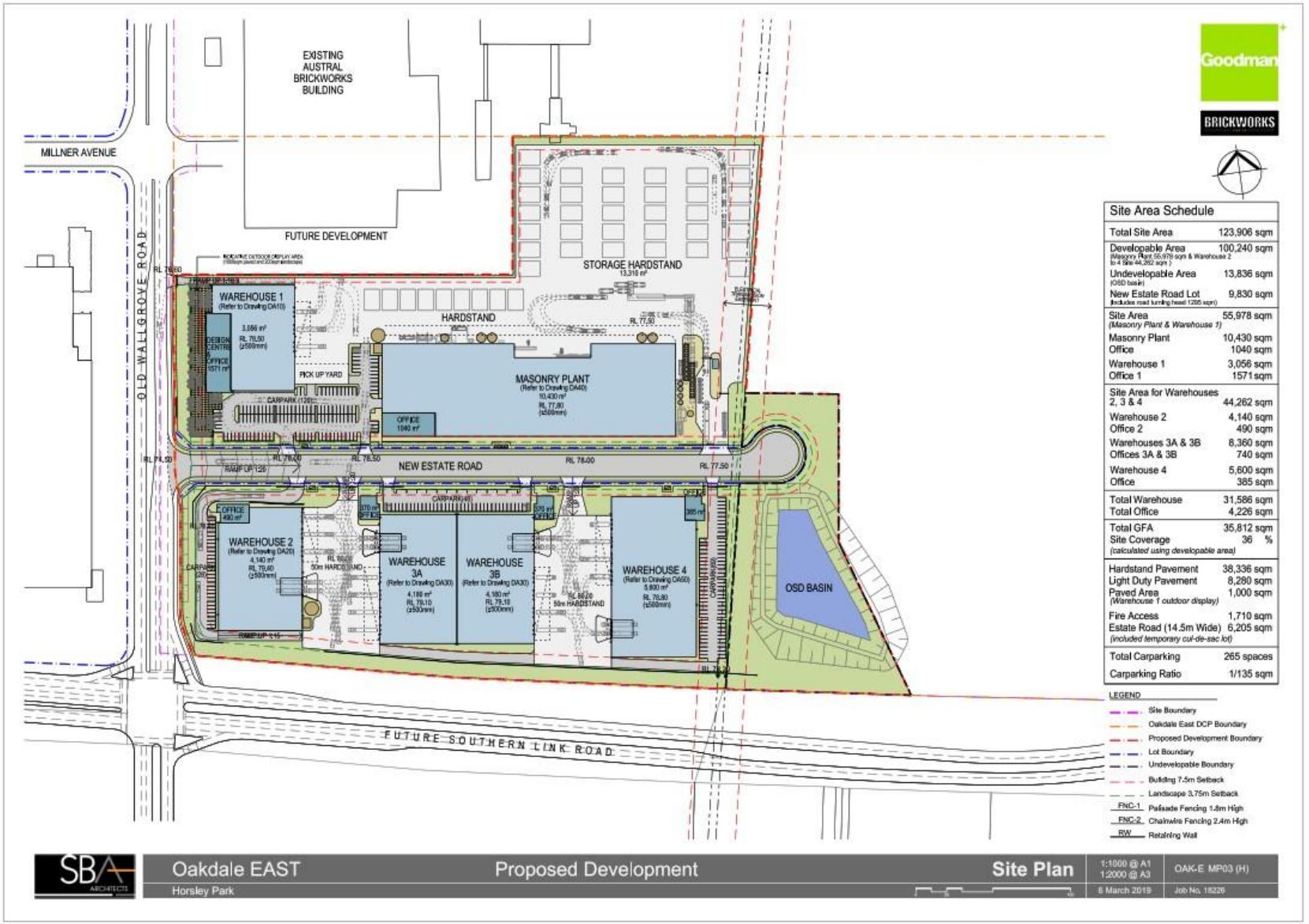
This report was prepared by Jennifer Norfolk (Heritage Consultant, Artefact Heritage), with management input and review from Vanessa Edmonds (Principal, Artefact Heritage).

Vanessa has graduate and post graduate qualifications in Aboriginal archaeology and palaeoanthropology and over 30 years of experience in cultural heritage management throughout Australia. Vanessa is a Full Member of the Australian Association of Consulting Archaeologists Inc.

Jennifer has a Master's degree in Archaeology and has five years' experience in Aboriginal cultural heritage management in NSW.

Figure 1.1: Location of the study area

Figure 1.2: Proposed plans (Source: Goodman March 2019)



2.0 LEGISLATIVE CONTEXT

2.1 State legislation

2.1.1 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal Places and objects. An Aboriginal object is defined by the NPW Act as:

> *any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.*

An Aboriginal Place is declared by the Minister, under Section 86 of the NPW Act, in recognition of its special significance with respect to Aboriginal culture. However, areas are only gazetted as Aboriginal Places if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is of special significance to Aboriginal culture. Aboriginal Places gazetted under the NPW Act are listed on the State Heritage Register established under the *Heritage Act 1977*.

The protection provided to Aboriginal objects applies irrespective of the level of their significance or issues of land tenure. Aboriginal objects and places are afforded automatic statutory protection in NSW whereby it is an offence to knowingly or unknowingly harm or desecrate an Aboriginal object or Aboriginal Place under Section 86 of the NPW Act.

In accordance with Section 89A any person who is aware of the location of an Aboriginal object must in the prescribed manner, notify the Chief Executive within a reasonable time after the person first becomes aware of that object. The prescribed manner is to complete an Aboriginal Heritage Information Management System Site Recording Form (DECCW 2010a: 14)

In order to undertake a proposed activity which is likely to involve harm to an Aboriginal Place or object, it is necessary to apply to the OEH for an Aboriginal Heritage Impact permit (AHIP). AHIPs are issued by OEH under section 90 of the NPW Act, and permit harm to certain Aboriginal objects or Aboriginal Places.

The project is Designated Development and Integrated Development and as such will require an AHIP to permit harm to Aboriginal objects or Places (section 2.1.4).

There are no Aboriginal Places listed within or close to the study area. Section 4 presents information on whether Aboriginal objects are within or likely to occur within the study area.

2.1.2 Native Title Act 1994

The *Native Title Act 1994* was introduced to work in conjunction with the Commonwealth *Native Title Act 1993*. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act. There are no Native Title claims currently registered in the study area.

2.1.3 Aboriginal Lands Right Act 1983

The *Aboriginal Land Rights Act 1983* (ALR Act) established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the ALR Act to:

(a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and

(b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

The study area is within the boundary of the Deerubbin LALC.

2.1.4 Environmental Planning & Assessment Act 1979

The *Environment Planning and Assessment Act 1979* (EP&A Act) provides planning controls and requirements for environmental assessment in the development approval process. 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 process for local government (consent) authorities and Part 5 which relates to activity approvals by governing (determining) authorities.

The proposal will be assessed as Designated Development under Part 6, Division 4 and Integrated Development under Part 6 Division 3 of the EP&A Act. Part 4, Division 4.3, Section 4.12 (8) requires an application for Designated Development to be accompanied by an Environmental Impact Statement. The EIS must address the impact of the project on heritage items, through the framework of existing heritage legislation including the *Heritage Act 1977* and the NPW Act, and the Local Environmental Plans and Development Control Plans. An EIS for Designated Development must be prepared in accordance with SEARs.

Integrated Development approval will need to be obtained from other public authorities (e.g. the EPA) before consent can be granted. Integrated Development applications require a permit listed in Division 4.8, section 4.46 of the EP&A Act which includes an AHIP under the NPW Act.

2.2 Commonwealth legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment and Heritage Legislation Amendment Act (No.1) 2003* amends the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to include 'national heritage' as a matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution. It also establishes the National Heritage List (NHL) and the Commonwealth Heritage List (CHL).

The *Australian Heritage Council Act 2003* (AHC Act) establishes a new heritage advisory body - the Australian Heritage Council (AHC), to the Minister for the Environment and Heritage and retains the Register of the National Estate (RNE).

The *Australian Heritage Council (Consequential and Transitional Provisions) Act* 2003 repeals the *Australian Heritage Commission Act* 1975, amends various Acts as a consequence of this repeal and allows the transition to the current heritage system.

Together the above three Acts provide protection for Australia's natural, Indigenous and non-Indigenous heritage. The new features include:

- A new NHL of places of national heritage significance.
- A new CHL of heritage places owned or managed by the Commonwealth.

- The creation of the AHC, an independent expert body to advise the Minster on the listing and protection of heritage places.
- Continued management of the Register of the National Estate (RNE).

National Heritage List

The NHL is a list of places with outstanding heritage value to our nation, including places overseas. So important are the heritage values of these places that they are protected under the EPBC Act. This means that a person cannot take an action that has, will have, or is likely to have, a significant impact on the national heritage values of a national heritage place without the approval of the Australian Government Minister for the Environment and Heritage. It is a criminal offence not to comply with this law and there are significant penalties.

Commonwealth Heritage List

The CHL is a list of places managed or owned by the Australian Government and not of relevance to this project.

Register of the National Estate

The RNE is an evolving record of Australia's natural, cultural and Aboriginal heritage places that are worth keeping for the future. The AHC compiles and maintains the RNE under the *Australian Heritage Council Act* 2003. Places on the RNE that are in Commonwealth areas, or subject to actions by the Australian Government, are protected under the EPBC Act by the same provisions that protect Commonwealth heritage places (see above).

Following amendments to the *Australian Heritage Council Act* 2003*,* the RNE was frozen on 19 February 2007, meaning no new places can be added, or removed. From 2012, all references to the RNE were removed from the EPBC Act and the AHC Act. The RNE is now maintained on a non-statutory basis as a publicly available archive. No Aboriginal sites were listed for Olympic Park on the RNE.

2.2.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act), deals with Aboriginal cultural property (intangible heritage) in a wider sense. Such cultural property intangible heritage includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. These values are not currently protected under the NPW Act. In most cases, archaeological sites and objects registered under the State Act will also be Aboriginal places subject to the provisions of the Commonwealth Act. There is no cut-off date and the ATSIHP Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The ATSIHP Act takes precedence over state cultural heritage legislation where there is conflict. The Commonwealth Minister who is responsible for administering the ATSIHP Act can make declarations to protect these areas and objects from specific threats of injury or desecration. The responsible Minister may make a declaration under Section 10 of the Commonwealth Act in situations where state or territory laws do not provide adequate protection of intangible heritage places.

3.0 ENVIRONMENTAL CONTEXT

The environmental context of the study area is to assist in the prediction of:

- The potential of the landscape over time to have accumulated and preserved Aboriginal objects
- The ways Aboriginal people have used the landscape in the past with reference to the presence of resource areas, surfaces for art, other focal points for activities and settlement
- The likely distribution of the material traces of Aboriginal land use based on the above.

3.1 Landscape, geology and soils

The geology of the study area is characterised by the Triassic Wianamatta group which consists of black to dark grey shale and laminate on top of medium to coarse-grained quartz sandstone, very minor shale and laminate. The landforms are a result of the weathering of local bedrock. The underlying geology is the Hawkesbury sandstone that was laid down as river sediments and is described as medium to course grained quartz sandstone, this is overlain by the finer sedimentary material caps of Ashfield Shale. Hawkesbury Sandstone weathers to form thin, sandy soils with low water-retaining qualities.

The western portion of the study area is comprised of the Blacktown Residual soil landscape which has shallow to moderately deep, hard setting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines.

The eastern portion of the study area, which contains a relic creek channel and the current course of the creek line known as Reedy Creek, is the current active floodplain of many drainage networks of the Cumberland Plain. The soil landscape is known as South Creek, an alluvial environment characterised by floodplains, valley flats and drainage depressions. The soils are often very deep, layered sediments over bedrock or relic soils. Plastic clays or structured loams occur in and immediately adjacent to drainage lines. Red and yellow podzolic soils are most common on terraces with small areas of structured grey clays, leached clay and yellow solodic soils (Bannerman and Hazelton 1990). The South Creek soil landscape has the potential to retain stratified archaeological deposits.

The study area today has had extensive modification however, and the natural Blacktown soil profile is almost entirely absent from the area. There is potential for remnant intact South Creek soils along the eastern boundary.

3.2 Hydrology

Reedy Creek, which forms the eastern boundary of the study area, is a tributary of Eastern Creek which is a major watercourse across the Cumberland plain that flows north into South Creek through prominent areas such as Bungarribee, Nuringingy Reserve and past Plumpton Ridge.

The surrounding vicinity of the Oakdale East site has a network of creeks and tributaries that area associated with the South Creek drainage system of the Cumberland Plain.

3.3 Vegetation and resources

The study area would have once been covered by open Cumberland Plain Woodland, which is typical of the Wianamatta Group shale geology. Tree species would have included Forest Red Gum (*Eucalyptus tereticornis*), Sydney Blue Gum (*E. saligna)* and Grey Box (*E. moluccana*). The

understory would likely have consisted of grass species, including Spear Grass, and shrub species such as Blackthorn. Much of the native vegetation communities in the vicinity of the study area have been extensively cleared since European settlement and several areas of vegetative regrowth have been heavily recolonised by *Casuarina glauca.* The historic clearing of vegetation may have also had an impact on the integrity of archaeological deposits and will have removed culturally modified trees.

A small stand of Cumberland Plain Woodland is also present within the study area. The dominant canopy trees comprise *Eucalyptus moluccana* (Grey Box). The shrub layer is dominated by *Bursaria spinosa* (Blackthorn) and it is common to find abundant grasses such as *Themeda triandra* (Kangaroo Grass)

Aboriginal people were highly mobile hunter-gatherers. They used a range or resources, some of which were only available seasonally, and that therefore necessitated movement or trade (Attenbrow 2010: 78). Inland Darug relied heavily on land mammals such as kangaroos, wallabies, possums, fruit bats and echidnas, with freshwater fish, shellfish, crustacea and tortoises and mammals (e.g. platypus and water rats) also eaten. A wide range of plant foods were also relied upon, some of which were also used for medicine and manufacturing tools. There are European accounts of Aboriginal people in canoes on rivers and in the ocean, catching and cooking fish on small fires within the vessels (Collins 1798). Darug-speaking peoples living on the Cumberland Plain appear to have mainly utilised bark huts for housing. With respect to settlement duration Attenbrow (2010: 54) states,

> *there is little direct historical evidence for the length of time people stayed at any one campsite (be it a rock shelter or bark hut), how often they moved, or what motivated them to move to another campsite.*

3.4 Historical background

European expansion throughout the Cumberland Plain displaced Aboriginal people from their traditional lands and effectively cut off their access to many resources. The first European activity in the area was exploratory; however, this was shortly followed by settlement.

The study area is located on land granted to John Thomas Campbell after 1811. Campbell was secretary to Governor Lachlan Macquarie, he owned several properties in the Sydney region. Campbell was granted the 1,100 acre property near Rooty Hill, by Macquarie, which he named ‘Mount Philo’ (Holder 1966). Historically, Horsley Park was associated with a property, a larger settlement to the south owned by George Johnston Senior’s daughter Blanche Weston (Yarwood 1967). The property was called ‘Kings Gift’. An Indian colonial style bungalow was erected on the property by Blanche known as Horsley Park (complete with Indian servants, brought to Australia from her husband’s time spent as a judge in India).

The earliest European land use of the study area and the surrounding vicinity was likely to have been associated with timber getting, grazing and pastoralism from the early 19th century onwards (AMBS 2007). John Thomas Campbell was known as a most efficient farmer and breeder of cattle and horses.

Early residential settlement in the broader Fairfield/ Penrith area was driven by the availability of fertile soil and easily accessible water sources such as creeks and river beds. For example, the Nepean River (to the west of the study area) provided the most fertile soil in the region and occupation and farming took place along its banks and alluvial from 1789 onwards (Thorpe 1986). Over the following decade, frequent flooding forced settlement to spread inland, to the east of the river. At this time, Eastern Creek (east of the study area) became associated with smaller allotments,

often given to emancipated convicts while land surrounding the study area-further inland and less fertile-was issued to free settlers in the form of large acreages (AMBS 2007).

A number of the larger grants that surrounded the study area became well known estates such as Bayly Park (Nicholas Bayly); King's Gift or Horsley Park (George Johnston Snr); Lochwood (George Johnston Jnr); Exeter Farm (James Badgery); Mt. Vernon (Anthony Fenn Kemp); Erskine Park (James Erskine); Minchinbury (William Minchin) and Regentville (James Jamison). Many of these estates were occupied by grand manors such as Bayly's single storey home in Bayly Park.

The current study area was acquired by Brickworks Limited around 1959 -1960. The land has been heavily modified as a quarry for Austral Bricks known as Plant no.3 which opened in 1972 (Figure 3.1). The quarry is still operational.

Figure 3.1: Landscape of the study area pre quarrying/ mining works (1947). Source: Goodman

4.0 ABORIGINAL CONTEXT

4.1 Ethno-historical background

Prior to the appropriation of their land by Europeans, Aboriginal people lived in small family or clan groups that were associated with particular territories or places. It seems that territorial boundaries were fairly fluid, although details are not known. The language group spoken on the Cumberland Plain is known as Darug (Dharruk – alternative spelling).

This term was used for the first time in 1900 (Matthews and Everitt) as before the late 1800s language groups or dialects were not discussed in the literature (Attenbrow 2010: 31). The Darug language group is thought to have extended from Appin in the south to the Hawkesbury River, west of the Georges River, Parramatta, the Lane Cove River and to Berowra Creek (Attenbrow 2010: 34). This area was home to a number of different clan groups throughout the Cumberland Plain.

British colonisation had a profound and devastating effect on the Aboriginal population of the Sydney region, including Darug speakers. In the early days of the colony Aboriginal people were disenfranchised from their land as the British claimed areas for settlement and agriculture. The colonists, often at the expense of the local Aboriginal groups, also claimed resources such as pasture, timber, fishing grounds and water sources. Overall the devastation of the Aboriginal culture did not come about through war with the British, but instead through disease and forced removal from traditional lands. It is thought that during the 1789 smallpox epidemic over half of the Aboriginal people of the Sydney region died. The disease spread west to the Darug of the Cumberland Plain and north to the Hawkesbury. It may have in fact have spread much further afield, over the Blue Mountains (Butlin 1983). This loss of life meant that some of the Aboriginal groups who lived away from the coastal settlement of Sydney may have disappeared entirely before Europeans could observe them or record their clan names (Karskens 2010: 425).

The British initially thought that Aboriginal people were confined to the coast taking advantage of the abundant marine resources available. The first major recorded expeditions into the interior did not witness any Aboriginal people, but evidence of their existence was noted. In April 1788, Governor Philip led an expedition west to Prospect Hill. It was noted,

> …that these parts are frequented by the natives was undeniably proved by the temporary huts which were seen in several places. Near one of these huts, the bones of kangaroo were found, and several trees where seen on fire (Phillip 1789).

It wasn't until rural settlement began in the western Cumberland Plain, during the 1790s, that Aboriginal groups in this region came into regular and permanent contact with British colonists. Relations quickly disintegrated, and tensions over land and resources spilled over. Governor King sanctioned the shooting of Aboriginal peoples in a General Order made in 1801 (Kohen 1986: 24). Intermittent killings on both sides continued for over 15 years, including the Appin massacre and attacks at South Creek in 1816 (Kohen 1986: 23; Karskens 2010: 225).

4.2 Archaeological context

4.2.1 Previous archaeological reports

There have been several archaeological studies undertaken in close proximity to the study area. These studies comprise assessments of similar landforms to the study area and give an idea of the local Aboriginal context. A summary of the previous studies is provided in Table 4.1.

Table 4.1: Summary of archaeological reports in the study region

Report	Key outcomes
Appleton (2002) The Archaeological Investigation of Lot 2, DP 120673, the site of a proposed new clay and shale extraction area. Old Wallgrove Road Horsley Park	• The assessment area is adjacent of the current study area. • The results of the survey were the identification of an area of PAD associated with an isolated mudstone flake along the banks of Ropes Creek, a second isolated mudstone flake was located along a vehicle track. • The PAD was identified based on the slight raised landform associated with Ropes Creek. • The raw material was mudstone.
Navin Officer (2003) Proposed 132kV Transmission Line Erskine Park, NSW, Cultural Heritage Assessment	• Navin Officer conducted an Aboriginal cultural heritage assessment for Integral Energy for the proposed 132 kV transmission line extending from the Sydney West Substation 3.5 km west to Erskine Park. • Two Aboriginal sites (artefact scatters) were identified and an area of archaeological potential. • The artefacts were located along eroding drainage lines. The PAD was identified based on the raised landform surrounding Ropes Creek. They concluded higher densities are likely to be locate near permanent water sources. • The raw materials were mudstone and silcrete.
JMcD CHM[1] (2004) Archaeological Investigations at the Austral Site (#45-5-2986) 'The Vineyard', Wallgrove Road, Horsley Park	• The assessment area is located immediately north east of the current study area. • Test excavations were conducted at a registered site which was located at the base of a former slope along the margin of an alluvial floodplain. • The excavation program recovered over 2000 lithic items. • The raw materials were silicified tuff, quartz, silcrete and silicified wood
JMcD CHM (2005) Heritage Conservation Strategy for Aboriginal sites in the lands owned by Valad Funds Management Ltd and Sargents P/L, in the Eastern Creek Business Park (Stage 3) Precinct Plan	• The assessment area was located approximately 2 km north west of the current study area. • The assessment identified areas of high archaeological value on shale hill slopes, first order tributary creek lines, shale ridges and low ridgetops. • Areas of moderate archaeological sensitivity were identified as areas surrounding high value landforms and exhibited low levels of disturbance. • Areas of low archaeological sensitivity were identified as those that demonstrated high levels of disturbance. This included areas that had been quarried.

[1] Jo MacDonald Cultural Heritage Management

Report	Key outcomes
GML (2013) Oakdale Central Aboriginal Archaeological Technical Report	• The subject area is to the west of the current study area. • A previous survey by GML identified an area of moderate archaeological potential along Eastern Creek • Subsurface testing was conducted in the moderate potential area adjacent to the creek as well as in the area of low potential along the hill slopes. • Almost 300 lithic artefacts were recovered. The raw materials present were silcrete, mudstone, quartz and quartzite. • It was found that artefact densities was continuous along the creek lines whereas along the slopes they were sparse.
Artefact Heritage (2015) Oakdale South Industrial Estate Archaeological Survey and Test Excavation Report	• The assessment area is located immediately southwest of the current study area. • The survey relocated a previously known site and recorded six new sites. • They were located in close proximity to a tributary of Ropes Creek and the predominant material was silcrete. • The testing program identified a concentration of indurated mudstone. • The test excavation interpreted the assemblage and distribution of artefacts as not showing intensive occupation.
Artefact Heritage (2018) Oakdale Industrial Estate, Oakdale West Archaeological Test Excavation Report	• The assessment area is located immediately west of the current study area. • Three low density subsurface artefact scatters were located adjacent to the creek line on elevated ground, and two isolated finds were located on vehicle track and an ephemeral drainage line. • The sites were assessed as being low scientific significance

4.2.2 Conclusions from previous reports

The reports summarised in Table 4.1 found potential for Aboriginal archaeological sites to be located throughout the landscape. Certain landforms were considered to have higher archaeological potential. Creek lines and associated lower slopes and alluvial flats are considered to have high potential for Aboriginal archaeological sites. JMcD CHM (2005) also identified areas of high archaeological value on shale hill slopes, first order tributary creek lines, shale ridges and low ridgetops.

Artefact scatters and open camp sites are expected to be the dominant site type and density of artefacts within the surrounding landscape will be higher located near to permanent water sources. The expected raw material for stone artefacts will be silcrete, mudstone and quartz, silcrete is a locally available source.

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4.3 Aboriginal Heritage Information Management System

The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information, including the AHIMS data appearing on the heritage map for the proposal be removed from this report if it is to enter the public domain.

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was undertaken on the 30 August 2018 (AHIMS search ID 367274).

An area of approximately 5 km surrounding the study area was included in the search. The AHIMS search provides archaeological context for the area and identifies whether any previously recorded Aboriginal sites are located within or near the study area. The parameters of the search were as follows:

GDA 1994 MGA 56	296413 – 302013 E 6252156 – 6257756 N
Buffer	0 m
Number of sites	108
AHIMS search ID	367274

A total of 108 sites were identified in the extensive AHIMS search area. The distribution of recorded sites within the AHIMS search area is shown in Figure 4.1. A registered Aboriginal site is made up of one or more features and these features should not be confused with registered sites. OEH lists 20 standard site features that can be used to describe a site registered with AHIMS.

The frequency of recorded site types (as opposed to the number of registered sites) is summarised in Table 4.2. For the 108 sites within the search area, four site features were recorded. Most recorded site features are Artefact scatters or Isolated finds (n=95), potential archaeological deposits (n=5) followed by Artefacts associated with PADs (n=5).

The nature and location of the registered sites reflects the past Aboriginal occupation from which they derive, but is also influenced by historical land-use, and the nature and extent of previous archaeological investigations. Although Aboriginal occupation covered the whole of the landscape, the availability of fresh water, and associated resources, was a significant factor in repeated and long-term occupation of specific areas within the landscape. Certain site types, such as culturally modified trees, are particularly vulnerable to destruction through historical occupation, while others, such as stone artefacts, are more resilient. Within the current search area, the majority of recorded sites area artefact scatters or isolated artefacts.

Table 4.2: Frequency of site features from AHIMS database

Site feature	Frequency	Percentage
Artefact	95	88
Art (Pigment or Engraved)	1	0.9
Potential Archaeological Deposit (PAD)	5	4.6
Modified Tree (Carved or Scarred)	1	0.9
Artefact, Modified Tree (Carved or Scarred)	1	0.9

Site feature	Frequency	Percentage
Artefact, Potential Archaeological Deposit (PAD)	5	4.6
Total	**108**	**100**

There are no AHIMS sites located within the study area. There are 15 AHIMS registered sites located within one kilometre of the study area, three of the registered sites are within 400 m of the study area, all are Artefact sites, one is associated with a PAD.

Many of the sites recorded are located on creeks and drainage lines. Ropes Creek is to the west of the study area and is a major tributary of South Creek. Reedy Creek forms the eastern border of the study area and is a major tributary of Eastern Creek. The sites within 400 m of the study area are located on a similar landform.

Artefact sites are the most likely site type to occur within the study area. Artefacts will be most visible in exposed surfaces; Scarred trees can be located in areas of old tree growth or in areas that have not experienced complete clearance.

The nature and distribution of the recorded Aboriginal sites identified by the AHIMS search can provide some archaeological context for the study area. AHIMS site distribution reflects where surveys and previous assessments have been undertaken. Although the AHIMS search does provide some context for the Aboriginal use of an area, due to the limitations of the AHIMS database, other information sources are also required to provide a more accurate understanding of the study area's Aboriginal archaeological potential.

Figure 4.1: Distribution of AHIMS sites within extensive search area

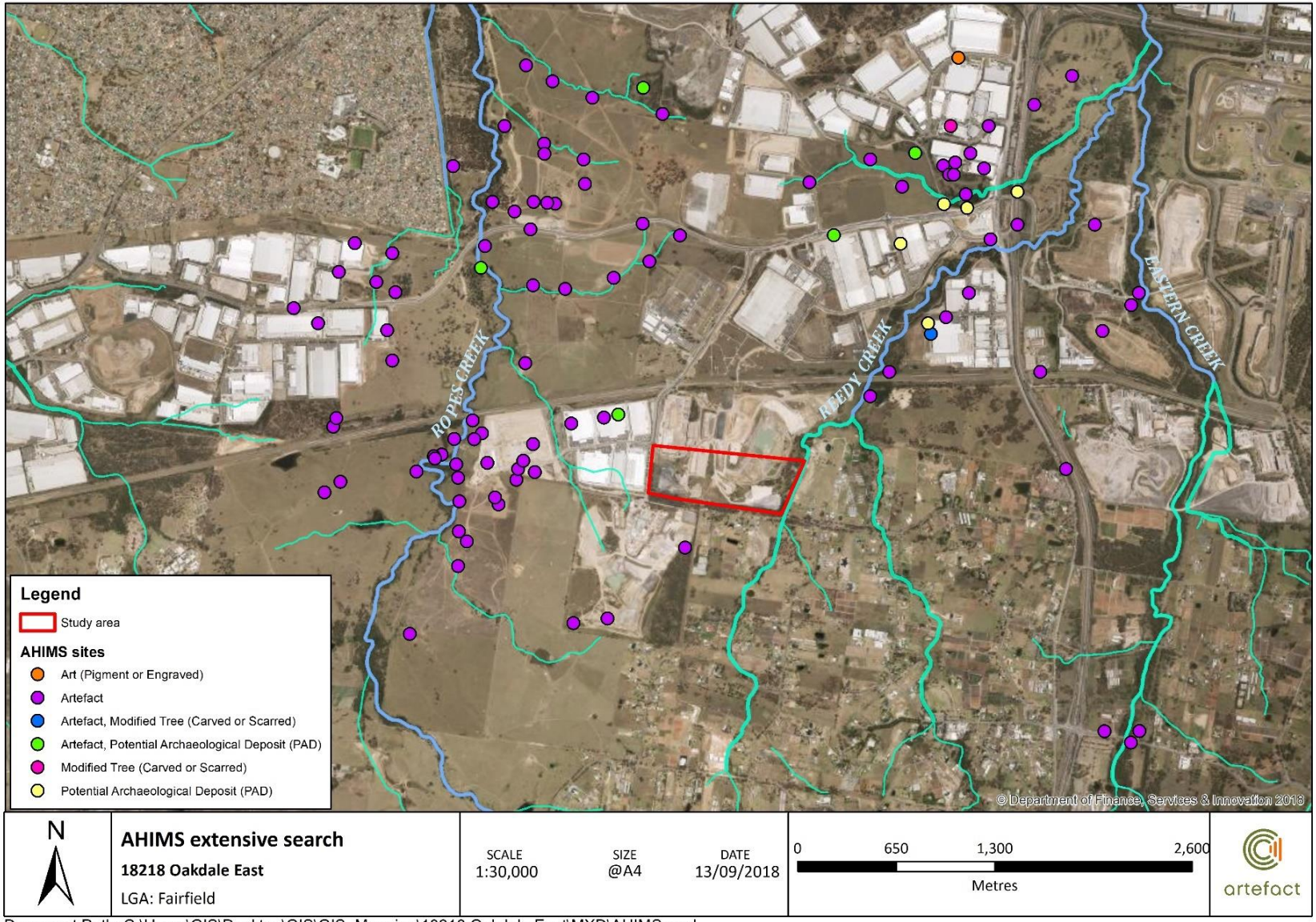

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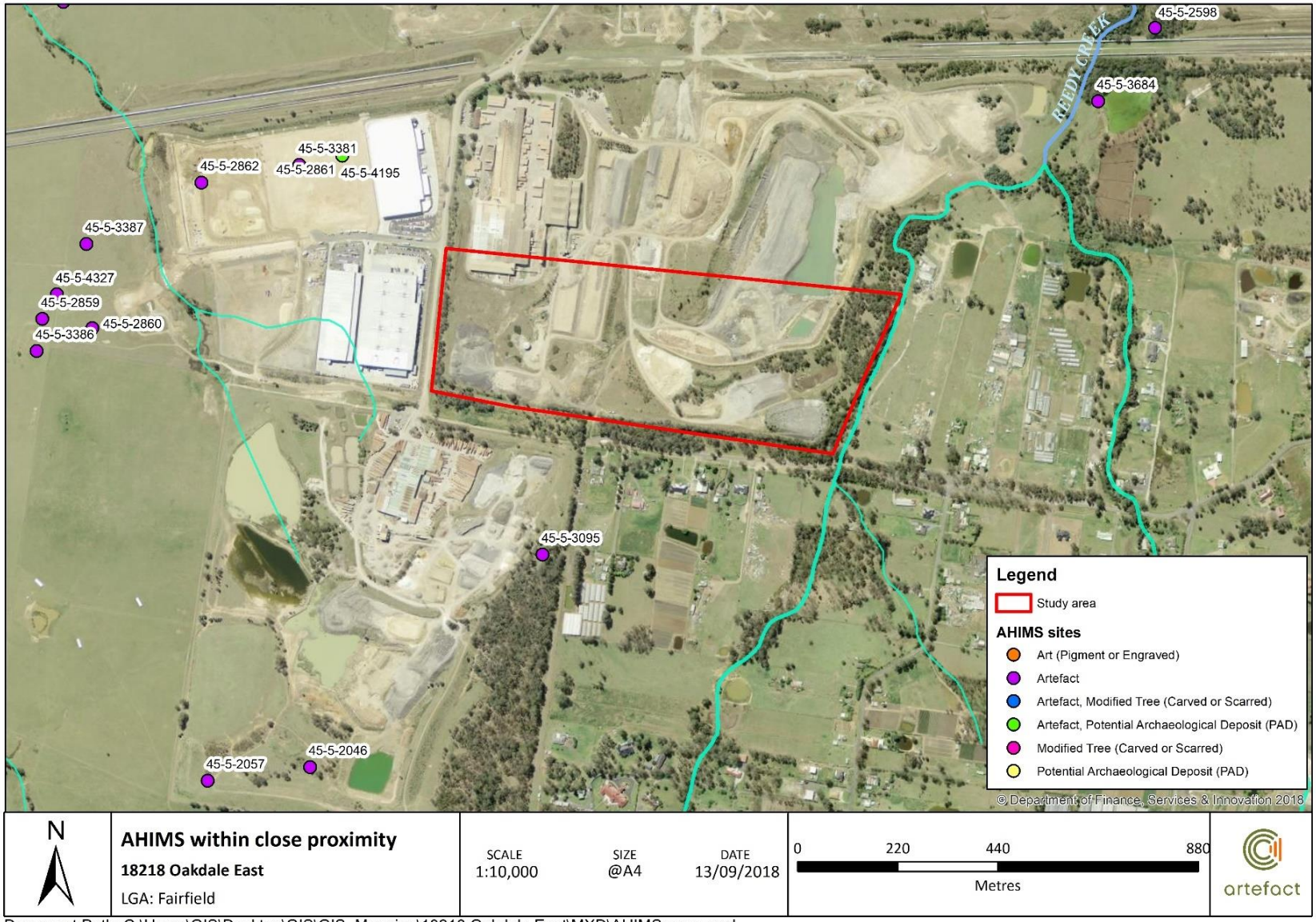
Figure 4.2: AHIMS registered sites within close proximity to study area



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4.4 Predictive modelling

4.4.1 Regional

Archaeological investigation across the Cumberland Plain has been comprehensive over the past 30 years, including survey, excavation and desktop analysis studies. This varied and intensive investigation has led to the development and continual refinement of a predictive model for Aboriginal occupation within the region.

The Cumberland Plain has been extensively studied due to the growth demand of the ever-increasing Sydney population. Regional studies have been done on the large Growth Centres of the North West and South West of the Cumberland Plain, west of Sydney Basin. White and McDonald (2010) have contributed to the debate over site prediction by discussing the nature of Aboriginal site distribution, interpreted through lithic analysis of excavated sites in the Rouse Hill Development Area (White and McDonald 2010). The Rouse Hill Development Area is located about 15 km north of the current study area, the watercourses in the development area (Caddies Creek and Second Ponds Creek) derive from the same source as South Creek, Hawkesbury River, and are of a similar stream order. The Soil landscapes are also reflective of those in the current study are, South Creek Soil Landscape along the high order watercourses and associated remnant Blacktown Soil Landscape. The study gave rise to the commonly referred Stream Order Model which provides a sound basis for archaeological investigations in the Cumberland plain. The paper provides a spatial and distributive analysis of Aboriginal objects in relation to freshwater resources and along varying landform units. The findings of this study highlighted the relationship between proximity to freshwater and landscape with archaeological evidence of Aboriginal occupation. The study found that artefact densities were most likely to be greatest on terraces and lower slopes within 100 m of freshwater resources (White and McDonald 2010). The predictive model identified that ridgelines and crests located between drainage lines will contain archaeological evidence though usually representative of background scatter (White and McDonald 2010).

While White and McDonald's (2010) predictive model can be seen as an indicative model of the archaeology of the Cumberland Plain, a more recent study has been conducted by Godden Mackay and Logan (GML 2016 at the East Leppington Precinct. The study utilised the Stream Order Model developed by White and McDonald (2010) in their investigations and three different and complementary models to explain their findings. The Stream Order Model is a regional based model and doesn't consider the small scale intra-landform variations that can affect the predictions of this model.

Owen and Cowie (2017) describe three other models that can be used to more accurately describe archaeological probability within the landscape. Economic Resource Model, Activity Overprinting Model and Domiciliary Spacing Model. The Economic Resource Model focuses on the resource zones, confluences of creeks are considered high resource zones due to the richness in flora and fauna. The model suggests that the evidence of Aboriginal activities will decrease with distance from theses resource rich nodes. Activity Overprinting Model was used to explain the density of sites at increasing distances from the creek and Domiciliary Spacing Model was used to describe the features and spatial variation of a site.

In conjunction with these models, an understanding of the soil landscape and the nature and prevalence of cultural material within these contexts is important in the predictive model process. Deposits that contain cultural material are likely to exist within both Blacktown soil landscapes and South Creek soil landscapes however, these are generally not stratified. Blacktown soils retrieve cultural material in A Horizon deposits which generally extend approximately 300 mm below the ground surface. Stratified archaeological deposits are likely to be located within the South Creek soil

landscape. These stratified deposits area most likely to exist within raised embankments where environmental forces, such as flash flooding, are less likely to have impacted Aboriginal cultural material situated on the ground surface. The deposits may have a vertical distribution that parallels alluvial deposition over time. The NSW Soil and Land Information System produced a technical report outlining the results of a core sample taken approximately 1.3 km north of the current study area, along the alluvial flats of South Creek. The results show that the South Creek soils extends to a depth of 2 m in this area and may parallel the depth of deposit within the study area.

Every predictive model has its limitations and constraints and should be used as a guiding factor for future investigation and be used as a bridging tool to further current understanding of the cultural environment.

4.4.2 Local

Based on the recorded AHIMS sites, previous studies and the environmental context, predictions can be made on the type of Aboriginal archaeological evidence potentially present within the current study area. This evidence could be found in the form of certain site types:

- **Open artefact scatters or isolated finds** – this was the most common site feature from the AHIMS search and is the most prevalent source of evidence of Aboriginal occupation that has influenced the predictive models for many studies. The visibility of these sites are dependent on surface visibility and exposure and are affected by the nature of the soil landscape. The erosional nature of the Blacktown soils within the study areas suggest that possible deposits are susceptible to erosion, yet the depositional nature of permanent watercourses such as the Eastern Creek gives rise to the probability of intact occupational records in the deep stratigraphic layers. Using the Stream Order Model and Economic Resource model we can assume there is a high likelihood for sites. Reedy Creek is connected to Eastern Creek, a high order watercourse as well as a resource rich environment. It is likely that artefact scatters will be located on the slopes and crests associated with the floodplains. The dominant material type is expected to be silcrete.
- **Culturally modified scarred trees** – while extensive clearing occurred post-European contact these sites may occur in any pockets of mature native trees. Types of scarring that would be expected are bark removal for utensils, weapons and habitation and resource collection.
- **Potential archaeological deposits** – where subsurface stone artefacts and or other cultural materials are likely to occur. Areas in which there are intact soil profiles that have experienced minimal to no previous disturbance may contain a record of Aboriginal occupation or utilisation of the study area. The creek line along the eastern boundary exhibited potential for subsurface artefacts due to the presence of stone material eroding out of the surface.

5.0 SURVEY METHODOLOGY

5.1 Aims

The aims of the archaeological survey were to:

- cover a representative sample of the study area and to include all landforms that will potentially be impacted by the proposed works
- record the landform, general soil information, surface conditions and vegetation conditions encountered during the survey and how these impact on the visibility of objects
- record any Aboriginal objects/sites observed during the survey
- to identify areas of potential archaeological deposit (PAD) that may be present in areas that have had no or minimal disturbance
- to collect information to ascertain whether further archaeological investigations are required.

5.2 Site definition and recording

An Aboriginal site is generally defined as an Aboriginal object or place. An Aboriginal object is the material evidence of Aboriginal land use, such as stone tools, scarred trees or rock art. Some sites, or Aboriginal places can also be intangible and although they might not be visible, these places have cultural significance to Aboriginal people.

Office of Environment and Heritage guidelines state in regard to site definition that one or more of the following criteria must be used when recording material traces of Aboriginal land use:

- The spatial extent of the visible objects, or direct evidence of their location
- Obvious physical boundaries where present, e.g. mound site and middens (if visibility is good), a ceremonial ground
- Identification by the Aboriginal community on the basis of cultural information.

For the purposes of this study an Aboriginal site would be defined by recording the spatial extent of visible traces or the direct evidence of their location.

5.3 Protocol for recording Potential Archaeological Deposits

Where areas of PAD are identified towards the margins of each survey unit, efforts must made by the survey team to delineate each area of potential beyond the survey unit. Where the extent of the PAD extends beyond the survey unit, efforts must be made to map the extent of that feature up to approximately 70 m outside the survey unit. If it is likely that these PADs continue beyond that point, the survey team must justify that the distance is adequate to provide an accurate representation of the PAD with regard to future planning and design for the project.

5.4 Survey sampling strategy

The study area was comprised of two Survey Units (SU), defined by property boundary and landform (Figure 5.1). A sample survey is acceptable, with justification, under the Code of Practice. Full coverage survey of each survey unit was not practicable due to the highly disturbed nature of the site

due to previous and currently active mining/ quarrying activities. Each SU was subject to sample survey, which included as much intensive investigation as was practicable given the access limitations.

Surface visibility was limited to ground exposures along drainage channels, erosion scours and areas of disturbance, other areas of surface visibility included vehicle tracks. Exposed vertical soil sections could be observed along the creek line, drainage lines and the exposed quarried sections.

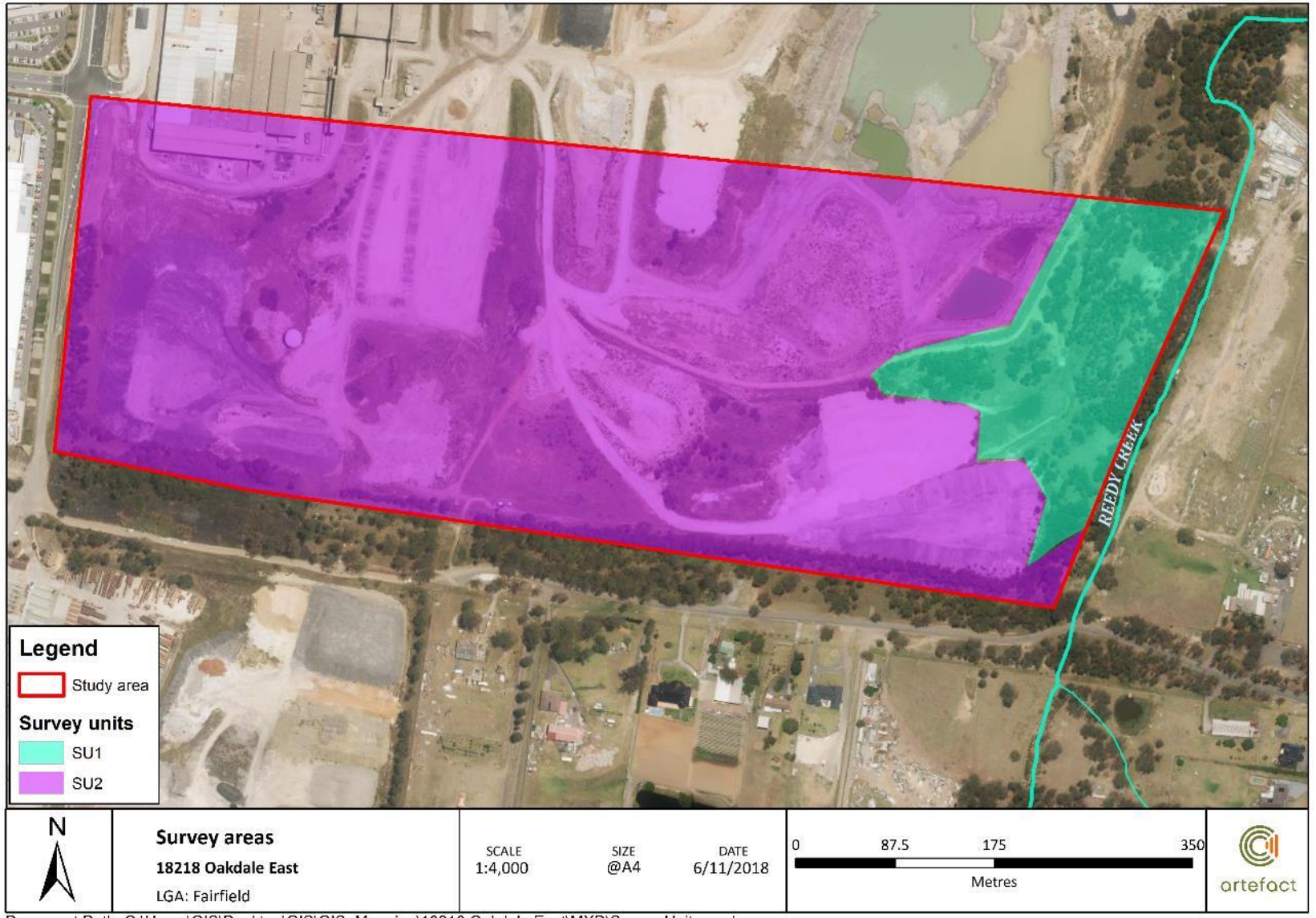
5.5 Survey methodology

Archaeological survey of the study area was conducted on foot, where possible, in accordance with the Code of Practice, on 18 October 2018. The survey was undertaken by Ryan Taddeucci (Senior Heritage Consultant, Artefact Heritage), Jennifer Norfolk (Heritage Consultant, Artefact Heritage), and Steve Randall (Aboriginal Site Officer, Deerubbin LALC).

A handheld Global Positioning System (GPS) was used to track the path of the survey team and record the coordinates of survey transects, as well as, the locations of any Aboriginal sites. Detailed aerial maps marked with grid coordinates for each of the two survey units were carried by the survey team in the field. The coordinate system projection used for all data recording was GDA94 MGA 56. All ground exposures were examined for Aboriginal objects.

A photographic record was kept during the survey. Photographs were taken to record aspects of survey units including creek line, vegetation, disturbance and identified Aboriginal sites. Scales were used for photographs where appropriate.

Figure 5.1: Location of survey units



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6.0 SURVEY RESULTS

6.1 Survey Unit 1

Survey Unit 1 is in the east of the study area along Reedy Creek and bound by the quarrying footprint and spoil mounds (Figure 6.1). The survey unit is approximately 30,000 square meters.

The survey unit is generally flat and raised above the adjacent creek line, the opposite creek bank in the adjoining property to the east of the survey unit has a higher elevation than SU1 (Figure 6.3 and Figure 6.8). The west edge of the SU slopes upwards towards a formed vehicle track that runs along the edge of a deep excavated pit (Figure 6.7 and Figure 6.8). There is an artificial drainage line that runs north south to an artificial dam that sits above the natural soil landscape (Figure 6.2).

The area was covered by grasses and leaf litter which affected ground surface visibility (Figure 6.4). The visibility was limited to erosion scours and around the base of trees where the artefact scatter was located (Figure 6.8). The vegetation consisted of immature tree growth, potentially from revegetation of rehabilitation practices. The vegetation included but not limited to melaleuca, wattle, and various eucalypt species and introduced grasses (Figure 6.3 and Figure 6.4).

It is evident that SU1 has experienced some form of previous disturbance from pastoral, grazing, vegetation clearance, vehicle access and water drainage (Figure 6.1 and Figure 6.5 and Figure 6.7). The area in which the artefacts were located appears to be relatively intact and may have intact subsurface potential for Aboriginal cultural material.

One artefact scatter and area of PAD (OE AS1) (AHIMS ID pending) were identified within SU1.

Figure 6.1: View east from the west edge of SU1 looking across damn and raised landform (J Norfolk, 18 October 2018)

Figure 6.2: View north of the levee around the artificial dam (J Norfolk, 18 October 2018)

Figure 6.3: View east of the evenly spaced vegetation and irrigation piping (J Norfolk, 18 October 2018)

Figure 6.4: Ground visibility around the damn and majority of the SU (J Norfolk, 18 October 2018)

Figure 6.5: Disturbance from vehicle access and excavated drainage lines (J Norfolk, 18 October 2018)

Figure 6.6: View west of artificial slope towards the quarry pit and vehicle track (J Norfolk, 18 October 2018)

Figure 6.7: View north along the western boundary of the survey unit adjacent to deep excavation (J Norfolk, 18 October 2018)

Figure 6.8: View east of the location of the artefact scatter and raised flat area adjacent to creek (J Norfolk, 18 October 2018)

6.2 Survey Unit 2

Survey unit 2 is mapped as the remainder of the study area. The survey was conducted by vehicle access with several stops to observe and photograph the undulating highly disturbed nature of the unit. The survey unit is approximately 277,000 square metres, with the survey coverage limited to the vehicle access tracks.

The survey unit is comprised of modified slopes, spoil mounds, deep excavated pits, quarry infrastructure and vehicle access tracks. The unit is dissected by a transmission line that runs north south through the centre (Figure 6.13). The southern and western boundary of the study area has an artificial levee (Figure 6.11 and Figure 6.15).

The visibility was restricted as the survey unit was well grassed, obscured by spoil mounds and buildings (Figure 6.9, Figure 6.12 and Figure 6.14). The vegetation was limited to the perimeter and exhibited immature tree growth. Subsurface soil profiles were visible in the exposed excavation pit walls, no intact soil profiles above clay were visible (Figure 6.10).

No Aboriginal objects or areas of PAD were identified within SU2.

Figure 6.9: View west from the eastern edge of survey unit) (J Norfolk, 18 October 2018)

Figure 6.10: View west showing deep excavation of quarrying pits and soil profiles (J Norfolk, 18 October 2018)

Figure 6.11: View west at the southern border of the study area, showing levee boundary and vehicle access tracks (J Norfolk, 18 October 2018)

Figure 6.12: View north from the southern boundary showing undulating modified landform (J Norfolk, 18 October 2018)

Figure 6.13: Transmission line (J Norfolk, 18 October 2018)

Figure 6.14: View north of the building structures in the north west of the study area (J Norfolk, 18 October 2018)

Figure 6.15: View north west of western boundary modified landform and western boundary of study area (J Norfolk, 18 October 2018)

Figure 6.16: View north of artificial slope along the centre of the study area showing restricted visibility (J Norfolk, 18 October 2018)

6.3 Survey coverage

A summary of survey coverage, in accordance with the Code of Practice, is outlined in Table 6.1 and Table 6.2 below. It should be noted that because the area is mostly disturbed by quarrying activities and covered in mounds of spoil, a calculation of survey coverage is approximate.

Table 6.1: Survey coverage summary

Survey unit	Landform	Survey unit area (sq m)	Visibility (%)	Exposure (%)	Effective coverage Area (sq m)	Effective coverage (%)
1	Raised flat	30450	20	5	304.5	1
2	Disturbed	277,000	5	10	13,850	0.05

Table 6.2: Landform survey coverage.

Landform	Landform Area (sq m)	Area effectively surveyed (sq m)	% of landform effectively surveyed	Number of sites
Raised Flat	30450	2000	6.5	1
Disturbed	277,000	2500	0.9	0

6.4 Results

One newly identified Aboriginal site, an artefact scatter and area of PAD (OE AS1) (AHIMS ID pending), was identified within SU1. This site was located within a similar slope landform, adjacent to a creek line as sites identified at Oakdale West (Artefact 20180. A full description of the site is provided below.

6.4.1 Oakdale East Artefact Scatter/ PAD 1 (OE AS1) (AHIMS ID pending)

Site type: Artefact Scatter and PAD
Centroid: 299740E 6255059N
Site extent: 295 m x 100 m

Oakdale East artefact scatter and potential archaeological deposit (OE AS1) consisted of a small, low density scatter of stone artefacts and an associated area of potentially intact deposit (PAD) that is slightly raised above the adjacent creek line (Reedy Creek) (Figure 6.18). The site extent is approximately 295 m in length and 100 m wide. Thirteen pieces of silcrete with evidence of human manufacture were located within the site extent (Figure 6.17). The site is an elevated, level surface above the natural floodplain and meandering creek line. The site is located immediately west of a tributary of Eastern Creek (Figure 6.19). The site has experienced minimal disturbance from previous pastural and grazing practises and the soils have experienced erosional effects. The archaeological integrity of the site is moderate to high, with potential disturbances from grazing cattle/ horses and land clearance.

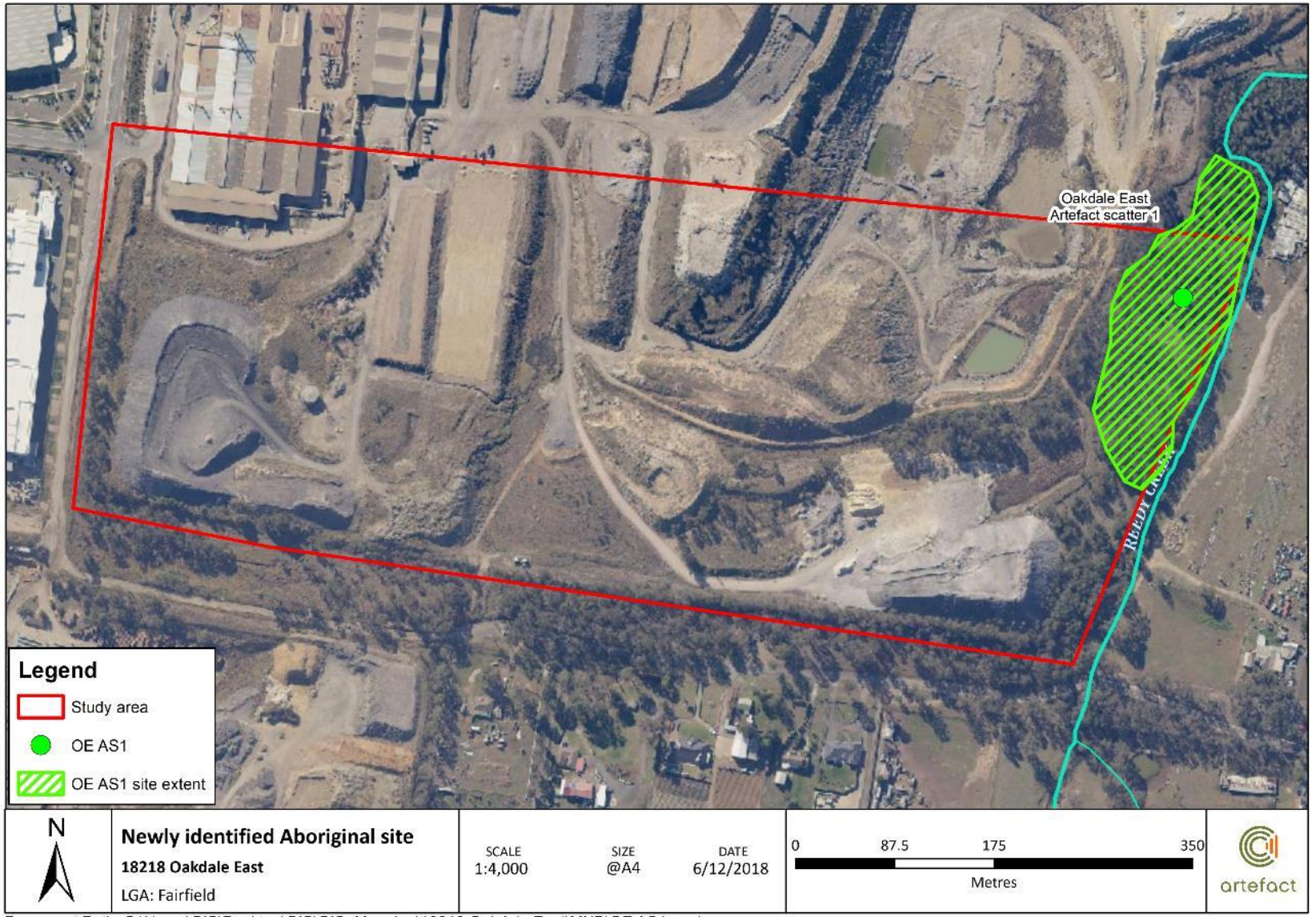
Vegetation around the site had been previously cleared as there is no old tree growth. Revegetation/ rehabilitation may have occurred as there appears to be uniformity to the spacing of individual trees. the adjacent property to the east had sparse stands of eucalypt and is well grassed. Ground visibility was high due to sparse grass and weed cover, the majority of the study area has been utilised for quarrying and previous grazing. Any exposures within the site shows silty loams with well-rounded ironstone/shale gravels.

Figure 6.17: Silcrete flakes found within the OE AS1 (AHIMS ID pending) (J Norfolk, 18 October 2018).

Figure 6.18: Location of OE AS 1 (AHIMS ID pending) east view of the elevated area adjacent to creek (J Norfolk, 18 October 2018).

Figure 6.19: Surface visibility and soils at location of OE AS1 (AHIMS ID pending) (J Norfolk, 18 October 2018).

Figure 6.20: Location and site extent of OE AS 1 (AHIMS ID pending)



7.0 DISCUSSION

7.1 Ground disturbance

Based on previous studies in the locality, historical records and survey observations, the study area has been subject to major subsurface disturbance, and therefore has low potential to contain intact archaeological resources in the area to be impacted by the proposed works. An artefact scatter was identified along the bank of Reedy Creek on the eastern most end of the study area. The area is not to be impacted by the current proposed works, but it has high potential to contain intact archaeological resources.

Aerial photos of the study area illustrate that from at least 1943 the study area has been impacted by vegetation clearance and followed by mining/ quarrying activities, construction of buildings, and the installation of mains water supply and transmission lines. These previous disturbances account for the alteration of the landscape and the removal of the subsurface deposits. The field survey identified the exposed profile of the deposit within the western portion of the study area, confirming that the subsurface deposit had been removed down beyond the clay layer.

Overall, based on the land use history and results of previous studies, there is low potential for archaeological remains to be present within the study area that is to be impacted by the proposed works.

7.2 Analysis of archaeological potential

The archaeological potential of an area is determined by its landform, its location and the level of disturbance. Certain landforms, such as gentle slopes, are conducive to Aboriginal occupation while others, such as steep slopes, are not. The location of appropriate landforms in relation to natural resources, in particular their proximity to a permanent water source, increases levels of potential. Correlations between site location and proximity to a water source have been proven in previous archaeological investigations where the number of sites and their densities is highest in close proximity to a water source.

In areas where there is high level of disturbance however, the archaeological potential is lowered. It is unlikely that surface finds in these areas are in their original context and it is unlikely that subsurface archaeological deposits are intact. The archaeological potential of an area is rated high, moderate or low, based on all of the above considerations.

- High - Intact archaeological material is likely to be found in this area.
- Moderate - Intact archaeological material may be found in this area.
- Low - It is unlikely that intact archaeological material will be found in this area.

The archaeological potential of the study area has been assessed as containing areas of low to nil and high dependant on the level of disturbance. While the study area has been located across a site that has experienced high levels of disturbance it is in close proximity to a permanent waterway, previous studies and observations in the field indicate that the area adjacent to Reedy Creek has potential for intact artefact yielding deposit.

8.0 SIGNIFICANCE ASSESSMENT

8.1 Significance assessment criteria

An assessment of the cultural heritage significance of an item or place is required in order to form the basis of its management. The Guide (OEH 2011: 10) provides guidelines, in accordance with the Burra Charter (Australia ICOMOS 2013) and the NSW Heritage Branch (Heritage Office 2001) for significance assessment with assessments being required to consider the following criteria:

- Social values – does the area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Historic values – is the area important to the cultural or natural history of the local area and/or region and/or state
- Scientific values - does the area have the potential to yield information that will contribute to an understanding of the cultural and natural history of the local area and/or region and/or state
- Aesthetic values – is the area important in demonstrating aesthetic characteristics in the local and/or region and/or state.

The social, historic and aesthetic values of the cultural significance of the study area are not assessed in this report. In order to assess these criteria an Aboriginal Cultural Heritage Assessment (ACHA) would need to be undertaken in conjunction with Aboriginal community consultation.

8.2 Scientific/ archaeological significance assessment

OEH requires consideration that includes the following:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

The survey resulted in the identification of an Aboriginal site with associated PAD (OE AS1) (AHIMS ID pending) located adjacent to the creek on the eastern boundary of the study area. The site comprised 13 silcrete artefacts eroding out of the deposit. The full significance of the site cannot be determined by this assessment, investigations were limited and did not exceed the study area boundary. The site is located on the boundary of the study area and the site extent, complexity and density is not fully understood as it could be part of a wider more complex site. Table 8.1 Provides a preliminary assessment of significance

No Aboriginal sites or areas of PAD were identified in the area to be impacted by the proposed works.

Table 8.1: Summary of scientific significance

Site name (AHIMS ID)	Research potential	Education potential	Representative value	Rarity	Overall scientific significance
OE AS1 (AHIMS ID pending)	Low	Low	Low	Low	Low

9.0 IMPACT ASSESSMENT

9.1 Proposed development

The proposal is for designated development for the construction and operation of a masonry plant (Concrete Works) and five warehouses for generic and distribution uses at its existing facility. The development has production capacity of 220,000 tonnes per annum.

The proposal involves the development of a portion of 224-398 Burley Road, Horsley Park site. The concept design (Figure 1.2) includes the following:

- Initial bulk earthworks: to create broad, flat, developable hardstand areas.
- Civil works: including internal access roads, parking areas, basins, retaining walls and services.
- Building Works: Construction of five warehouses within new subdivision area.

The potential for Aboriginal archaeological material to be present within the proposed development are as likely to be nil to very low. If Aboriginal archaeological material is present within the disturbed landscape, it would be of low scientific significance due to a lack of archaeological context and integrity. It was found that natural deposits were located immediately adjacent to the existing creek line. However, the proposed works will not impact the potential intact Aboriginal archaeological deposits.

9.2 Impacts to potential archaeological resources

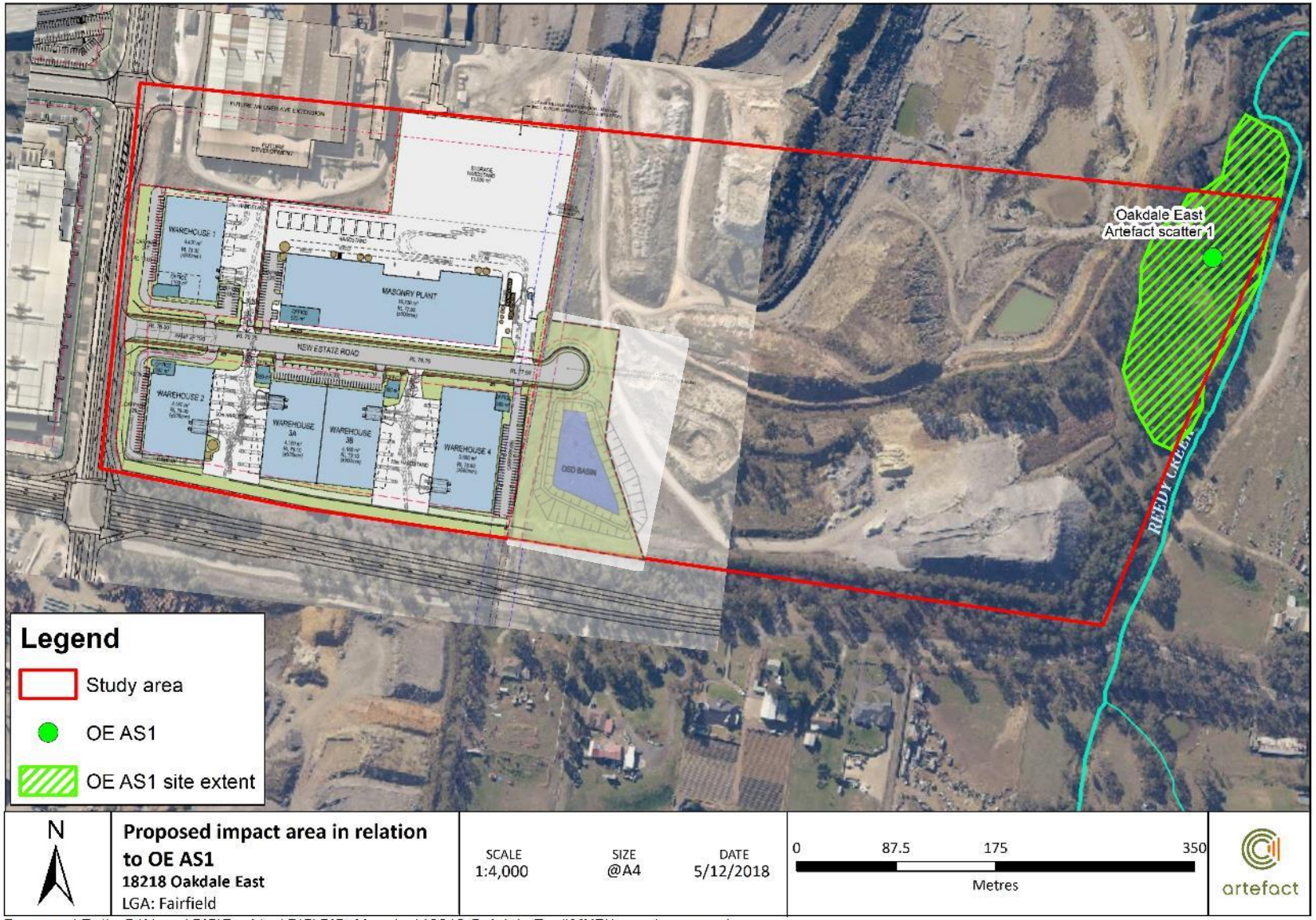
Due to the highly disturbed nature of the ground in the portion of the study area that is to be impacted by the proposed development, archaeological deposits are not likely to exist. Therefore, it is highly unlikely there will be impacts Aboriginal archaeological remains. The location of the identified Aboriginal site and PAD in relation to the proposed works is seen in Figure 9.1.

The impact assessment for OE AS1 (AHIMS ID pending) in relation to the proposed works is summarised in Table 9.1.

Table 9.1 Impact assessment summary based of proposed works

Site name	Type of harm	Degree of harm	Consequence of harm
OE AS1 (AHIMS ID pending)	None	None	No loss of value

Figure 9.1: Proposed impact area in relation to OE AS1 (AHIMS ID pending)



10.0 MANAGEMENT OR MITIGATION MEASURES

The overall guiding principle for cultural heritage management is that where possible, Aboriginal sites should be conserved. If conservation is not practicable, measures should be taken to mitigate impacts to Aboriginal sites.

The current development proposal will not impact on OE AS1 (AHIMS ID pending). If in the future development plans change and impacts are proposed for OE AS1 (AHIMS ID pending) then further investigations would be required, specifically subsurface test excavations in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (Department of Environment, Climate Change & Water [DECCW] 2010a). The preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR) would be required in accordance with the Guide to Investigating and Reporting on Aboriginal Cultural Heritage in New South Wales (the Guide) (Office of Environment & Heritage [OEH] 2011). Consultation would be required with Registered Aboriginal Parties (RAPs) in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (Consultation Requirements) (DECCW 2010b). This report would make recommendations for the management of archaeological and cultural values in the study area based on consultation with RAPs and whether an Aboriginal Heritage Impact Permit would be required.

The current development proposal is unlikely to impact any intact archaeological remains therefore no further archaeological investigation or mitigation is required. An unexpected finds policy is required to be implemented in the event of Aboriginal objects being identified during ground works and excavation.

An unexpected finds policy would involve the following actions:

- Stop work within the affected area, protect the potential archaeological find, and inform environment staff or supervisor.
- Contact a suitable qualified archaeologist to assess the potential archaeological find.
- If Aboriginal archaeological material is identified, works in the affected area should cease, and the OEH should be informed. Further archaeological mitigation may be required prior to works recommencing.
- If human remains are found or disturbed in, on or under the land, you must:
  - not further disturb or move these remains
  - immediately cease all work at the particular location
  - notify NSW Police
  - notify OEH (formerly DECCW's) Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location
  - not recommence any work at the particular location unless authorised in writing by OEH.

11.0 RECOMMENDATIONS

The following recommendations were based on consideration of:

- Statutory requirements under the *National Parks and Wildlife Act 1974*
- The requirements of the Code of Practice
- The results of the background research and archaeological survey results.

It was found that:

- No Aboriginal archaeological site or areas of PAD are located within the area to be impacted by the proposed development.
- One Aboriginal site (OE AS1) (AHIMS ID pending) comprising an artefact scatter and potential archaeological deposit was identified adjacent to Reedy Creek on the eastern boundary of the study area.

It is therefore recommended that:

- No further investigation is required for the proposed development area as it is considered to be of nil to low archaeological sensitivity.
- If changes are made to the concept design that may result in impacts to the identified aboriginal site (OE AS1) (AHIMS ID pending) and area of archaeological sensitivity along the Reedy Creek corridor then further archaeological assessment and investigations would be required. This would require test excavations to investigate the archaeological potential and an Aboriginal Cultural Heritage Assessment and consultation with the Aboriginal community to address the cultural values and to support the application for an Aboriginal Heritage Impact Permit (AHIP).
- Where changes to the scope of the proposal result in impacts beyond the extent of the study area, further archaeological survey and addendum ASR reporting may be required
- An unexpected finds policy should be implemented, with the following conditions:
  - Stop work within the affected area, protect the potential archaeological find, and inform environment staff or supervisor.
  - Contact a suitable qualified archaeologist to assess the potential archaeological find.
  - If Aboriginal archaeological material is identified, works in the affected area should cease, and the OEH should be informed. Further archaeological mitigation may be required prior to works recommencing.
- If human remains are found or disturbed in, on or under the land, you must:
  - not further disturb or move these remains
  - immediately cease all work at the particular location
  - notify NSW Police
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  - not recommence any work at the particular location unless authorised in writing by OEH.

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