



# Environmental Survey of Commonwealth Land at Badgerys Creek: Aboriginal Heritage

Prepared by Australian Museum Consulting  
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## Executive Summary

The environmental issues of Commonwealth owned land at Badgerys Creek have been the subject of a number of investigations since the 1980s, when the area was first identified as a possible location for a second airport for Sydney. The current environmental survey of Commonwealth-owned land at Badgerys Creek has been prepared by Australian Museum Consulting (AM Consulting) for SMEC Australia Pty Ltd (SMEC), on behalf of the Western Sydney Unit (WSU) of the Department of Infrastructure and Regional Development. The report builds upon a substantial body of existing information about the site to provide an updated baseline of the status and condition of specific environmental aspects. In particular, this report focuses on Aboriginal cultural heritage.

Environmental investigations undertaken for the area addressing Aboriginal heritage include the 1997 *Draft Environmental Impact Statement* (EIS) and the 1999 *Supplement to the Draft EIS*. The 1997 EIS identified 60 Aboriginal heritage sites, comprising open artefact scatters, scarred trees, and isolated artefacts within the boundaries of the Commonwealth owned land at Badgerys Creek. Based on these results and a review of landforms, water resources and past land use, the 1997 EIS concluded that 23 Aboriginal heritage sites were identified within areas of moderate and high archaeological potential, associated primarily with minor and secondary creek corridors.

The constrained timeframe for the current investigation has been such the survey targeted only the 23 Aboriginal heritage sites identified by the 1997 EIS as being located within areas of moderate and high archaeological potential. Inspection of these high priority sites was intended to allow an assessment of their current status and condition, development of interim management recommendations for each specific site, and assist in the development of overall management recommendations for the entirety of the Commonwealth Lands at Badgerys Creek.

The following recommendations have been developed to provide guidance in the short term for the management of heritage values within the Commonwealth owned land at Badgerys Creek:

Consultation with the representatives of the local Aboriginal communities has not been carried out for the current investigation. Archaeological and heritage management best practice requires that representatives of the local Aboriginal community are included as stakeholders in decisions concerning any heritage objects, archaeological places or Sacred Sites. In addition, assessments of cultural significance, the values of a site to the Aboriginal community itself, can only be carried out by the relevant Aboriginal communities.

### **Recommendation 1**

***Aboriginal community consultation should be carried out to ensure the appropriate involvement of Aboriginal stakeholders in the assessment and decision making regarding their heritage. Consultation should comply with the Australian Heritage Commission's Ask First: A guide to respecting Indigenous heritage places and values (2002), and address the NSW Office of Environment and Heritage's Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW 2010), as appropriate.***

In order to assess the Aboriginal cultural heritage of the Commonwealth owned land at Badgerys Creek, an Aboriginal heritage survey is required to identify and record a representative sample of material traces and evidence of Aboriginal occupation within the Badgerys Creek area. The survey will provide the opportunity to test the predictive model of Aboriginal heritage developed for the region, and is essential to allow the development of an appropriate strategy and methodology for further impact mitigation planning.

## **Recommendation 2**

***Full archaeological survey of the Commonwealth owned land at Badgerys Creek should be undertaken in consultation and engagement with Aboriginal community stakeholders. The survey and assessment should seek to assess a representative sample of all landforms within the area, and should comply with the requirements of the NSW Office of Environment and Heritage's Code of Practice for Archaeological investigation of Aboriginal Objects in New South Wales (DECCW, 2010)***

In order to generate a holistic understanding of the Aboriginal cultural heritage of the Badgerys Creek area, archaeological excavations are recommended in the event that future works or developments are proposed within the Commonwealth owned land at Badgerys Creek. Increased knowledge of the archaeology of the Commonwealth owned land will allow an appropriate management of the risks to Aboriginal heritage arising from future land use or development within the lands.

## **Recommendation 3**

***A program of archaeological test and salvage excavations should be carried out throughout impact areas resulting from future development or land use activities on the Commonwealth owned land at Badgerys Creek, in consultation and engagement with Aboriginal community stakeholders. The scope and methodology of the excavation should respond to the results of the archaeological survey and assessment, and should seek to recover and analyse an appropriate representative sample of the Aboriginal archaeological resource of the area.***

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# 1 Introduction

This environmental survey of Commonwealth owned land at Badgerys Creek has been prepared by Australian Museum Consulting (AM Consulting) for SMEC Australia Pty Ltd (SMEC) on behalf of the Western Sydney Unit (WSU) of the Department of Infrastructure and Regional Development. This investigation builds upon a substantial body of existing information about the site to provide an updated baseline of the status and condition of specific environmental aspects. In particular, this report focuses on Aboriginal cultural heritage.

The environmental issues of the Badgerys Creek site have been the subject of a number of past investigations. This includes environmental investigations undertaken for the Draft Environmental Impact Statement (EIS) that was completed in 1997 and the Supplement to the Draft EIS completed in 1999, both under the *Environment Protection (Impact of Proposals) Act 1974*. The purpose of the current investigation is to build upon the previous work relating to the environmental issues of the site and to bring the knowledge up to date. This current work interprets the findings of the survey in the context of current Commonwealth and NSW legislation and guidance materials.

## 1.1 Objectives of the Current Investigation

The objectives of the environmental survey are to:

- Update existing baseline environmental information for the Commonwealth-owned land at Badgerys Creek and specifically the status and condition of the site's flora, fauna, cultural heritage and hydrological features.
- Identify the national, state and regional significance of these environmental aspects in the broader environmental context of the area surrounding the site.
- Analyse any changes in status and condition since the last field surveys undertaken in the late 1990s and particularly in the context of the requirements of the *Environment Protection and Biodiversity Conservation Act 1999*.
- Provide baseline data to inform any future environmental investigations of the Commonwealth-owned land at Badgerys Creek.
- Provide a benchmark against which past and future surveys can be compared.
- Make recommendations to inform future site survey program(s).

This report is intended to assist the Commonwealth to identify, analyse and consider options available for the existing management of the site, and in relation to potential future development and management of the site. It has been prepared in the context of current Commonwealth and New South Wales (NSW) legislation and guidance documents. It should be noted that as the aim of the current investigation is to address Aboriginal heritage issues within the Commonwealth owned land, NSW legislation has no standing; however, the WSU has indicated a commitment to a 'good neighbour policy', which includes consideration of State heritage guidelines and heritage best practice.

## 1.2 Methodology & Authorship

This report is consistent with the principles of the *Burra Charter: The Australia ICOMOS charter for the conservation of places of cultural significance* (rev. 2013), and addresses current best-practice heritage guidelines as identified in the NSW Office of Environment and Heritage's (OEH) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in New South Wales* (DECCW 2010).

The following tasks have been completed for this investigation:

- Review of all statutory and non-statutory Commonwealth and NSW registers and lists. The results are in Section 2 and 3.2.2 of the report;
- Review of previous Aboriginal heritage studies conducted on the Commonwealth owned land at Badgerys Creek;
- Review of the environmental and Aboriginal heritage context of the Badgerys Creek area, and development of a predictive model for Aboriginal heritage for the local region, based on the current understanding of Aboriginal heritage and archaeology;
- Targeted survey of Aboriginal heritage sites within areas of high or moderate archaeological potential in the Commonwealth owned land at Badgerys Creek, to establish their current status and condition; and
- An assessment of gaps in the current investigation and provision of management recommendations to guide future investigation and management of Aboriginal heritage within the Commonwealth owned land at Badgerys Creek.

The report has been prepared by Christopher Langeluddecke, AM Consulting Project Manager, Aboriginal Heritage and Ngaire Richards, AM Consulting Project Officer. AM Consulting Senior Project Manager Jennie Lindbergh, reviewed the report for quality and consistency.

### 1.3 Limitations

The following limitations to the current investigation of the Commonwealth owned land at Badgerys Creek area are relevant:

- Constrained timeframe for background review, investigation of additional documentary resources and field survey;
- Time constraints for the field survey has meant that a detailed investigation of each previously identified Aboriginal heritage site within the identified potential and listed heritage item was not possible. The targeted archaeological survey undertaken for the current investigation inspected 21 Aboriginal sites within zones assessed in the 1997 *Draft Environmental Impact Statement* (EIS) as having moderate and high archaeological potential; and
- Consultation with the local Aboriginal community was not included in the project scope, and therefore it has not been possible to assess the potential cultural or spiritual significance of Aboriginal heritage sites.

It has not been possible to obtain a complete version of the *Technical Paper 11: Aboriginal Cultural Heritage* (Navin Officer 1997) produced for the 1997 EIS. The version available for the current investigation did not contain detailed descriptions of Aboriginal sites recorded by that assessment. In the absence of detailed site information, the current investigation has based the assessment of previous site condition on the limited information available in the OEH Aboriginal Heritage Information Management System (AHIMS) database.

In order to accommodate the constrained timeframe, survey undertaken for this investigation has targeted at high priority Aboriginal heritage sites, within areas of high and moderate archaeological potential. This targeted survey has allowed for development of interim management recommendations for each specific site investigated, and assisted in the development of overall management recommendations for the entirety of the Commonwealth Lands at Badgerys Creek. An Aboriginal heritage survey to identify and record a representative sample of material traces and evidence of Aboriginal occupation across the whole of the Commonwealth lands at Badgerys Creek is included as a recommendation of this report.

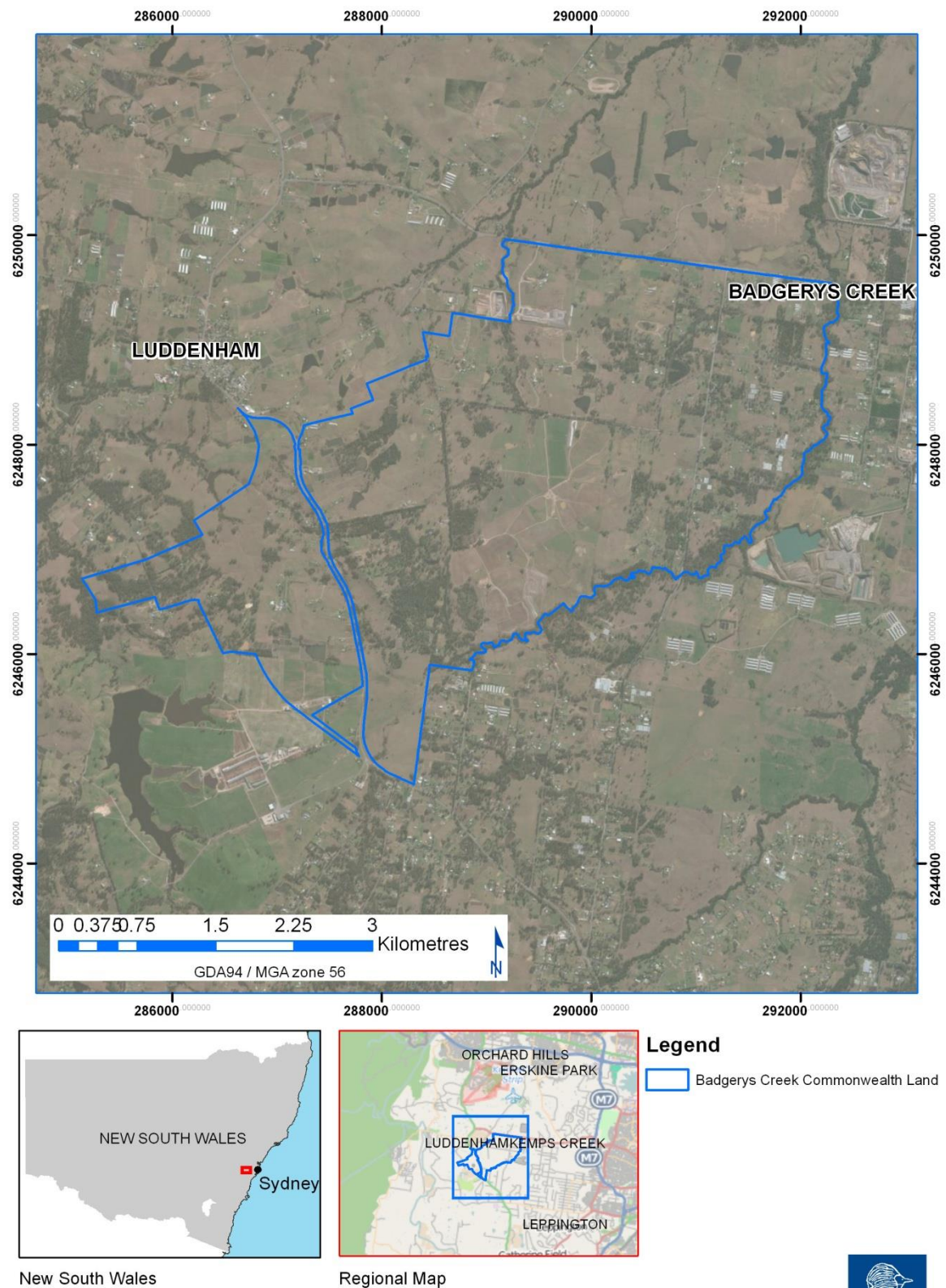
Assessments of cultural significance, the values of a site to the Aboriginal community itself, can only be carried out by the relevant Aboriginal communities. Archaeological and heritage management best practice requires that representatives of the local Aboriginal community

are included as stakeholders in decisions concerning any heritage objects, archaeological places or Sacred Sites. Consultation with Aboriginal community stakeholders is included as a recommendation of this report for any subsequent heritage investigations.

## 1.4 Study Area

The study area for this environmental survey consists of Commonwealth owned land at Badgerys Creek as shown in Figure 1.1. The study area includes the creeks bordering the site and the land immediately adjacent to The Northern Road, within the Commonwealth-owned land, also known as Lot 1 DP838361. Where appropriate, it also discusses the area immediately surrounding the land in order to provide a broader context for the survey.

The Commonwealth owned land comprising the study area are located within the Liverpool LGA and are approximately 50 kilometres west of the Sydney CBD, 15 kilometres west of the Liverpool town centre, and 12 kilometres south of Penrith. To the west lie the Nepean River and the Blue Mountains, including the Greater Blue Mountains World Heritage Area. The Commonwealth owned land is adjacent to the north-western boundary of the South West Growth Centre and at the far western edge of the Western Sydney Employment Area.



New South Wales

Regional Map

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**Figure 1.1 Commonwealth owned land at Badgerys Creek comprising the current study area.**



## 2 Relevant Legislation & Guidelines

The conservation and management of heritage items takes place in accordance with relevant Commonwealth, State or local government legislation. Non-statutory heritage lists, ethical charters, conservation policies, organisational policies, and community attitudes and expectations can also have an impact on the management, use, and development of heritage assets.

### 2.1 Commonwealth Legislation

#### 2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework for the protection and management of places of national environmental significance. The heritage lists addressed by the EPBC Act include the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List (WHL), the National Heritage List (NHL), and the Commonwealth Heritage List (CHL).

All World Heritage properties in Australia are matters of national environmental significance protected and managed under the EPBC Act (UNESCO 2014). The NHL protects places that have outstanding value to the nation. The CHL protects items and places owned or managed by Commonwealth agencies. The Australian Government Department of the Environment is responsible for the implementation of national policies and programs to protect and conserve the environment, water and heritage, and promote climate action. The Minister's approval is required for controlled actions which would have a significant impact on items and places included on the WHL, NHL or CHL.

There are no Aboriginal heritage items or places listed on the NHL or CHL within or near the Commonwealth owned land at Badgerys Creek.

#### 2.1.2 *Environment Protection and Biodiversity Conservation Regulations 2000*

Schedule 7B of the EPBC Regulations 2003 (regulation 10.03D) sets out the Commonwealth Heritage Management Principles of which the following are relevant to the local heritage environment:

3. *The management of Commonwealth Heritage places should respect all heritage values of the place and seek to integrate, where appropriate, any Commonwealth, State, Territory and local government responsibilities for those places.*
6. *Indigenous people are the primary source of information on the value of their heritage and that the active participation of indigenous people in identification, assessment and management is integral to the effective protection of indigenous heritage values*

Identification of heritage items and places with Indigenous cultural heritage value that are recognised and protected by the Commonwealth, State and local governments provides a context for the local heritage environment of the Commonwealth owned land at Badgerys Creek.

#### 2.1.3 *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

The purpose of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSHP Act) is to preserve and protect areas and objects in Australia and in Australian waters, that are of particular significance to Indigenous people in accordance with their traditions. The ATSIHP Act allows the Environment Minister to make a declaration

protecting significant Indigenous areas or objects, including human remains, from 'threat of injury or desecration'. Emergency declarations can also be made by the Minister, or authorised officers, where there is a serious and immediate threat. The ATSIHP does not protect all forms of Indigenous heritage; for example, it does not cover areas and objects whose heritage significance is due to their archaeological, scientific or historical interest (Department of the Environment 2014:5).

There are no areas and objects within or near the Commonwealth owned land at Badgerys Creek that are the subject of a declaration under the ATSIHP Act.

#### 2.1.4 *Native Title Act 1993*

Native title is the recognition by Australian law that Aboriginal peoples or Torres Strait Islanders have rights and interests to land and waters that arise from traditional laws and customs. The *Native Title Act 1993* (Native Title Act) recognises and protects native title in Australia, and establishes a mechanism for determining native title claims. It also provides for negotiations between native title holders or registered native title claimants (native title parties) and other parties regarding the use and management of land and waters, in the form of Indigenous Land Use Agreements (ILUAs).

The Native Title Registrar of the National Native Title Tribunal (NNTT) keeps three public registers of native title information: the National Native Title Register, the Register of Native Title Claims, and the Register of Indigenous Land Use Agreements. Registered native title holders are recognised as having a right to speak for Country on Indigenous culture and heritage (OEH 2012a:7).

There are no approved native title determinations, native title determination applications, or ILUAs registered within the Commonwealth owned land at Badgerys Creek.

#### 2.1.5 *Guidelines & Strategies*

Commonwealth guidelines and strategies related to Aboriginal heritage that are of likely or potential relevance to the Commonwealth owned land at Badgerys Creek are listed in the following table with comment provided on the nature of their relevance

**Table 2.1 Commonwealth guidelines and strategies related to Aboriginal heritage.**

Guideline/Strategy	Agency	Comment
<i>Burra Charter: The Australian ICOMOS charter for the conservation of places of cultural significance</i> (Australia ICOMOS, 2013)	Australia ICOMOS	The Burra Charter and the associated series of Practice Notes provide a best practice standard for managing cultural heritage places in Australia.
<i>EPBC Act Policy Statement 1.1 – Significant Impact Guidelines – Matters of National Environmental Significance</i> (2013)	Department of the Environment	Provides overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under national environment law — the EPBC Act.
<i>EPBC Act Policy Statement 1.2 – Significant Impact Guidelines – Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies</i> (2006)	Department of the Environment	Applies to any person who proposes to take an action which is either situated on Commonwealth land or which may impact on Commonwealth land, and/or representatives of Commonwealth agencies who propose to take an action that may impact on the environment anywhere in the world.
<i>Ask First: A guide to respecting Indigenous heritage places and values</i> (Australian Heritage Commission, 2002)	Australian Heritage Commission (non-statutory)	Provides a practical guide for land developers, land users and managers, cultural heritage professionals and many others who may have an impact on Aboriginal heritage. Is intended to ensure that the rights and interests of Aboriginal people in maintaining their heritage is accepted and respected.
<i>Heritage Strategy</i> (2005)	Department of Transport and Regional Services	Provides guidelines for managing heritage places owned and / or managed by DOTAR (now Department of Infrastructure and Regional Development), in accordance with the 2004 amendments to the EPBC Act and the EPBC Regulations 2000.

## 2.2 Relevant NSW legislation

### 2.2.1 *National Parks and Wildlife Act 1974*

Under the provisions of the *National Parks and Wildlife Act 1974* (NPW Act), the Director-General of the National Parks and Wildlife Service (NPWS; now OEH) is responsible for the care, control and management of all national parks, historic sites, nature reserves, state conservation areas, karst conservation reserves and regional parks. The Director-General is also responsible, under this legislation, for the protection and care of native fauna and flora, and Aboriginal places and objects throughout NSW.

All Aboriginal Objects are protected under the NPW Act regardless of their significance or land tenure. Aboriginal Objects can include pre-contact features such as scarred trees, middens and open camp sites, as well as physical evidence of post-contact use of the area such as Aboriginal fringe camps. The NPW Act also protects Aboriginal Places, which are defined as a place that 'is or was of special significance with respect to Aboriginal culture'. Aboriginal Places can only be declared by the Minister administering the NPW Act.

Under Section 90 of the Act, it is an offence for a person to destroy, deface, damage or desecrate an Aboriginal Object or Aboriginal Place without the prior issue of an Aboriginal Heritage Impact Permit (AHIP). The Act requires a person to take reasonable precautions and due diligence to avoid impacts on Aboriginal Objects. AHIPs may only be obtained from the Environmental Protection and Regulation Division (EPRD) of OEH.

The *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* commenced on 1 October 2010. This Regulation excludes activities carried out in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* from the definition of harm in the NPW Act. That is, test excavations may be carried out in accordance with this Code of Practice, without requiring an AHIP. The Regulation also specifies Aboriginal community consultation requirements (*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*). In addition, the Regulation adopts a Due Diligence Code of Practice which specifies activities that are low impact, providing a defence to the strict liability offence of harming an Aboriginal object.

### *Aboriginal Heritage Information Management System (AHIMS)*

Part of the regulatory framework for the implementation of the NPW Act is the Aboriginal Heritage Information Management System (AHIMS), maintained by OEH. AHIMS includes a database of Aboriginal heritage sites, items, places and other objects that have been reported to the OEH. Also available through AHIMS are site cards, which describe Aboriginal sites registered in the database, as well as Aboriginal heritage investigation reports, which contribute to assessments of scientific significance for Aboriginal sites. The AHIMS is not a comprehensive list of all Aboriginal heritage sites in NSW; rather, it reflects information which has been reported to OEH. As such, site co-ordinates in the database vary in accuracy depending on the method used to record their location. Heritage consultants are obliged to report Aboriginal sites identified during field investigations to OEH, regardless of land tenure, or whether such sites are likely to be impacted by a proposed development.

The results of a site search for the local area are presented in Section 3.2.

### 2.2.2 *Heritage Act 1977*

The Heritage Act 1977 (Heritage Act) provides protection for heritage places, buildings, works, relics, moveable objects, precincts and archaeological sites that are important to the people of NSW. These include items of historic (non-Aboriginal) and Aboriginal heritage



significance. Where these items have particular importance to the people of NSW, they are listed on the State Heritage Register (SHR).

There are no Aboriginal heritage items or places in or near the Commonwealth owned land at Badgerys Creek are listed on the SHR.

### *2.2.3 Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the main act regulating land use planning and development in NSW. The EP&A Act controls the making of environmental planning instruments (EPIs). Two types of EPIs can be made: State Environment Planning Policies (SEPPs), covering areas of State or regional environmental planning significance; and Local Environmental Plans (LEPs), covering LGAs. SEPPs and LEPs commonly identify and have provisions for the protection of local heritage items and heritage conservation areas. Commonwealth owned land at Badgerys Creek are within Liverpool Local Government Area.

### *Liverpool Local Environmental Plan 2008*

Part 5, Clause 5.10 'Heritage conservation' of the Liverpool LEP is consistent with current heritage best practice guidelines, providing for the protection of heritage items, places, conservation areas, and archaeological sites. Schedule 5 'Environmental heritage' does not include any Aboriginal objects or places of heritage significance within or near the Commonwealth owned land at Badgerys Creek.

### *2.2.4 Guidelines & Strategies*

NSW guidelines and strategies related to Aboriginal heritage that are of likely or potential relevance to the Commonwealth owned land at Badgerys Creek are listed in the following table with comment provided on the nature of their relevance.

**Table 2.2 NSW guidelines and strategies related to Aboriginal heritage.**

Guideline/Strategy	Agency	Comment
<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010)	Office of Environment and Heritage	This Code has been developed to support the process of investigating and assessing Aboriginal cultural heritage. It specifies the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. An Aboriginal cultural heritage assessment that requires an archaeological investigation to be undertaken must be done in accordance with the requirements of this Code
<i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (DECCW, 2010)	Office of Environment and Heritage	This guide provides best practice guidance for investigating and assessing Aboriginal cultural heritage in NSW, and outlines OEH's requirements for Aboriginal cultural heritage reporting in NSW.
<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i> (DECCW 2010)	Office of Environment and Heritage	This Code is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for consent in the form of an AHIP.
<i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010)	Office of Environment and Heritage	Focuses on the requirements for consultation with Aboriginal people as part of the heritage assessment process: <ul style="list-style-type: none"> <li>• to determine potential harm on Aboriginal cultural heritage from proposed activities</li> <li>• that informs decision making for any application for an AHIP where it is determined harm cannot be avoided.</li> </ul>

## 3 Existing Environment

### 3.1 Environmental Context

An understanding of environmental factors within the local landscape provides a context for past human occupation and history of an area. The analysis of environmental factors contributes to the development of the predictive modelling of archaeological sites, and is also required to contextualise archaeological material and to interpret patterns of past human behaviour. In particular, the nature of the local landscape including topography, geology, soils, hydrology and vegetation are factors which affect patterns of past human occupation.

#### *3.1.1 Topography & Geology*

The Commonwealth-owned land at Badgerys Creek is located in the south west Cumberland Plain. The local topography is characterised by the gently undulating plains and low hills of the Cumberland Lowlands physiographic region of the Sydney Basin, and comprises broad rounded crests and ridges, with gently inclined slopes of less than 5%, occasionally up to 10% (Bannerman and Hazelton 1990:2, 28). Landform units within the Commonwealth owned land at Badgerys Creek include ridges, slopes and flats (terrace plain and plain). Elevations range from a low point of c.45m above sea level (asl) where Elizabeth Drive crosses Badgerys Creek, to 119m asl at Anchau trigonometric station (Department of Aviation [DoA] 1985:274, 276).

The Commonwealth owned land at Badgerys Creek are located on the Bringelly Shale formation of the Wianamatta Group, which consists of shale (claystone and siltstone), carbonaceous claystone, laminate and fine to medium-grained lithic sandstone. Outcrops of shale do not occur naturally, but may be present where soils have been removed (Bannerman and Hazelton 1990:2-3, 28). The Luddenham Dyke, composed of olivine basalt, transects the western side of the Commonwealth owned land at Badgerys Creek and intrudes into the sedimentary rocks of the Wianamatta Group. It forms an elevated ridge which extends south east from Luddenham toward Bringelly (DoA 1985:264, 273; Department of Transport and Regional Development [DoTaRD] 1997:16-3). This geological landscape does not generally result in stone outcrops suitable as surfaces for art (such as rock engravings or paintings), artefact manufacture (surfaces for sharpening stone tools or sources of raw material), or as shelters for camping. As such, art sites, grinding grooves, stone quarries, and shelters are unlikely to be present in the Commonwealth owned land at Badgerys Creek.

#### *3.1.2 Soils*

The region is characterised by two soil landscapes; the Blacktown landscape (residual) and the South Creek landscape (fluvial). The Commonwealth owned land at Badgerys Creek are within the Blacktown soil landscape, containing shallow to moderately deep soils up to a maximum depth of 200cm. Friable brownish black loam (A horizon) and hardsetting clay loam (A2 horizon) occur as topsoil up to 50cm deep, overlying strongly pedal, mottled brown light clay (B horizon), and deep subsoil of light grey plastic mottled clay (B3 or C horizon). The soils contain naturally occurring iron indurated gravel-sized fragments of shale. Minor sheet and gully erosion may occur in areas where surface vegetation has been cleared (Bannerman and Hazelton 1990:28-31).

The South Creek soil landscape occurs along drainage channels and narrow floodplains associated with the Badgerys Creek and Cosgroves Creek tributaries, with surficial deposits of Quaternary alluvium derived from Wianamatta Group shales and Hawkesbury sandstone. The alluvium typically contains fine-grained sand, reddish brown silt, and clay. Brown apedal single-grained loam and hardsetting dull brown clay loam may occur as topsoil up to a depth of 50cm near drainage channels (A horizon), overlying bright brown light to medium clay (B

horizon) (Bannerman and Hazelton 1990:68-70; DoA 1985:270). Stratified or *in situ* potential archaeological deposits are most likely to occur in the fluvial South Creek soils.

### 3.1.3 Vegetation

Prior to the implementation of European land practices, the Commonwealth owned land at Badgerys Creek is likely to have been vegetated by open woodland and dry sclerophyll forest. Common tree species would have included forest red gum (*Eucalyptus tereticornis*), narrow-leaved ironbark (*E. crebra*), grey box (*E. moluccana*), and spotted gum (*Corymbia maculata*) (Bannerman and Hazelton 1990:29). Native vegetation communities in the vicinity of the Commonwealth owned land at Badgerys Creek are predominantly regrowth, as the area has been extensively cleared since European settlement. Such clearing also impacts the integrity of archaeological deposits, and may have removed trees modified by Aboriginal people in the past.

### 3.1.4 Hydrology & Drainage

The Commonwealth owned land at Badgerys Creek is within the catchment of the Hawkesbury-Nepean River system. The elevated ridge extending from Luddenham is the watershed between the South Creek and Nepean River subcatchments. The nearest permanent watercourse is Badgerys Creek, which defines the south eastern boundary of the Commonwealth owned land and flows north east into South Creek. Non-perennial watercourses near the Commonwealth owned land include Oaky and Cosgroves Creeks, which also flow north east into South Creek; Duncans Creek, which flows west into the Nepean River; and a number of minor, unnamed first-order tributaries (Figure 3.1). Although minor tributaries are unlikely to have provided permanent fresh water, they would have been used by Aboriginal people as seasonal water sources. It is therefore likely that Aboriginal sites are present throughout the Commonwealth owned land at Badgerys Creek.

### 3.1.5 Land Use & Disturbance

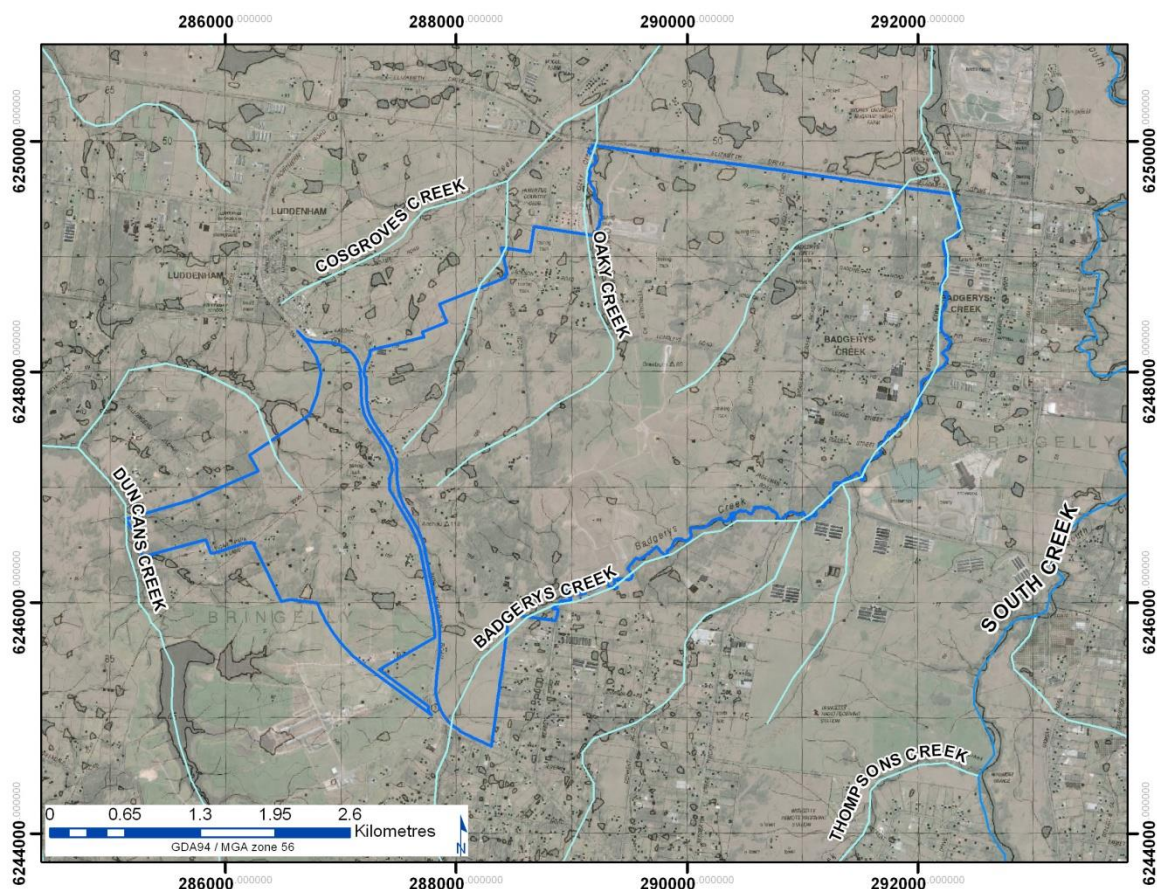
The Commonwealth owned land at Badgerys Creek is approximately 1,700 hectares in size and is currently tenanted. There are about 200 short term residential rural and commercial leases. The majority of the properties are rural residential and are generally two hectares in area or greater. The main land uses are various agricultural purposes and low density rural residential development. Commercial leases include grazing, horse agistment, a winery, shop, piggery, duck farm and market gardens.

The various land use activities have resulted in the majority of the Commonwealth owned land at Badgerys Creek having been extensively cleared of its original vegetation, particularly mature trees. Many watercourses within the Commonwealth owned land have undergone modifications as a result of European agricultural land use practices, with a large number of man-made earthen dams present (DoA 1985:280). Disturbance has also resulted from the development of infrastructure including roads, electricity and telecommunications transmission lines. Road easements within the Commonwealth owned land at Badgerys Creek are provided in Table 3.1.

The construction of dams and road networks is likely to have affected the integrity of the archaeological resource, in particular subsurface archaeological deposits adjacent to disturbed watercourses.

**Table 3.1 Road easements within the Commonwealth owned land at Badgerys Creek.**

Elizabeth Drive	The Northern Road
Gardiner Road	Taylor's Road
Pitt Street	Winston Close
Longleys Road	Badgerys Creek Road
Leggo Street	Ferndale Road
Fuller Street	Jackson Road
Jagelman Road	Ford Crescent
Anton Road	Willowdene Avenue
Vicar Park Lane	



**Legend**

- Watercourse**
- Badgerys Creek Commonwealth Land
  - Major
  - Minor

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Topographic data © 2006 Department of Lands 1:25000 TopoView Topographic and Orthophoto Map mosaic. Watercourse data © Commonwealth of Australia (Geoscience Australia) 2006.



**Figure 3.1 Watercourses in the vicinity of the Commonwealth owned land at Badgerys Creek**



## 3.2 Aboriginal Heritage Context

This section describes the nature of the known Aboriginal archaeology of the Commonwealth owned land at Badgerys Creek, based upon a review of relevant archaeological reports and publications, and a search and review of previously recorded sites in the OEH AHIMS database. This review and discussion allows for the development of a predictive model for potential Aboriginal sites within the Commonwealth owned land. Summary descriptions of site features are provided in Table 3.2.

**Table 3.2 Description of Aboriginal site features (after OEH 2012b:8-10)**

Site Feature	Description
Aboriginal Ceremony and Dreaming	Previously referred to as mythological sites these are spiritual/story places where no physical evidence of previous use of the place may occur, e.g. natural unmodified landscape features, ceremonial or spiritual areas, men's/women's sites, dreaming (creation) tracks, marriage places etc.
Aboriginal Resource and Gathering	Related to everyday activities such as food gathering, hunting, or collection and manufacture of materials and goods for use or trade.
Art	Art is found in shelters, overhangs and across rock formations. Techniques include painting, drawing, scratching, carving engraving, pitting, conjoining, abrading and the use of a range of binding agents and the use of natural pigments obtained from clays, charcoal and plants.
Artefacts	Objects such as stone tools, and associated flaked material, spears, manuports, grindstones, discarded stone flakes, modified glass or shell demonstrating evidence of use of the area by Aboriginal people.
Burials	A traditional or contemporary (post-contact) burial of an Aboriginal person, which may occur outside designated cemeteries and may not be marked, e.g. in caves, marked by stone cairns, in sand areas, along creek banks etc.
Ceremonial Ring	Raised earth ring(s) associated with ceremony.
Conflict	Previously referred to as massacre sites where confrontations occurred between Aboriginal and non-Aboriginal people, or between different Aboriginal groups.
Earth Mound	A mounded deposit of round to oval shape containing baked clay lumps, ash, charcoal and, usually, black or dark grey sediment. The deposit may be compacted or loose and ashy. Mounds may contain various economic remains such as mussel shell and bone as well as stone artefacts. Occasionally they contain burials.
Fish Trap	A modified area on watercourses where fish were trapped for short-term storage and gathering.
Grinding Grooves	A groove in a rock surface resulting from manufacture of stone tools such as ground edge hatchets and spears, may also include rounded depressions resulting from grinding of seeds and grains.
Habitation Structure	Structures constructed by Aboriginal people for short or long term shelter. More temporary structures are commonly preserved away from the NSW coastline, may include historic camps of contemporary significance. Smaller structures may make use of natural materials such as branches, logs and bark sheets or manufactured materials such as corrugated iron to form shelters. Archaeological remains of a former structure such as chimney/fireplace, raised earth building platform, excavated pits, rubble mounds etc.
Hearth	Cultural deposit sometimes marked by hearth stones, usually also contains charcoal and may also contain heat treated stone fragments.
Modified Tree	Trees which show the marks of modification as a result of cutting of bark from the trunk for use in the production of shields, canoes, boomerangs, burials shrouds, for medicinal purposes, foot holds etc.,

Site Feature	Description
	or alternately intentional carving of the heartwood of the tree to form a permanent marker to indicate ceremonial use/significance of a nearby area, again these carvings may also act as territorial or burial markers.
Non-Human Bone and Organic Material	Objects which can be found within cultural deposits as components of an Aboriginal site such as fish or mammal bones, ochres, cached objects which may otherwise have broken down such as resin, twine, dilly bags, nets etc.
Ochre Quarry	A source of ochre used for ceremonial occasions, burials, trade and artwork.
Potential Archaeological Deposit (PAD)	An area where Aboriginal objects may occur below the ground surface.
Shell	An accumulation or deposit of shellfish from beach, estuarine, lacustrine or riverine species resulting from Aboriginal gathering and consumption. Usually found in deposits previously referred to as shell middens. Must be found in association with other objects like stone tools, fish bones, charcoal, fireplaces/hearths, and burials. Will vary greatly in size and components.
Stone Arrangement	Human produced arrangements of stone usually associated with ceremonial activities, or used as markers for territorial limits or to mark/protect burials.
Stone Quarry	Usually a source of good quality stone which is quarried and used for the production of stone tools.
Waterhole	A source of fresh water for Aboriginal groups which may have traditional ceremonial or dreaming significance and/or may also be used to the present day as a rich resource gathering area (e.g. waterbirds, eels, clays, reeds etc.).

### 3.2.1 Historical Context

#### *Living as Australia's Earliest Inhabitants*

At the time of European settlement, the Aboriginal people of the Sydney region were organised into named territorial groups. Those groups local to the south west Cumberland Plain, of which Badgerys Creek is a part, would most likely have spoken dialects belonging to either the Darug or Gundungurra language groups (Attenbrow 2010:23, 32). The anthropologist and linguist RH Mathews identified the area they occupied:

*The Dhar'rook [Darug] and Gun'dungur'ra [Gundungurra] tribes respectively occupied the country from the mouth of the Hawkesbury river to Mount Victoria, and thence southerly to Berrima and Goulburn, New South Wales. On the south and southeast they were joined by the Thurrawal [Dharawal], whose language has the same structure, although differing in vocabulary (Mathews 1901:140).*

Mathews' descriptions of tribal boundaries are based on the distribution of language groups in this area, which are derived largely from his work with members of Aboriginal communities in the Sydney region in the late nineteenth and early twentieth centuries (Attenbrow 2010:16).

Creeks and other water resources were foci for Aboriginal occupation, providing fresh water, fish, shellfish, eels, waterbirds and plant foods, in addition to terrestrial animals drawn to the water (Attenbrow 2010:70-71). An historical account written by Francis Barrallier in 1802 noted that the diet of Aboriginal people around Camden (approximately 20km south of the Commonwealth owned land at Badgerys Creek) usually consisted of:

*[...] opossums [possum] and squirrels [probably gliders], which are abundant in that country, and also upon kangaroo-rat and kangaroo, but they can only catch this last one with the greatest trouble, and they are obliged to unite in great numbers to hunt it (Barrallier 1802[1897]).*

Trees provided shade, habitat for animals and birds, and bark for shelters (huts), canoes, paddles, shields, baskets and bowls. Stone outcrops provided material with which to make tools. When overhanging they provided shelter from the elements, and flat stone surfaces and shelters were sometimes engraved or painted by Aboriginal artists, although shelters and art sites mainly occur around the periphery of the Cumberland Plain in sandstone geology (Attenbrow 2010:105, 113-116, 120-122).

### *Surviving as Aboriginal People in a White-Dominated Economy*

Aboriginal groups and their traditional way of life underwent many changes following European settlement. It is unclear how many people lived in the region, although the Aboriginal population of the western Cumberland plain was considered by settlers to be less dense than along the coast. Introduced diseases, such as the smallpox epidemic of 1789, spread beyond the boundary of the colony in Sydney, and had a serious effect on the local population (Hunter 2003 [1793]; Attenbrow 2010:17). Historical records indicate that by the 1880s, a small number of groups lived in the south west Cumberland Plain, and while some still practised traditional economic activities, others were employed on farms (Table 3.3):

**Table 3.3 Location and employment of Aboriginal people in the south west Cumberland Plain, 1882 (after Thornton 1883:12-13)**

Location	Number of people	Employment
Camden	18	Employed at Camden Park
Liverpool	29	Fishing, hunting, and gathering wild honey
Campbelltown	3	Farm labourers and domestic servants

### *3.2.2 Regional Archaeological Context*

Aboriginal occupation of the Sydney region is likely to have spanned at least 20,000 years, although dates of more than 40,000 years have been claimed for artefacts found in gravels of the Cranebrook Terrace on the Nepean River (Nanson et al. 1987; Stockton 2009; Stockton & Holland 1974). Late Pleistocene occupation sites have been identified on the fringes of the Sydney basin and from rock shelter sites in adjoining areas. Dates obtained from these sites were 14,700 BP at Shaws Creek in the Blue Mountain foothills (Kohen et al. 1984), c.15,000-c.11,000 BP at on a levee near Pitt Town adjacent to the Hawkesbury River (Williams *et al.* 2012), c.11,000 BP at Loggers Shelter in Mangrove Creek (Attenbrow 1981, 2004), and c.20,000 BP at Burrill Lake on the South Coast (Lampert 1971). The majority of sites in the Sydney region, however, date to within the last 5,000 years, with some researchers proposing that occupation intensity increased from this period (Kohen 1986; McDonald 1994; McDonald & Rich 1993); although Williams has recently argued that this is part of a longer trend in stepwise population growth and diversification of economic activity evident in south east Australia from the Early to Mid-Holocene (Williams 2013). This increase in sites may reflect an intensity of occupation which was influenced by rising sea levels, which stabilised approximately 6,500 years ago. Older occupation sites along the now submerged coastline would have been flooded, with subsequent occupation concentrating on and utilising resources along the current coastlines and in the changing ecological systems of the hinterland (Attenbrow 2010:55-56).

The spread of urban development across the Cumberland Plain, particularly over the last few decades, has meant that archaeological investigations have intensified with the need for environmental impact assessments. Most archaeological investigations conducted within this



framework have been restricted by small study areas (as defined by individual developments) and limited project briefs. As a result, the Cumberland Plain has become the most intensively investigated archaeological landscape in Australia. The studies carried out over these decades of development in the west provide a broad picture of the regional archaeological context.

#### *Previous Archaeological Investigations*

There have been a number of archaeological investigations previously undertaken in the vicinity of the Commonwealth owned land at Badgerys Creek. The information summarised in Table 3.4 and Figure 3.2 is based on reports that have been registered with the OEH AHIMS in the localities of Badgerys Creek, Luddenham, Bringelly, Leppington, Erskine Park, Kemps Creek, West Hoxton and Orchard Hills, and which are most relevant and informative to archaeological background of the current project.

**Table 3.4 Summary of previous local Aboriginal heritage investigations**

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Dean-Jones (1991)	Lot 3 DP623799, Adams Road, Luddenham	Archaeological survey for proposed clay/shale extraction	1 artefact scatter was identified around the margin of a dam on the edge of the Oaky Creek floodplain, comprising 22 artefacts made of indurated fine sandstone, chert/tuff, and mudstone.	Adjacent to current study area (north west)
HLA- Envirosciences Pty Ltd (1995)	Farnsworth Avenue, Warragamba to The Northern Road, Luddenham	Archaeological survey for proposed haulage roads	10 sites identified in Wallacia, including 7 PADs on Farnsworth Avenue near Megarritys Creek, 1 artefact scatter near the corner of Park Road and Montelimar Place, 1 isolated artefact (stone axe) to the south of Park Road.	1.0km west
Steele (1999)	Luddenham & Mamre Roads, Luddenham	Archaeological survey for proposed rural residential subdivision and golf course	5 artefacts scatters, 1 isolated artefact and 1 potential scarred tree were identified. The locations of 5 previously identified sites were confirmed, 7 previously identified sites could not be relocated.  Sites on the Cosgrove Creek flat were generally dispersed along the watercourse and had low artefact densities. This area was assessed as having moderate archaeological sensitivity. Sites near the confluences of Kemps Creek and Badgerys Creek with South Creek, in the vicinity of a low gradient spur, are situated closer together. A number of these sites produced large quantities of artefacts. This area was assessed as having high archaeological sensitivity.	2.18km north

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Steele (2001)	Luddenham & Mamre Roads, Luddenham	Archaeological test excavation, rural residential subdivision and golf course	<p>3 geomorphological zones were investigated: the floodplain, slope and a ridgeline spur. A very low density of artefacts was found in alluvial deposits on the floodplain and aggrading lower slope. The highest density of artefacts, as well as naturally occurring silcrete gravels, was found on the ridgeline spur.</p> <p>The artefact assemblage was dominated by silcrete (93.7%), followed by quartz (4.4%) and tuff (1.8%), with a minor amount of other raw materials including volcanics, petrified wood and quartzite (0.1%).</p>	2.18km north
Steele (2007)	Twin Creeks Estate, Luddenham Road, Luddenham	Archaeological salvage excavation and monitoring, rural residential subdivision and golf course	<p>120 flaked stone artefacts were recovered from 16 test trenches in shallow colluvial soils. The assemblage was dominated by silcrete (90%, 108 artefacts), with smaller quantities of silicified tuff (6.67%, 8 artefacts), petrified wood (1.67%, 2 artefacts), quartzite (0.83%, 1 artefact), and indurated mudstone (0.83%, 1 artefact). No artefacts showed evidence of heat treatment. The artefact density was considered to be low, with approximately 7.5 artefacts per square metre. 90–95% of stone material recovered from the salvage excavation and surface collection was amorphous naturally fractured rock.</p> <p>Flakable quality silcrete cobbles were noted to be present across the surface of the study area.</p>	2.18km north

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Artefact Heritage (2012)	The Northern Road between The Old Northern Road, Narellan to Mersey Road, Bringelly	Archaeological survey for proposed road upgrade	32 sites identified; including 29 artefact sites, 2 scarred trees and 1 PAD. Landform units on which sites occurred include flats (4 artefact sites and 2 scarred trees), lower hillslope (12 artefact sites), lower hillslope/terrace (1 artefact site), hillslope (4 artefact sites), creek flat/terrace (1 PAD), creek flat (1 artefact site), upper hillslope (4 artefact sites), and low ridgeline (2 artefact sites). In addition, 4 previously recorded sites had been destroyed; including 2 artefact sites and 2 PADs.	Adjacent to current study area (south)
Brayshaw McDonald (1992)	Herbert Street, Kemps Creek to Bringelly sub- station	Archaeological survey of proposed 33kV transmission line	1 artefact scatter was identified on a low spur 80–150m from South Creek, comprising 11 artefacts of indurated mudstone, silcrete and chert.	2.47km south east
Australian Museum Business Services (AMBS) (2012)	Austral & Leppington North Precincts, South West Growth Centre	Archaeological survey for precinct planning	7 sites identified; including 2 artefact sites on slopes, 4 artefact sites and 1 artefact site/PAD on creek flats associated with Kemps Creek, Bonds Creek, and unnamed, minor tributaries.	4.22km east
White (2001)	Lot 70 DP260492, McCann Road and Bringelly Road, Leppington	Archaeological survey for proposed subdivision	Six isolated stone artefacts and one area of PAD were identified on a ridge between South Creek and Kemps Creek.	6.09km south east
AMBS (2013)	Leppington Precinct, South West Growth Centre	Archaeological survey for precinct planning	16 sites identified including 11 artefact sites on slopes, 1 artefact site on a slope/crest, and 2 PADs and 2 artefacts sites on creek flats associated with Kemps Creek and unnamed, minor tributaries.	7.36km south east
Navin Officer (2006)	Lot 13 DP707337, between Camden Valley Way and Cowpasture Road, Leppington	Archaeological survey for proposed redevelopment of caravan park	1 stone artefact, a silcrete flaked piece, was identified on a low gradient slope.	9.76km south east

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Dallas (1988a)	Luddenham Equestrian Centre, Luddenham Road, Erskine Park	Archaeological survey for proposed recreational and residential development	12 artefact scatters identified; 8 along the bank and flats of Cosgroves Creek, 3 on a ridge near the confluences of Kemps Creek and Badgerys Creek with South Creek, and 1 in disturbed deposits on South Creek. The presence of subsurface fine grained silcrete cobbles and nodules on the ridge was noted.  Artefacts were predominantly manufactured from silcrete; other stone types included chert and quartz.	2.18km north
JMCHM (2000)	"Austral Site", Mamre Road, Erskine Park	Archaeological survey for proposed light industrial subdivision	5 artefact scatters and 3 isolated artefacts were identified on areas with ground surface exposure on unsealed vehicle tracks, cattle tracks and areas of sheetwash erosion. 7 sites were identified on lower hillslopes, 2 on creek banks, and 1 on floodplain.	5.54km north east
McIntyre– Tamwoy (2003)	Junction of Mamre Road and Erskine Park Road, Erskine Park	Archaeological survey for proposed road works	4 sites identified, including 1 artefact scatter and 3 isolated finds. The location of 2 previously identified sites were confirmed	5.54km north east
JMCHM (2009)	Mamre Road Biodiversity Lot, Erskine Park	Aboriginal Heritage Management Plan	9 sites previously identified; 5 artefact scatters and 2 isolated finds in the vicinity of minor, first order tributaries of South Creek, and 2 artefact scatters in the vicinity of a second order stream channel. All sites are within 300m of the closest water source, with most sites between 50–200m.  Sites were recorded on lower hillslope landform units (67% of total sites), the interface of lower hillslope and creek bank (22%), and floodplain–creek bank (11%).	5.81km north east
McIntyre (1984)	Portion 7785, Erskine Park	Archaeological survey for proposed quarry extension	1 artefact scatter identified in a disturbed context adjacent to a road, comprising five pieces of flaked silcrete, one chert flake and one piece of broken quartz.	6.2km north east

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Navin Officer (2005a)	CSR lands, Lenore Lane, Erskine Park	Archaeological test excavation, proposed industrial development	<p>49 artefacts were recovered from 20 of 38 test pits. The lithic assemblage was dominated by silcrete (55.1%, 27 artefacts) and rhyolitic tuff (24.5%, 12 artefacts), with minor quantities of chert, chalcedony, quartz and unidentified stone (20.3%, 10 artefacts).</p> <p>The greatest density of artefacts occurred on locally elevated and relatively level ground adjacent to an unnamed creekline. Lower densities of artefacts were recorded on low gradient slopes along a spurline.</p>	6.2km north east
Navin Officer (2005b)	CSR lands, Lenore Lane, Erskine Park	Archaeological test excavation, proposed industrial development	<p>285 artefacts were recovered from 88 of 256 test pits. Low densities of artefacts were found on all landform units tested, including a ridgeline, spurline, valley floor, and locally elevated and relatively level ground adjacent to a watercourse.</p> <p>The greatest quantity of artefacts was recovered from valley floor contexts, which were assessed as having moderate to high archaeological potential. All other landform units were assessed as having moderate archaeological potential.</p>	6.2km north east

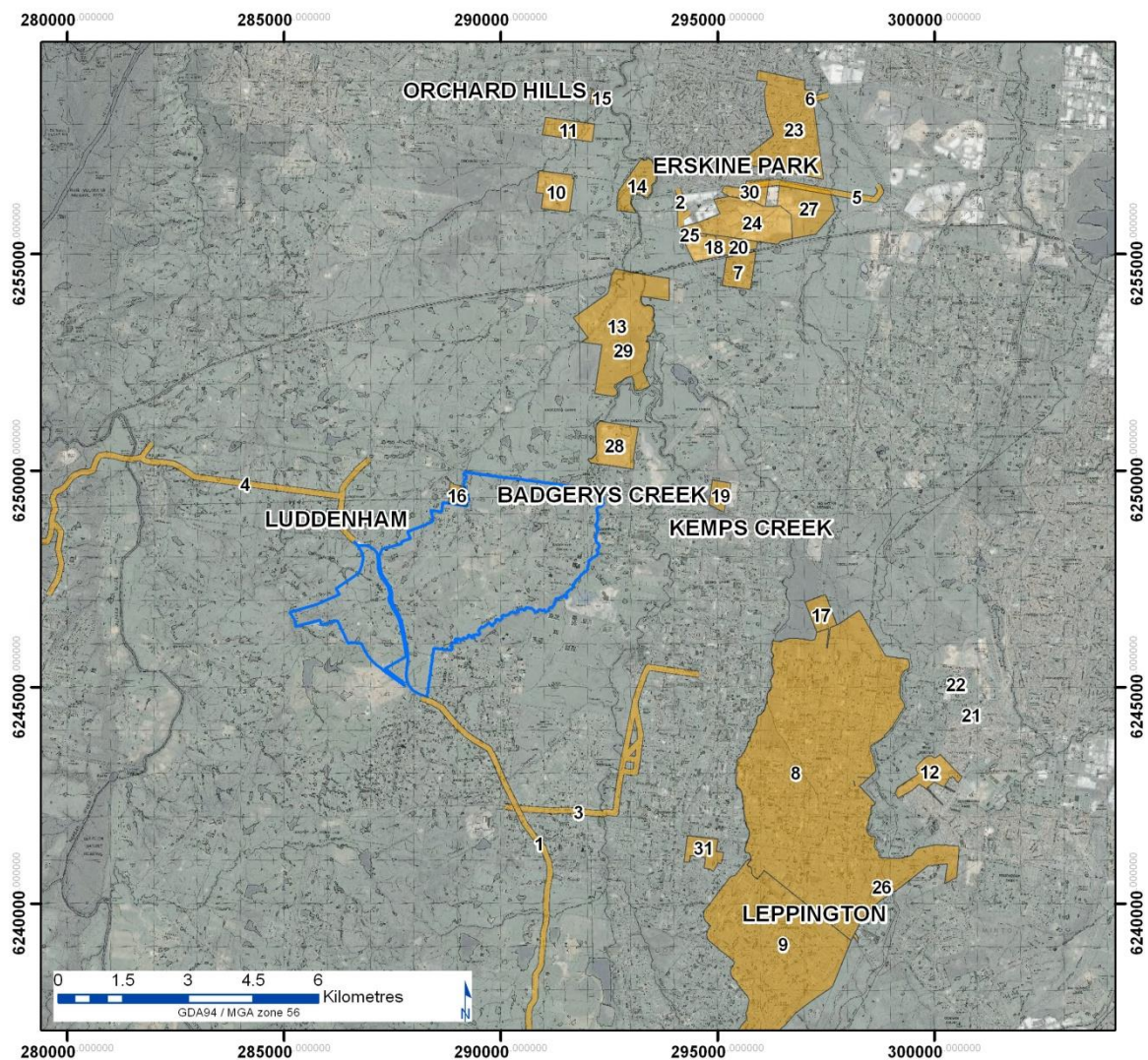
Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Navin Officer (2005c)	Crown road reserve near Mamre Road, Erskine Park	Archaeological test excavation, proposed access road	<p>172 artefacts were recovered from 21 of 24 test pits on a low spurline, previously identified as an area of archaeological potential. The artefact density was considered to be low, with 29.48 artefacts per square metre.</p> <p>The assemblage was dominated by silcrete (72.67%, 96 lithic items) and tuff (17.44%, 30 items), with smaller quantities of milky quartz (2.33%, 4 items), quartzite (2.33%, 4 items), rhyolitic tuff (1.745%, 3 items), unidentified stone (1.745%, 3 items), chert (1.16%, 2 items), and chalcedony (0.58%, 1 item). Some lithic items were heat affected, mostly silcrete and tuff, although it could not be determined if the heat fracturing was from anthropogenic or natural causes.</p>	6.14km north east
Brayshaw (2005)	Mamre Road/Erskine Park Road, Erskine Park	Archaeological survey for proposed intersection upgrade	1 artefact scatter, comprising one silcrete flake and one silcrete flaked fragment, was identified on a very gentle slope beside Mamre Road, approximately 60–140m from an unnamed tributary of South Creek. Three other small fragments of unmodified silcrete were also noted in this area.	6.28km north east
Navin Officer (2007)	Erskine Park Employment Area, Ropes Creek	Archaeological test excavation, proposed industrial development	<p>261 artefacts were recovered from 112 test pits. The lithic assemblage was dominated by silcrete (70%), with smaller quantities of tuff (21.3%), quartz (3.9%), chert (2.6%), volcanics (1.6%), and quartzite (0.6%).</p> <p>The highest concentration of artefacts occurred on the basal slopes, midslopes and crest of a spurline.</p>	6.86km north east

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Total Earth Care Pty Ltd (2007)	Lenore Lane, Erskine Park	Archaeological salvage excavation, Erskine Centre Industrial Park	<p>1 previously identified artefact scatter of 15 flaked pieces and surrounding area was investigated. The largest number of artefacts were recovered from hilltop excavation areas (81.8% of total assemblage), and from a knoll below the hilltop (15.6%), with relatively few artefacts found mid-slope (2.7%).</p> <p>1,014 artefacts were recovered, with the distribution of artefact concentrations suggesting the presence of knapping floors around the top of the hill as well as discrete knapping events. The assemblage was dominated by silcrete (87.6%, 888 artefacts), with smaller quantities of quartz (10.7%, 108 artefacts), indurated mudstone (1.0%, 10 artefacts), and silicified tuff (0.8%, 8 artefacts).</p>	7.2km north east
Navin Officer (2003)	Erskine Park to West Sydney sub-station	Archaeological survey of proposed 132kV transmission line	2 sites were identified on basal slopes adjacent to minor drainage lines; one scatter of 4 silcrete and 3 mudstone artefacts, and one scatter of 8 silcrete artefacts. 1 PAD was identified on alluvial soils on a terrace near the junction of Ropes Creek with an unnamed tributary.	7.58 km north east
Koettig (1981)	South St Marys Second Stage Release Area, Erskine Park	Archaeological survey of proposed land release area	No Aboriginal sites identified.	8.0km north east
Navin Officer (2005d)	Ropes Creek to Erskine Park Road, Erskine Park	Archaeological survey for proposed gas main	1 previously identified site, an artefact scatter with shell (freshwater mussel), was relocated on the elevated eastern bank of Ropes Creek. More than 40 artefacts manufactured from silcrete, tuff/chert, and quartz were noted; however, no shell material was visible.	9.92km north east
Nicholson (1989)	Lot 2, Elizabeth Drive, Kemps Creek	Archaeological survey for proposed quarry	No Aboriginal sites identified.	0.59km north



Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Kohen (1991)	Lot 2, Elizabeth Drive, Kemps Creek	Archaeological survey for proposed landfill development	1 artefact scatter identified adjacent to Badgerys Creek, comprising 22 artefacts manufactured from silcrete (18 artefacts), chert (2), and quartz (2).	0.59km north
JMCHM (2001a)	1503 Elizabeth Drive, Kemps Creek	Archaeological survey for proposed redevelopment of Nolans Quarry	1 PAD with 1 quartz flake identified on a ridgeline on Bringelly shale, near a headwater tributary of Kemps Creek.  Due to poor ground visibility, it was recommended that archaeological test excavation be undertaken prior to development to determine if sub-surface artefacts are present.	2.5km east
Haglund (1979)	Kemps Creek	Archaeological survey for proposed substation	No Aboriginal sites identified.	4.26km east
Archaeological & Heritage Management Solutions (AHMS) (2005a)	85 Bakers Lane, Kemps Creek	Archaeological survey of proposed development area in Emmaus Village	4 sites identified, including 1 artefact scatter and 2 isolated artefacts on low-lying flats/footslopes, and 1 artefact scatter on a drainage line. All sites were within the Blacktown soil landscape.	5.18km north east
AHMS (2005b)	85 Bakers Lane, Kemps Creek	Archaeological test excavation, proposed development area in Emmaus Village	11 artefacts and probable artefacts were recovered from 15 test trenches. The artefacts were manufactured from silcrete (7) and tuff (4). The density of artefacts present was considered to be low compared to other sites in the local area (Luddenham), partially attributed to disturbance from erosion and mixing of remnant soils arising from vegetation clearance, ploughing and grazing, and bioturbation.	5.18km north east
Kayandel (2006)	Lot 1978 DP792932, 17th and 2nd Avenues, West Hoxton	Archaeological survey for proposed residential subdivision	No Aboriginal sites identified.	8.12km east

Report Author/ Date	Location	Reason for Investigation	Findings	Approximate distance from Commonwealth owned land at Badgerys Creek
Brayshaw McDonald Pty Ltd (1995)	Cowpasture Road, West Hoxton	Archaeological salvage excavation, residential subdivision	2 previously identified sites were excavated; one on a remnant alluvial terrace overlying Bringelly shale, approximately 40m from an unnamed tributary of Cabramatta Creek, and the second on the heavily disturbed footslope of a spur with very little topsoil (WH4).  3,672 artefacts were recovered from the terrace, with 90% obtained from two silcrete knapping floors. Artefacts were predominantly manufactured from silcrete (96.6%), with smaller quantities of indurated mudstone/chert (2.1%), quartz (1.1%), and igneous stone (0.1%). No artefacts were recovered from the footslope.	8.61km east
Kayandel Archaeological Services (2005)	Lot 330 DP2475, 15th Avenue, West Hoxton	Archaeological survey for proposed residential subdivision	1 artefact scatter comprising 2 silcrete flakes, one probable milky quartz flake, and one milky quartz flaked piece/core fragment, was identified on a spurline.	8.82km east
Archaeological Surveys & Reports Pty Ltd (2009)	Lot 40, DP738126, Patons Lane, Orchard Hills	Archaeological survey for proposed waste and resource management facility	2 isolated artefacts identified, 1 mudstone/tuff broken flake and 1 quartzite backed blade, identified 100m and 350m from Blaxland Creek, respectively	6.26km north
Dallas (1989a)	Lots 1 and 2 DPS217319 & 547057, Luddenham Road, Orchard Hills	Archaeological survey for proposed canine showground	No Aboriginal sites identified.	6.46km north
Brayshaw (1989)	Orchard Hills	Archaeological survey for proposed urban subdivision	No Aboriginal sites identified.	7.94km north
Dallas (1988b)	Corner Samuel Marsden and Landsdowne Roads, Orchard Hills	Archaeological site inspection for Kindalin School annexe	No Aboriginal sites identified.	8.81km north



### Legend

- Badgerys Creek Commonwealth Land  Previous investigations

### Key

- |   |   |   |
|---|---|---|
| 1. Artefact Heritage (2012)                         | 12. Brayshaw McDonald (1995)            | 23. Koettig (1981)                              |
| 2. Brayshaw (2005)                                  | 13. Dallas (1988a)                      | 24. McIntyre (1984) Navin Officer (2005a 2005b) |
| 3. Brayshaw McDonald (1992)                         | 14. Dallas (1989)                       | 25. Navin Officer (2005c)                       |
| 4. HLA-Envirosciences (1995)                        | 15. Dallas (1998b)                      | 26. Navin Officer (2006)                        |
| 5. Navin Officer (2003)                             | 16. Dean-Jones (1991)                   | 27. Navin Officer (2007)                        |
| 6. Navin Officer (2005d)                            | 17. Haglund (1979)                      | 28. Nicholson (1989) Kohen (1991)               |
| 7. AHMS (2005a 2005b)                               | 18. JMCHM (2000) McIntyre-Tamwoy (2003) | 29. Steele (1999 2001 2007)                     |
| 8. AMBS (2012)                                      | 19. JMCHM (2001a)                       | 30. Total Earth Care Pty Ltd (2007)             |
| 9. AMBS (2013)                                      | 20. JMCHM (2009)                        | 31. White (2001)                                |
| 10. Archaeological Surveys & Reports Pty Ltd (2009) | 21. Kayandel (2005)                     |   |
| 11. Brayshaw (1989)                                 | 22. Kayandel (2006)                     |   |

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**Figure 3.2 Previous archaeological investigations in the region**

### *The Current Regional Model*

As indicated above, regional trends indicate that Aboriginal sites are most frequently located in close proximity to permanent water courses on creek banks, alluvial flats and lower hillslopes, or on high ground such as ridges and knolls, and within range of food resources and the raw materials for manufacturing tools.

Previous studies have highlighted the problems inherent in characterising archaeological sites on the Cumberland Plain solely by surface visibility and the presence of stone artefacts, and the importance of test excavation in establishing the nature and density of archaeological material. Excavations in this region of the Cumberland Plain have predominantly concentrated on the major creeks and their tributaries (particularly South Creek and Ropes Creek), and have found extensive deposits representing repeated use of the area for occupation or resource use such as stone tool manufacture (knapping activities) within c.150m of these permanent water sources (e.g. Brayshaw McDonald Pty Ltd 1995; Total Earth Care Pty Ltd 2007). Low densities of artefacts representing one-off resource use or infrequent occupation have also been located near reliable water sources, although prior disturbance of these sites arising from historical land use practices and/or soil erosion is often cited as a factor in the low density of artefacts found (e.g. Navin Officer 2005c:18; Steele 2001:73-74; Steele 2007:54). Sites or PADs in the vicinity of less reliable, ephemeral creeks are generally considered likely to have low-to-moderate density archaeological deposits (AHMS 2005b:48). Low-lying, flood prone areas are also unlikely to have been used extensively for camping (Steele 2001:73; Navin Officer 2007:25).

A number of predictive models relating to Aboriginal occupation patterns and site locations have been formulated through archaeological investigations in the Cumberland Plain (Dallas 1989b; Haglund 1980; Kohen 1986; Smith 1989). More recent works have contributed to refining these models (JMCHM 1997, 1999, 2001b; McDonald 1999; for the south west Cumberland Plain see also ENSR Australia Pty Ltd 2009; AMBS 2000, 2014; Godden Mackay Logan 2012). Key trends are summarized below:

- Site frequency and density are directly related to the location of sites within the landscape.
- Complex sites (defined as sites with more artefact types and more archaeological features in intricate arrangement) are usually located close to permanent water sources. These sites would have been used intensively by larger groups, or used repeatedly by smaller groups over a longer period of time.
- Creek junctions could provide foci for site activity and the size of the confluence (based on stream order) could influence the size of sites.
- Sites with large numbers of artefacts can occur on ridge tops and hill crests.
- Sites situated in alluvial soils retain the potential for stratified deposits.
- Potential Archaeological Deposits (PADs) are most likely to be located along valley floors and low slopes in well-drained areas.
- Surface artefact distribution does not accurately reflect the composition or density of subsurface archaeological deposits. Some areas with few or no surface manifestations have often been shown to contain subsurface archaeological deposits.
- Artefact scatters are most commonly linked to the close proximity of permanent water sources in areas such as creek and river banks and alluvial flats. The majority of sites are located within 100m of fresh water.
- Artefact assemblages generally comprise a small proportion of formal tool types with the majority of assemblages dominated by unretouched flakes and debitage.
- High concentrations of artefacts are more likely to be located within resource rich areas.
- Silcrete is the dominant raw material used for tool manufacture, followed by tuff/chert. Silcrete sources are located in the north western Cumberland Plain at places such as St Marys, Plumpton Ridge, Marsden Park, Schofields, Riverstone,



Deans Park, Llandilo and Ropes Creek. However, flakable silcrete cobbles and amorphous naturally fractured rock have been noted during surveys and excavations at Luddenham and Erskine Park (e.g. Dallas 1988a; Brayshaw 2005; Navin Officer 2005c; Steele 2007).

- Stands of remnant old growth vegetation retain the potential for scarred trees to be present; however, large scale land clearance of the Cumberland Plain in general means that such stands of vegetation are rare.

It should be noted that archaeological investigations still reveal site information in contradiction to the current, general predictive model for the area. For example, ENSR Australia Pty Ltd (ENSR) undertook excavations at the Oran Park and Turner Road Land Release Precincts in 2009, approximately 12 km south of the Commonwealth owned land at Badgerys Creek, and concluded that:

*The archaeological landscape revealed by this investigation suggests that archaeological models derived from other regions or other areas should not be applied uncritically. There was no evidence for greater complexity (defined as intricacy) associated with confluences. There was no evidence of greater densities of archaeological material associated with higher order watercourses. Instead it appears that archaeological deposit in the south west [Cumberland Plain] is of relatively low density with occasional clusters in association with all areas of reliable water regardless of stream order. Future assessments in south west Sydney would benefit from paying greater attention to the investigation of areas within 300 m of all reliable watercourses (i.e. more than the conventional 50 m vicinity of watercourses) (ENSR 2009:66).*

It is expected that further archaeological work will continue to refine the current regional site prediction model.

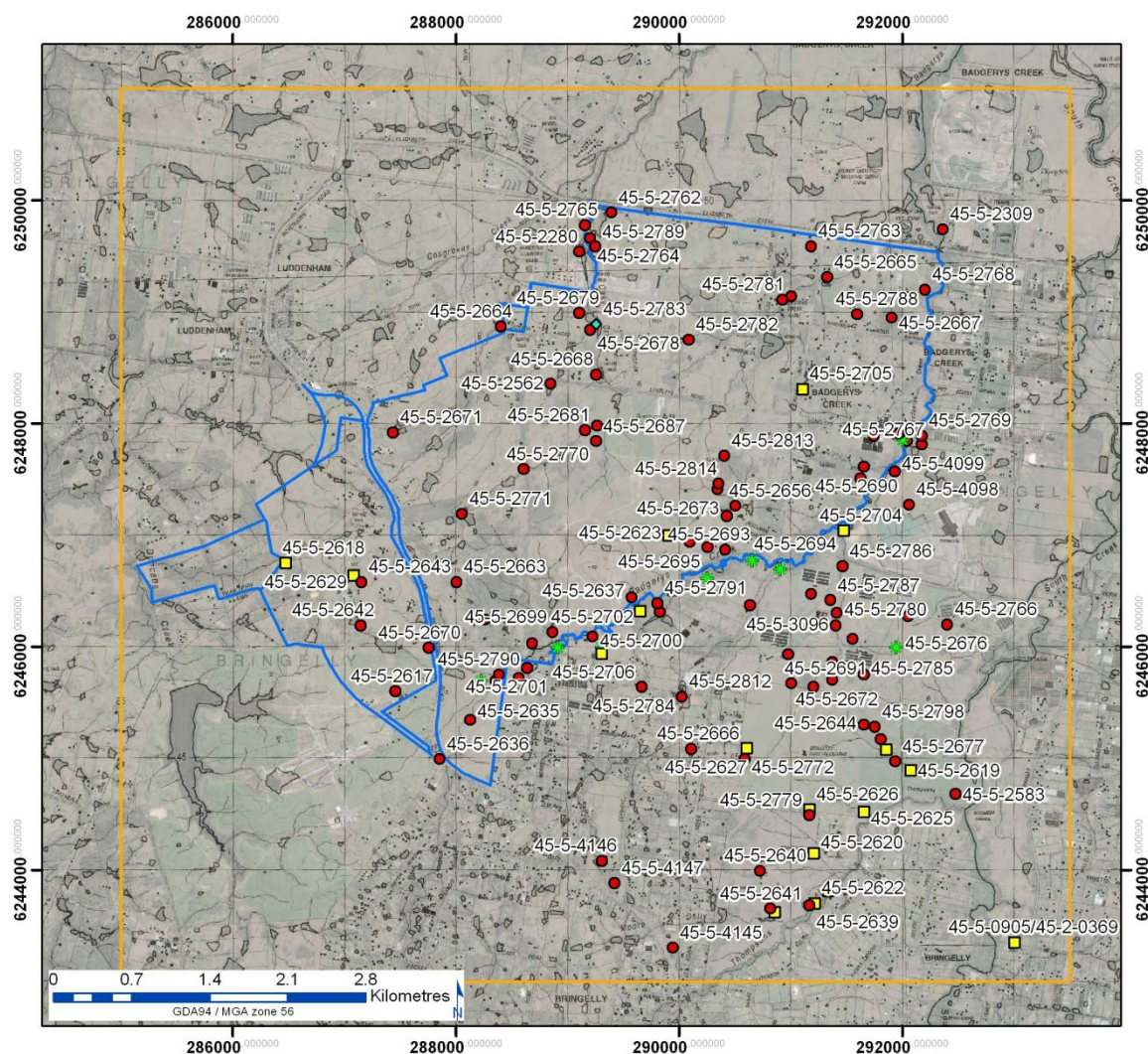
#### *Registered Aboriginal Sites*

An extensive search of the AHIMS database was undertaken on 8 September 2014 (AHIMS client service ID # 147073), and 118 registered Aboriginal sites were identified within an 8.5km x 8km polygon centred on the Commonwealth owned land at Badgerys Creek (Datum: GDA, Zone: 56, Eastings: 285000-293500, Northings: 6243000-6251000). The results of the AHIMS search are summarised in Table 3.5 and presented in Figure 3.3.

An additional basic search was undertaken on 12 September 2014 (AHIMS client service ID # 147633), incorporating a property to the west which is non-contiguous with the majority of the Commonwealth owned land at Badgerys Creek (Datum: GDA, Zone: 56, Eastings: 284750-285000, Northings: 6243000-6251000). No additional registered Aboriginal sites were identified.

**Table 3.5 Summary of Aboriginal sites previously recorded in and near the Commonwealth owned land at Badgerys Creek.**

Site Feature	Number of sites recorded	Percentage of sites recorded (to 2 decimal places)
Artefact	109	92.37%
Modified Tree	8	6.78%
Artefact; Potential Archaeological Deposit (PAD)	1	0.85%
<b>Total</b>	<b>118</b>	<b>100.00%</b>



## Legend

- |  |   |
|--|---|
| <span style="border: 1px solid blue; padding: 2px;"> </span> Badgerys Creek Commonwealth Land                | <b>AHIMS Site Feature</b>   |
| <b>AHIMS Search Extent</b>   | <span style="color: red;">●</span> Artefact                                 |
| <span style="border: 1px solid orange; padding: 2px;"> </span> Extensive Search (client service ID # 147073) | <span style="color: green;">★</span> Modified Tree                          |
|  | <span style="border: 1px solid yellow; padding: 2px;"> </span> No site data |
|  | <span style="color: blue;">◆</span> Artefact; PAD                           |

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**Figure 3.3 Location of Aboriginal sites previously recorded within and near the Commonwealth owned land at Badgerys Creek.**

Artefacts (artefact scatters, open camp sites and isolated finds) are the most common feature of Aboriginal sites found on the south west Cumberland Plain in the vicinity of the Commonwealth owned land at Badgerys Creek, followed by modified trees and PAD. Details of the Aboriginal sites previously recorded within the Commonwealth owned land at Badgerys Creek are presented in Table 3.6, below.

**Table 3.6 Summary of previously recorded Aboriginal heritage sites within Commonwealth owned land at Badgerys Creek (Confidential information relating to sensitive Aboriginal site locations removed.)**

AHIMS Site ID	Site Name	Datum	Zone	Easting	Northing	Site Type	Artefact Count
45-5-2562	EG6					Artefact	6
45-5-2586	B3					Artefact	1
45-5-2617	B31					Artefact	1
45-5-2618	B32					Artefact	unknown
45-5-2623	B68					Artefact	unknown
45-5-2629	B39					Artefact	unknown
45-5-2630	B40					Modified Tree (Carved or Scarred)	n/a
45-5-2631	B42					Artefact	1
45-5-2632	B44					Artefact	3
45-5-2633	B45					Artefact	12
45-5-2634	B8					Modified Tree (Carved or Scarred)	n/a
45-5-2635	B7					Artefact	1
45-5-2637	B5					Artefact	1
45-5-2638	B4					Artefact	1
45-5-2642	B24					Artefact	1
45-5-2643	B25					Artefact	1
45-5-2656	B102					Artefact	19
45-5-2658	B67					Artefact	1
45-5-2659	B66					Artefact	16
45-5-2663	B79					Artefact	1
45-5-2665	B88					Artefact	2
45-5-2667	B90					Artefact	2
45-5-2668	B93					Artefact	1
45-5-2670	B92					Artefact	4
45-5-2671	B91					Artefact	2
45-5-	B101					Artefact	1

AHIMS Site ID	Site Name	Datum	Zone	Easting	Northing	Site Type	Artefact Count
2673							
45-5-2678	B80					Artefact	11
45-5-2679	B81					Artefact	1
45-5-2680	B78					Artefact	1
45-5-2681	B77					Artefact	9
45-5-2682	B75					Artefact	1
45-5-2683	B76					Artefact	1
45-5-2685	B74					Artefact	1
45-5-2687	B71					Artefact	1
45-5-2690	B59					Artefact	1
45-5-2693	B55					Artefact	2
45-5-2699	B46					Artefact	13
45-5-2705	B15					Artefact	unknown
45-5-2762	B95					Artefact	8
45-5-2763	B87					Artefact	5
45-5-2764	B82					Artefact	1
45-5-2768	B41					Artefact	1
45-5-2770	B70					Artefact	5
45-5-2771	B69					Artefact	1
45-5-2781	B86					Artefact	5
45-5-2782	B84					Artefact	7
45-5-2783	B43					Artefact; PAD	5
45-5-2788	B112					Artefact	3
45-5-2789	B94					Artefact	1
45-5-2790	B54					Artefact	1
45-5-2813	B104					Artefact	1
45-5-2814	B103					Artefact	1



*Second Sydney Airport Site Selection Programme (1985)*

In 1985, Anutech Pty Ltd undertook an archaeological assessment of the proposed airport site at Badgerys Creek and its surrounds as part of the Second Sydney Airport Site Selection Programme. The field survey was limited to a small portion of the proposed site, and focussed on creek lines and gently undulating hills where it was considered Aboriginal sites were most likely to occur (Figure 3.4). The effective survey coverage was not quantified; however, it was noted that there was 'relatively little' ground surface exposure adjacent to the creeks due to vegetation coverage, and 'limited' exposure on hillslopes. One Aboriginal site was identified (AHIMS Site 45-5-0517); an artefact scatter comprising five silcrete flakes and flaked pieces in a ploughed and devegetated area adjacent to Badgerys Creek. The results of the survey were considered to be representative of the Badgerys Creek area due to the uniformity of landforms, and the low density of sites reported in similar locations in the surrounding region and in the sandstone gorges of the Nepean River to the west. It was concluded that intensive agricultural use and extensive vegetation clearance would have resulted in the destruction or disturbance of artefact scatters in Badgerys Creek, and that 'most sites in the area would now be of little scientific importance', with the exception of any sites on the banks of Badgerys Creek itself that had incurred only minor surface damage and disturbance (DoA 1985:206-208).

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*Draft Environmental Impact Statement (1997)*

Chapter 20 of the 1997 Draft Environmental Impact Statement (EIS) addressed the Aboriginal cultural heritage impacts of the proposed Second Sydney Airport (DoTaRD 1997). Discussion was based on a separate specialist investigation documented in *Technical Paper 11: Aboriginal Cultural Heritage* (Navin Officer 1997). The Badgerys Creek study area comprised the composite footprint of the three airport options (Figure 3.4). The field survey aimed to cover a representative sample of landscape units, and targeted 33% of the combined area of all three options (14.22km<sup>2</sup> surveyed out of 33.82km<sup>2</sup>). The effective survey coverage was again not quantified, although ground surface visibility was described as 'relatively high' (Figure 3.5).

One hundred and ten sites were recorded; comprising 102 artefact sites (58 artefact scatters and 44 isolated finds), 8 scarred trees, and one potential archaeological deposit (Figure 3.6; Navin Officer 1997:5-1). Artefact scatters were generally characterised as having low numbers of artefacts and low artefact densities, with a maximum average surface artefact density of one artefact per square metre (Navin Officer 1997:5-2, 5-9, 20-1). Of the eight scarred trees identified; five were interpreted as 'possibly' Aboriginal in origin, two as 'probable' and one as 'most likely'. Most of the trees were located on alluvial flats and valley floor landscape units, and fluvial corridor zones (Navin Officer 1997:5-6-5-7). Specific site descriptions and location co-ordinates were not included in the report; however, zones and sites of moderate or high archaeological potential were identified based primarily on environmental variables, specifically area of the minor and secondary creek corridors.

The investigation identified a range of management measures to mitigate impacts, including:

- surface survey of the remaining unsurveyed areas of the proposed direct impact areas;
- a program of subsurface testing in areas of defined archaeological potential;
- salvage excavations to be conducted in a range of locations, according to the priorities and criteria identified in the preceding testing program;
- salvage of Aboriginal scarred trees after appropriate field recording, if appropriate;
- regular monitoring of indirect impacts on sites;
- environmental protection to be reviewed and, if necessary, redesigned to mitigate indirect impacts on sites;
- development of conservation and management plans for *in situ* site conservation;
- subsequent curation and care of salvaged materials; and
- monitoring of ground surface disturbance during construction activities (Navin Officer 1997:20-11-20-13).

The Auditor's Report on the Draft EIS (SMEC 1998) noted that the Draft Technical Paper on Aboriginal Cultural Heritage, although well written and argued in many sections, had major flaws in logic, data (or lack thereof), interpretation (especially the work of others) and presentation. It further noted that some of these flaws could not be corrected without substantial additional field investigations. The flaws included problems in the sampling strategy used in executing the field survey and the fact that no test excavations were carried out.

The Auditor's assessment concluded that the scientific (or archaeological) significance of the known and unknown cultural heritage resources in the Badgerys Creek area might well prove to be higher than that presented in the draft EIS. Despite this reservation, the Auditor concurred with inferences made in the Draft EIS that the scientific significance of the known and projected cultural heritage resources at Badgerys Creek is low. The Auditor also commented that a cultural heritage management plan would need to be prepared if the airport proposal was to proceed.



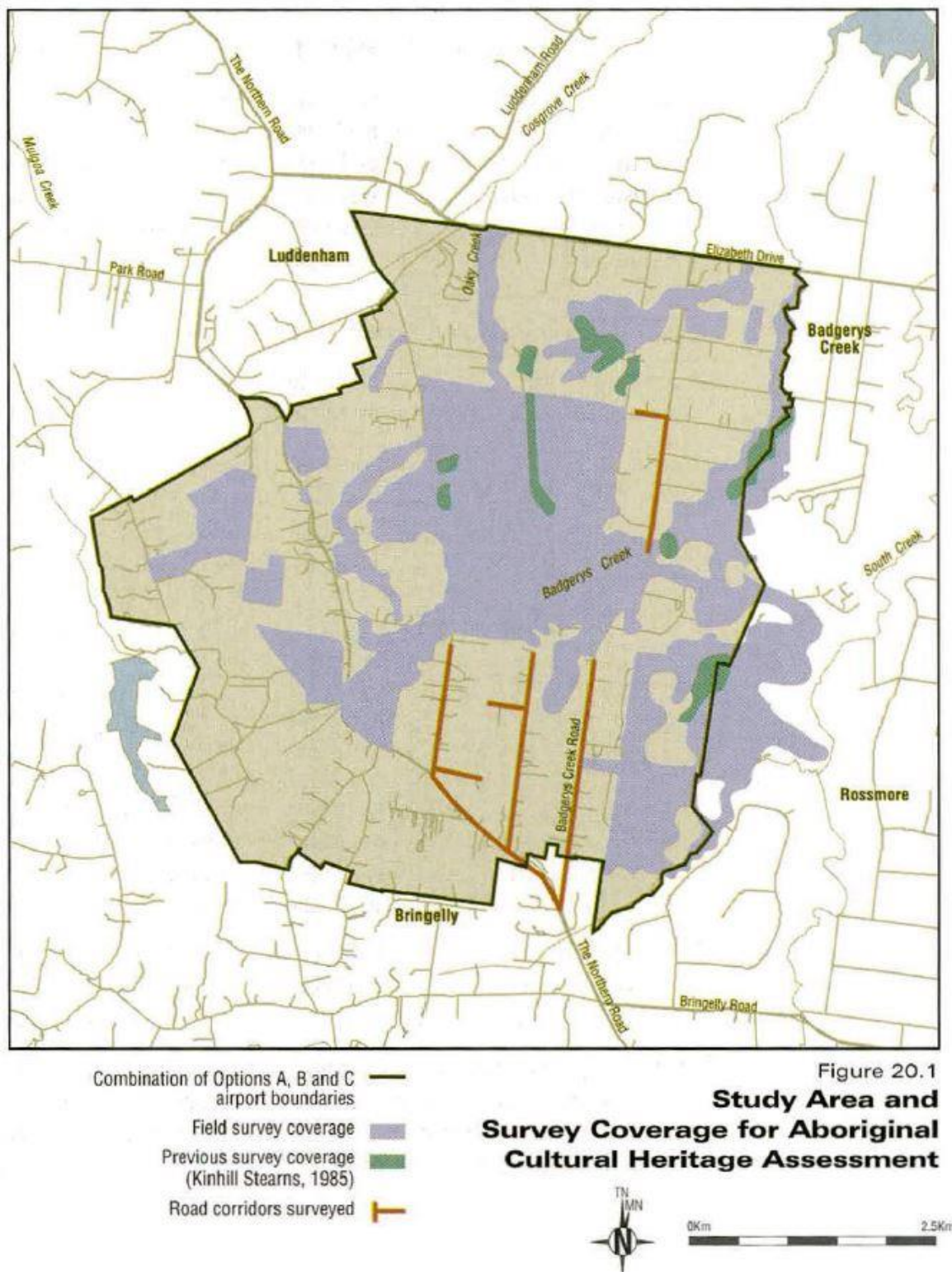
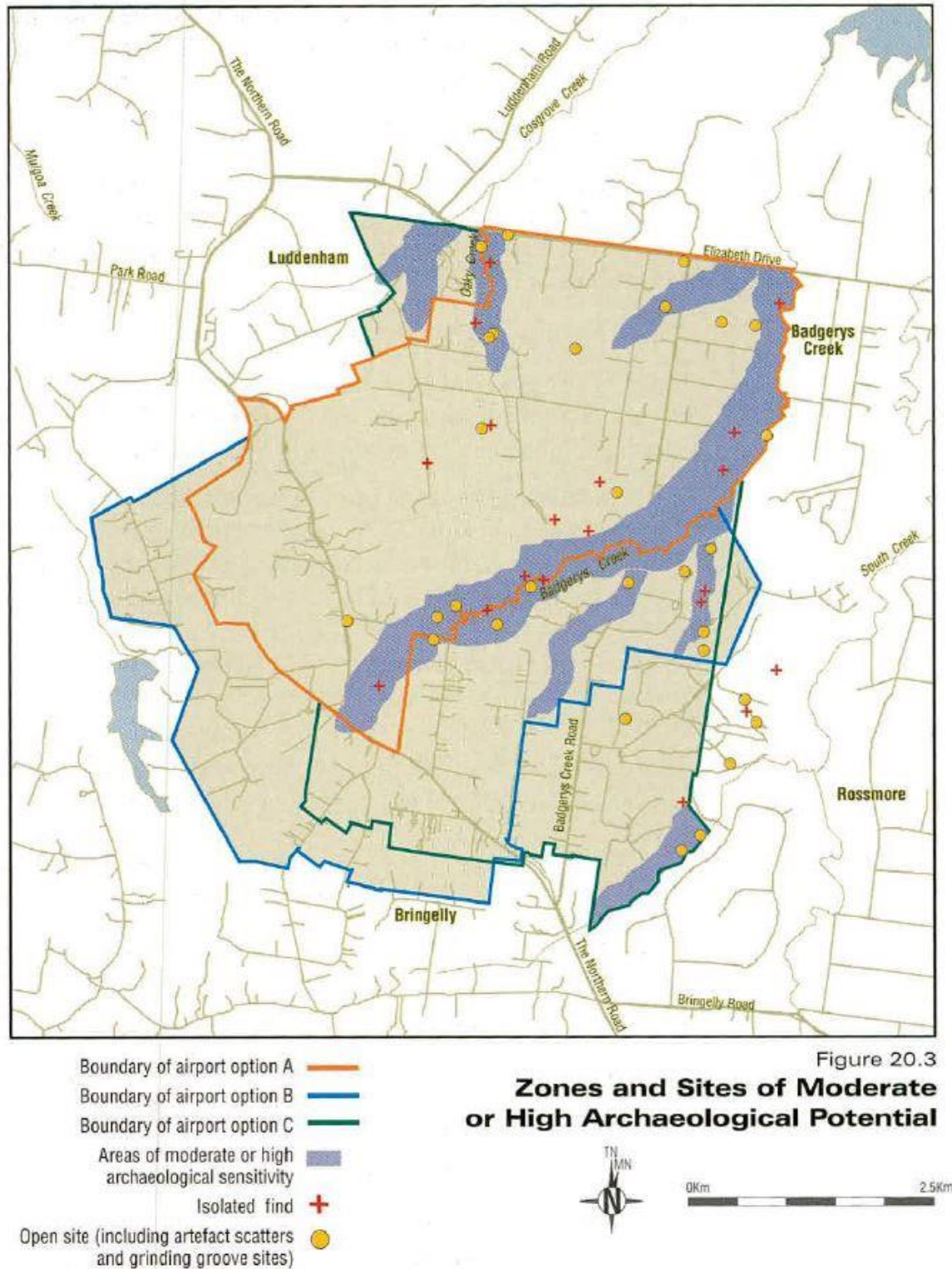


Figure 3.5 Study Area and Survey Coverage for Aboriginal Cultural Heritage Assessment addressed in the 1997 Draft EIS (Navin Officer 1997: Figure 20-1)



**Figure 3.6 Aboriginal Recordings and Zones and Sites of Moderate or High Archaeological Potential identified by Navin Officer and addressed in the 1997 Draft EIS (Navin Officer Heritage Consultants 1997: Figure 20-3)**

*Supplement to the Draft EIS (1999)*

Chapter 17 of the 1999 Supplement to the Draft EIS summarised the findings of the 1997 Draft EIS and issues raised in submissions. A response to the issues raised in the Auditor's Report and in submissions was provided, particularly in relation to consultation and methodology (Department of Transport and Regional Services [DoTaRS] 1999). The response noted the following points:

- Consultation was undertaken in accordance with protocols agreed with Aboriginal groups prior to the commencement of the consultation process.
- Much of the consultation work conducted with Aboriginal representatives in the process of compiling their reports and stated views was conducted orally and within traditional modes of consultation and documented and presented in a manner deemed culturally appropriate by the relevant group or community.
- The sample survey methodology followed standards recognised within the field of archaeology and although they had not been released at the time the study was undertaken, the survey methodology complied with the NSW NPWS guidelines (1997). All archaeological surveys conducted in larger study areas invariably involve degrees of sampling.
- Sub-surface testing was not carried out as it was not warranted given the available data from excavations carried out in adjacent and comparable environments. It was argued that testing would have resulted in otherwise avoidable and irreversible damage through excavation to many archaeological sites located outside of the zone of impact.
- The identification of contemporary Aboriginal cultural values is centred on consultation within the Aboriginal community and reporting in the Draft EIS relies on the actual words of the Aborigines to identify their own cultural values and beliefs regarding the sites and the intangible (non-archaeological) values they contained. The succinctness of these reports and their brevity relative to the majority of the Draft EIS obscures the level of activity on behalf of the Aboriginal study team who compiled them.
- Detailed information pertaining to Aboriginal sites (such as site location and contents) is generally not made available to the public. This is a well-established protocol which ensures the optimal protection for Aboriginal sites. However the available evidence was utilised by the archaeologists and Aboriginal community in preparing all significance assessments.

An assessment of the cumulative impacts on the existing or surviving Aboriginal cultural resource in the region surround the Second Sydney Airport was also undertaken for the Supplement. The finding was that the predicted cumulative impact resulting from the development of any of the airport options would have a significant impact to the archaeological resource of the Cumberland Plain, noting however that only a very small proportion of the Cumberland Plain had been subject to comprehensive field survey (DoTaRS 1999: Appendix G).

The Auditor's Report on the Supplement to the Draft EIS (SMEC 1999) noted that the Supplement states that once a preferred option is selected, a detailed and comprehensive program of subsurface testing and salvage would be conducted within the preferred airport option. The Auditor suggested the possibility that test excavations may reveal items of greater significance than what has been identified on site to date. The Auditor also noted that the Supplement identified that all of the airport options would impact on sites that are valued by the local Aboriginal community for their cultural significance.



*Environment Australia assessment report (1999)*

Environment Australia's report summarised the findings of the draft EIS, Supplement and Auditor's Reports. The following points were made in relation to the assessment of Aboriginal heritage:

- A higher priority could have been given to more detailed supporting anthropological and historical studies to assist in addressing issues relating to Aboriginal cultural significance more effectively.
- More detailed studies into contemporary Aboriginal heritage values, as opposed to archaeological values, would have helped to clarify the nature of the cultural heritage significance of the proposed airport site.
- Further work into contemporary Aboriginal heritage values should be done prior to construction of the airport as part of the conservation management plan.
- Information relating to the implications of native title claims for the airport development has not been provided.
- The survey methodology appears to have been adequate and in accordance with accepted methodological standards in NSW NPWS guidelines.
- The decision not to undertake sub-surface testing for the EIS was appropriate as it could have resulted in unnecessary damage to cultural heritage sites and was in accordance with current best practice in the conservation of cultural heritage.
- A conclusion in Technical Paper 11 'Aboriginal Cultural Heritage' that 'below the plough zone and within the deeper sedimentary deposits of the lower Badgerys Creek fluvial corridor, the potential for significant archaeological deposits within a regional context cannot be wholly discounted' was not included in the Draft EIS.
- A regional survey of the archaeological and contemporary Aboriginal cultural heritage resources of the Cumberland Plain would assist in identifying the Aboriginal cultural heritage values of the Cumberland Plain and would allow a more accurate assessment of individual sites and suites of sites.
- The suggestion that regional trade-offs may assist in mitigating cumulative impacts induced by the airport development was not taken up in the environmental management measures proposed in the Supplement. The possibility of pursuing such initiatives could be explored in the context of regional environmental planning, in consultation with the local Aboriginal community.

The report made the following recommendations:

- The construction program should allow for the excavation and recording in accordance with established practice of any Aboriginal archaeological deposits of regional or national significance found during the planned program of sub-surface testing or during construction.
- An Aboriginal cultural heritage conservation management plan must be developed to guide the management of the Aboriginal heritage of the Badgerys Creek site. This plan should be developed in consultation with the local Aboriginal community, and should include documentation of the significance of the site or parts of the site to Aboriginal communities.

*3.2.3 Aboriginal Heritage Site Prediction Modelling*

On the basis of the registered archaeological sites in the region, and review of previous archaeological studies, the following conclusions can be drawn regarding the potential presence and location of Aboriginal heritage sites within the landscape of the Commonwealth owned land at Badgerys Creek:

- Artefacts (artefact scatters, open camp sites and isolated finds) are the most common feature of Aboriginal sites occurring across the landscape, and are the most likely site type to be present in the Commonwealth owned land at Badgerys Creek. This site type usually appears as low density open artefact scatters or isolated finds, although



high density scatters may also be present. Stone artefact sites are found in all environmental contexts, but are most readily identified in areas where vegetation is limited and ground surface is visible. Larger sites with higher densities of artefacts tend to be found close to permanent water sources, such as Badgerys Creek;

- Sites situated on relatively undisturbed alluvial soils have the potential to be associated with stratified subsurface archaeological deposits. Excavations within the region indicate that high densities of artefacts can be present up to 300m from water sources, and that subsurface material may be much greater than indicated by surface numbers of artefacts; and
- Modified trees have previously been recorded within the Commonwealth owned land at Badgerys Creek, and may be present in areas adjacent to Badgerys Creek that have not been previously cleared of vegetation for past agricultural practices, transport corridors and rural residential developments.

On the basis of the archaeological sites registered in the region and review of previous archaeological studies, the following types of site are unlikely to be present within the Commonwealth owned land at Badgerys Creek:

- Stone quarries, grinding grooves, art and shelter sites are highly unlikely to be found in the Commonwealth owned land at Badgerys Creek because of the lack of suitable stone outcrops; and
- Aboriginal burials and ceremonial and dreaming sites (including ceremonial rings) are highly unlikely to be present in the Commonwealth owned land at Badgerys Creek given the disturbance caused by early pastoralism, agriculture, and roads.

While the 1997 EIS developed a predictive model to determine the nature of the surviving Aboriginal heritage and archaeology in the Commonwealth owned land at Badgerys Creek, the significant amount of archaeological investigations in the region have added and refined the understanding of the archaeology and heritage of the region. Notably, the 1997 EIS suggested that most Aboriginal heritage sites would be located within 50m of water resources (Navin Officer 1997:59). More recent archaeological excavations in the surrounding region have suggested that Aboriginal heritage sites with dense subsurface archaeological deposits may be located up to 300m from water sources, which has significant implications for future heritage significance and impact assessment, and for the development of appropriate heritage impact mitigation measures and research methodologies.

## 4 Survey Methodology

The 1997 EIS identified 60 Aboriginal heritage sites, comprising open artefact scatters, scarred trees, and isolated artefacts within the boundaries of the Commonwealth owned land at Badgerys Creek. Based on these results and a review of landforms, water resources and past land use, the 1997 EIS concluded that 23 Aboriginal heritage sites were identified within areas of moderate and high archaeological potential, associated primarily with minor and secondary creek corridors.

Due to the limited scope and time available to undertake the field survey for the current investigation, it was not possible to undertake a full archaeological survey of all 60 previously identified Aboriginal heritage sites within the Commonwealth owned land at Badgerys Creek. In order to accommodate the investigation's aims, the methodology for the current survey targeted only the 23 Aboriginal heritage sites identified by the 1997 EIS as being located within areas of moderate and high archaeological potential. Inspection of these high priority sites was intended to allow an assessment of their current status and condition, development of interim management recommendations for each specific site, and assist in the development of overall management recommendations for the entirety of the Commonwealth Lands at Badgerys Creek.

Two of the properties containing Aboriginal sites identified within the areas of high and moderate archaeological potential by the 1997 EIS could not be accessed during the current targeted survey, and the condition of the Aboriginal sites registered on these properties, AHIMS Site 45-5-2783 (B43) and AHIMS Site 45-5-2682 (B75), could not be verified. A targeted survey of the remaining accessible 21 Aboriginal heritage sites identified within areas of moderate and high archaeological potential was undertaken by AM Consulting archaeologists Chris Langeluddecke and Ngairé Richards on 22 and 23 September 2014.

The aims of the targeted survey were to:

- confirm the location, condition and extent of the previously recorded Aboriginal heritage sites within areas of moderate or high archaeological potential, as identified by the 1997 EIS;
- identify past or ongoing impacts to the sites;
- record relevant data to allow updating of AHIMS sites information; and
- develop interim recommendations for options on how to manage the Aboriginal sites inspected, for any necessary further archaeological investigations and management of the Commonwealth lands at Badgerys Creek.

Photographs were taken during the targeted survey using a Fuji Finepix HS 20 EXR digital camera. Site coordinates were recorded using a Garmin Oregon 300 handheld GPS unit. Where Aboriginal artefacts were encountered, notes were made regarding their type, size, and material; and descriptions of the site were recorded including the environmental setting and details of any disturbance to archaeological material in the site's vicinity. The following discussion of survey results is organised by AHIMS site number.

## 5 Survey Results

The Commonwealth owned land at Badgerys Creek comprise a rural residential environment, impacted predominantly by small scale agricultural activities. The majority of previously recorded Aboriginal cultural heritage sites within areas of moderate and high archaeological potential targeted for the current survey were impacted by cattle or horse grazing and activities, and dam construction and associated erosion.

Aboriginal heritage sites and locations inspected during the current survey are identified in Table 5.1, and their location is presented in Figure 5.1.

**Table 5.1 Summary of Aboriginal cultural heritage sites targeted by the current survey (Confidential information relating to sensitive Aboriginal site locations removed)**

AHIMS Site ID	Site Name	Datum	Zone	Northing	Easting	Site Type	Details
45-5-2630	B40					Possible scarred tree	Possible scarred tree present
45-5-2632	B44					Artefact Scatter	Site not visible
45-5-2633*	B45					Artefact Scatter	3 artefacts present
45-5-2634	B8					Possible scarred tree	Possible scarred tree present
45-5-2635	B7					Isolated Artefact	Site not visible
45-5-2637	B5					Isolated Artefact	1 artefact present
45-5-2638	B4					Isolated Artefact	Site not visible
45-5-2665	B88					Artefact Scatter	Site not visible
45-5-2678*	B80					Artefact Scatter	64 artefacts present
45-5-2679	B81					Isolated Artefact	Site not visible
45-5-2683	B76					Isolated Artefact	Site not visible
45-5-2685	B74					Isolated Artefact	Site not visible
45-5-2690	B59					Isolated Artefact	Site not visible
45-5-2693	B55					Artefact Scatter	Site not visible
45-5-2699	B46					Artefact Scatter	1 artefact present
45-5-2762	B95					Artefact Scatter	1 artefact present

AHIMS Site ID	Site Name	Datum	Zone	Northing	Easting	Site Type	Details
45-5-2764	B82					Artefact Scatter	Site not visible
45-5-2768	B41					Isolated Artefact	Site not visible
45-5-2781	B86					Artefact Scatter	Site not visible
45-5-2789	B94					Isolated Artefact	Site not visible
45-5-2790	B54					Artefact Scatter	Site not visible

\*given the extensive area in which artefacts were located, more than one GPS location was recorded for these sites

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.1 Location of Aboriginal site locations surveyed, originally recorded during the 1996 Navin Officer surveys**

## 5.1 Targeted Survey Results

### 45-5-2630 – Possible Culturally Scarred Tree

**Property Address:** 255 Longleys Road, Badgerys Creek (Figure 5.5)

**Landform:** Flat

**Site Size:** 2x2m

**Exposure:** n/a

**Site Description & Current Condition:** AHIMS site 45-5-2630 comprises a possible culturally scarred eucalypt tree within the riparian corridor of Badgerys Creek. The tree is approximately 5m west of the creek on the edge of the bank, and is approximately 10m east of a property fenceline. It stands approximately 20m high, and its trunk is approximately 3.4m in girth at approximately 1.5m high. The tree is a Forest Redgum (*Eucalyptus tereticornis*) species, and is in very poor condition, with insect damage or rotting visible within the heartwood.

The scar is approximately 3m long, 0.6m wide, and reaches to the ground at the base of the tree. Approximately 0.2 to 0.1m of overgrowth is visible around most of the scar edge, and the scar is oriented approximately north-northwest ( $330^{\circ}$ ) (see Figure 5.2 and Figure 5.3). No axe marks are visible within the scar, which may be due to the deteriorated condition of the heartwood. Although the site has been recorded on AHIMS as a culturally scarred tree, it is not possible to definitively identify the origin of the scar due to its condition, and such scarring may have been caused by natural impacts, such as fire damage. Comparison with a photograph of the tree taken during the 1996 survey indicates that there has been significant damage to the heartwood since that time (see Figure 5.4). The site is currently within the fenced riparian corridor around the creek, and is not easily accessible, or exposed to stock activity.

#### *Interim Recommendation:*

***No intervention is currently recommended for this highly damaged potentially scarred tree. Current fencing should be maintained in order to protect the tree and its immediate vicinity from human or stock movement.***



**Figure 5.2** AHIMS site 45-5-2630, possible culturally scarred tree and surrounds. View to south east.



**Figure 5.3** Detail of possible culturally scarred tree recorded of AHIMS Site 45-5-2630. View to south east.





**Figure 5.4 AHIMS site 45-5-2630 as recorded during the 1996 survey (Navin Officer 1997: Appendix H, Plate 4).**

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.5 Location of AHIMS Sites 45-5-2630, 45-5-2682, 45-5-2683, 45-5-2685, and 45-5-2690, with current recorded location of AHIMS Site 45-5-2630 labelled in italics.**

#### 45-5-2632 – Artefact Scatter

**Property Address:** 650 Badgerys Creek Road, Badgerys Creek (Figure 5.8)

**Landform:** lower slope

**Site Size:** 150x25m (recorded during 1996 survey)

**Exposure:** n/a

**Site Description & Current Condition:** AHIMS site 45-5-2632 is described in the site card as a scatter of three stone artefacts exposed within a gully erosion/horse track area approximately 150x25m in size. The site was originally recorded as an open artefact scatter consisting of four artefacts exposed within gully erosion and horse tracks in a paddock and in open woodland south of a tributary of Badgerys Creek. Impacts to the site were limited to horse tracks and erosion, and the overall site condition was recorded as poor.

No evidence of the Aboriginal site was able to be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility is limited by dense riparian woodland around the creek, and by grass within a fenced paddock. Although horses are present on the property in adjacent paddocks, none were actively grazing in the previously recorded vicinity of the site, and no evidence of impacts from horse tracks or gully erosion was observed during the current survey.

#### *Interim Recommendation:*

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impacts from erosion, stock movement or overgrazing. No active management of the site is currently recommended.***



**Figure 5.6 AHIMS site 45-5-2632 location. View to north.**



**Figure 5.7 AHIMS site 45-5-2632 location. View to north west showing riparian vegetation.**

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.8 Location of AHIMS Sites 45-5-2632, 45-5-2665, and 45-5-2781.**

*45-5-2633 – Artefact Scatter*

**Property Address:** 1802 The Northern Road, Badgerys Creek (Figure 5.15)

**Landform:** simple slope

**Site Size:** 100x40m (recorded during current survey)

**Exposure:** stock and water erosion areas.

**Site Description & Current Condition:** AHIMS 45-5-2633 is located around a dam wall, and in an erosion area at an adjacent gate. The AHIMS site card notes that 12 artefacts were originally recorded at this site, exposed within areas being impacted by vehicle access and erosion. Overall site condition was recorded as poor.

Three artefacts were visible at the site during the current survey, one exposed on top of the dam wall (artefact #1, see Figure 5.9 and Figure 5.10) and two in an erosion area west of the dam (artefacts #2 and 3, see Figure 5.11, Figure 5.12 and Figure 5.13). Details of the artefacts recorded are presented in Table 5.2. Although a large erosion area was present at the gateway along the western fenceline of the paddock as recorded on the AHIMS site card, no artefacts were visible within this exposure (see Figure 5.14).

Most of the erosional areas around the site appear to have been caused by stock movement, particularly near the western gate area, exacerbated by water runoff on the western side of the dam. The property is currently unoccupied, with no stock present in the paddock where the site is located.

**Table 5.2 AHIMS site 45-5-2633 artefact details.**

Artefact #	Material	Colour	Length	Width	Thickness	Artefact Type
1	Silcrete	Red	35mm	30mm	10mm	Broken flake
2	Silcrete	Red	12mm	11mm	3mm	Broken flake
3	Chert	grey	30mm	15mm	10mm	Broken core

***Interim Recommendation:***

***Consideration should be given to implementing erosion control measures to establish vegetation at site exposures. Although the property is currently unoccupied, site managers should be mindful of impacts that may arise from illegal access and use of the property.***

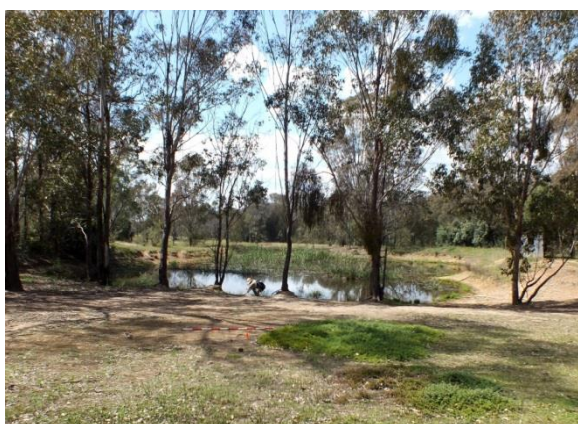




**Figure 5.9** AHIMS site 45-5-2633 location of artefact #1 on dam wall. View to south west.



**Figure 5.10** AHIMS site 45-5-2633 artefact #1.



**Figure 5.11** AHIMS site 45-5-2633 location of artefact #2 and 3 in erosion area west of dam. View to east.



**Figure 5.12** AHIMS site 45-5-2633 artefact #2.



**Figure 5.13** AHIMS site 45-5-2633 artefact #3.



**Figure 5.14** Erosion area at gateway on western fenceline of paddock, previously recorded as containing artefacts. View to south.



(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.15 Location of AHIMS Sites 45-5-2633 and 45-5-2699, with current recorded location of AHIMS Sites 45-5-2633 and 45-5-2699 labelled in italics.**

#### 45-5-2634 - Possible Culturally Scarred Tree

**Property Address:** 1720 The Northern Road, Badgerys Creek (Figure 5.19)

**Landform:** flat

**Site Size:** 1x1m

**Exposure:** n/a

**Site Description & Current Condition:** AHIMS site 45-5-2634 is a possible culturally scarred eucalypt tree within a paddock approximately 100m west of Badgerys Creek. The tree is a Grey Box (*Eucalyptus macrocarpa*) standing approximately 18m high, and is approximately 2m in girth at approximately 1.5m high (see Figure 5.16 and Figure 5.17). The tree is in very poor condition with insect damage visible within the heartwood.

When originally recorded, the scar was identified as being 22cm long and 35cm wide, with approximately 30cm of overgrowth visible around the scar (see Figure 5.18). The scar was oriented to the west, and no axe marks were visible at that time within the scar. Termite damage to the tree was noted, as was flood damage and possible machine damage.

The tree has been significantly damaged since the original recording, and it is no longer possible to identify the scar as being cultural in origin. Bark has been removed from the tree to a height of approximately 1.6m around 80% of the trunk, and it is no longer possible to identify the shape of the originally recorded scar. Given the presence of cattle in the paddock during the current survey, it is likely that removal of bark has occurred through the stock rubbing or scratching on the tree, a common cause of tree damage in rural environments (DEC, 2005:44). The tree continues to be impacted by stock activity.

#### *Interim Recommendation:*

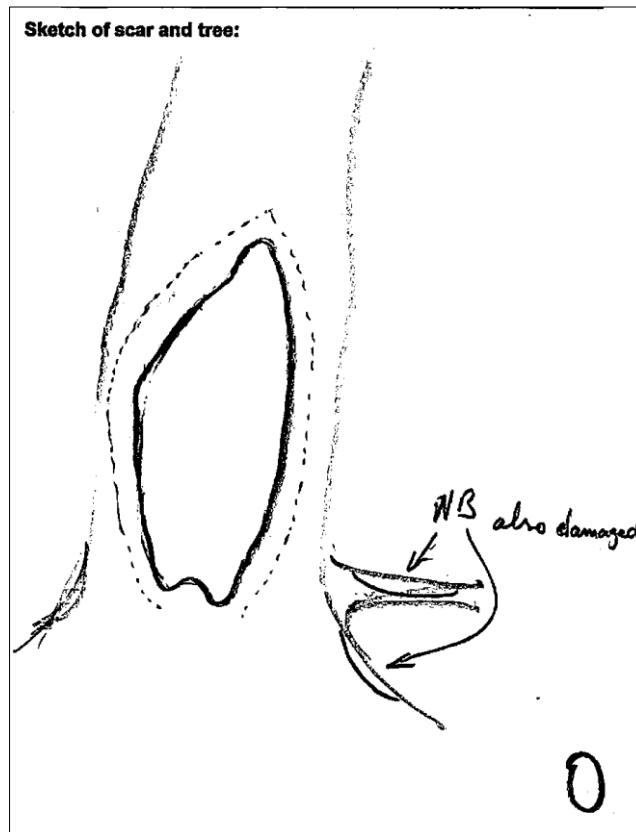
***Consideration should be given to installation of fencing around the site to prevent further cattle impacts and damage to the health of the tree.***



**Figure 5.16.** AHIMS site 45-5-2634, possibly culturally scarred tree location. View to south east.



**Figure 5.17** AHIMS site 45-5-2634 detail of scarring/damage. View to south east.



**Figure 5.18 Sketch of AHIMS site 45-5-2634 from AHIMS site card, showing original extent of scarring as recorded during original 1996 survey.**

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.19 Location of AHIMS Sites 45-5-2634, 45-5-2638, and 45-5-2790, with current recorded location of AHIMS Site 45-5-2634 labelled in italics.**

*45-5-2635 – Isolated Artefact*

**Property Address:** 1720 The Northern Road, Badgerys Creek (Figure 5.22)

**Landform:** Flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** stock track

**Site Description & Current Condition:** AHIMS site 45-5-2635 is described on the site card as a single isolated artefact exposed within a “cow track/creek bank” exposure. The site is recorded as being on the bank of Badgerys Creek, and was being impacted by stock movement and erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Although there are currently some impacts and exposures caused by stock movement along the bank of the creek, visibility along most of the recorded site area is limited by low grasses (see Figure 5.20 and Figure 5.21).

***Interim Recommendation:***

***Consideration should be given to implementing erosion control measures to establish vegetation along the creekline, supported by temporary fencing to prevent ongoing stock impacts as vegetation re-establishes.***



**Figure 5.20** AHIMS site 45-5-2635 location. View to south.



**Figure 5.21** Impacts and erosion caused by stock movement along Badgerys Creek in the vicinity of AHIMS site 45-5-2635. View to north east.

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.22 Location of AHIMS Sites 45-5-2635.**



*45-5-2637 – Isolated Artefact*

**Property Address:** 55 Longleys Road, Badgerys Creek (Figure 5.26)

**Landform:** waning lower-slope

**Site Size:** 1x1m

**Exposure:** vehicle track

**Site Description & Current Condition:** AHIMS site 45-5-2637 comprised an isolated silcrete artefact originally recorded near a ford on Badgerys Creek. The artefact was recorded within an exposure approximately 20x7m in size. The site was being impacted by erosion and vehicle activity.

A single isolated artefact was identified in the vicinity of the originally recorded site location during the current survey (see Figure 5.23 and Table 5.3). The isolated silcrete artefact was located within a vehicle track adjacent to a corner post of the property boundary, approximately 30-40m west of Badgerys Creek. The adjacent paddock is being impacted by ploughing, and the location of the isolated artefact is being impacted by heavy vehicle access (see Figure 5.24 and Figure 5.25)

***Interim Recommendation:***

***Consideration should be given to implementing erosion control measures to establish vegetation at the site, supported by temporary fencing to prevent ongoing impacts from vehicle access through the site.***

**Table 5.3 Figure 3.19 AHIMS site 45-5-2637 artefact details.**

Artefact #	Material	Colour	Length	Width	Thickness	Artefact Type
1	Silcrete	Red	29mm	20mm	8mm	flake



**Figure 5.23** AHIMS site 45-5-2637 artefact detail.



**Figure 5.24** AHIMS site 45-5-2637 location. View to east.



**Figure 5.25** AHIMS site 45-5-2637 location, showing position of artefact identified during current survey. View to west.

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.26 Location of AHIMS Site 45-5-2637, with current recorded location of AHIMS Site 45-5-2637 labelled in italics.**

#### 45-5-2638 – Isolated Artefact

**Property Address:** 1720 The Northern Road, Badgerys Creek (Figure 5.19)

**Landform:** flat/creek bank

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** stock/water erosion

**Site Description & Current Condition:** AHIMS site 45-5-2637 comprised an isolated chert artefact originally recorded adjacent to Badgerys Creek. The artefact was recorded within an erosional area approximately 2.6x3.9m in size along the creek. The erosion of the site was recorded as being caused by water activity and stock movement.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Significant erosion was present along the creek verges, and the creek surrounds were being significantly impacted by stock movement and access to the creek. Visibility immediately surrounding the creek bank is limited by low grasses (see Figure 5.27 and Figure 5.28).

#### *Interim Recommendation:*

***Consideration should be given to implementing erosion control measures to establish vegetation at the site, supported by temporary fencing to prevent ongoing impacts from stock activity along the creekline.***



**Figure 5.27** AHIMS site 45-5-2637 location. View to north west.



**Figure 5.28** AHIMS site 45-5-2637 location. View to south west.

#### 45-5-2665 – Artefact Scatter

**Property Address:** 735 Badgerys Creek Road (Figure 5.8)

**Landform:** flat

**Site Size:** 20x5m (recorded during original survey)

**Exposure:** excavated trench

**Site Description & Current Condition:** AHIMS site 45-5-2665 comprised a scatter of two silcrete artefacts recorded associated with an excavated trench and dam wall. The site was recorded as being impacted by ploughing, vehicle activity, stock movement and erosion.

No evidence of the Aboriginal site was able to be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. The property is heavily overgrown with grasses and reeds, and no exposures of natural soils are visible at the site. The vicinity of the site is currently being impacted by small stock grazing activity (see Figure 5.29 and Figure 5.30).

**Interim Recommendation:**

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impact from erosion, stock movement or overgrazing. No active management of the site is currently recommended. Although the property is currently unoccupied, site managers should be mindful of impacts that may arise from illegal access and use of the property.***



**Figure 5.29** AHIMS site 45-5-2665 location. View to east.



**Figure 5.30** AHIMS site 45-5-2665 location. View to east.

*45-5-2678 – Artefact Scatter*

**Property Address:** 40 Jackson Road, Luddenham (Figure 5.52)

**Landform:** simple slope

**Site Size:** 190x100m

**Exposure:** erosion areas/salt scald

**Site Description & Current Condition:** AHIMS site 45-5-2678 was originally recorded as a scatter of 11 artefacts exposed within erosional areas associated with a dam on Oaky Creek. The original survey recorded two erosional areas measuring 20x6m and 2x4m, and noted ongoing impacts to the site arising from stock activity, ploughing and erosion (see Figure 5.31).

The current survey identified 64 artefacts within five separate exposures at the site. Artefacts were recorded within six exposures within 100 m of Badgerys Creek, with the majority (artefacts #9 to #68) within 20m of a large dam. Exposures comprised erosion caused by water and stock activity, with horses grazing in the paddock (see Figure 5.32 to Figure 5.36). Visibility away from the active erosion areas was limited by low grasses.

Artefacts recorded at AHIMS site 45-5-2648 during the current survey were manufactured from silcrete, chert, mudstone quartz and quartzite materials, and included bifacial blades, cores and flakes (see Table 5.4 and Figure 5.37 to Figure 5.51).

**Interim Recommendation:**

***Consideration should be given to implementing erosion control measures to establish vegetation at site exposures. Stock grazing in the vicinity of the site should be limited where possible, to prevent the creation of new erosion areas. Consideration should be given to establishing fencing around the site exposures, incorporating an appropriate buffer area to prevent impacts to any subsurface Aboriginal cultural material.***





**Figure 5.31 AHIMS site 45-5-2678 as recorded during the 1996 survey. (Navin Officer 1997: Appendix H, Plate 5).**



**Figure 5.32 AHIMS site 45-5-2678 location of artefact# 1 to 8. View to east.**



**Figure 5.33 AHIMS site 45-5-2678 location of artefact #9 to 68. View to east.**



**Figure 5.34 AHIMS site 45-5-2678 location of artefact #59 to 62. View to south.**



**Figure 5.35 AHIMS site 45-5-2678 location of artefact #63. View to south west.**



**Figure 5.36 AHIMS site 45-5-2678 location of artefact #64. View to north.**

**Table 5.4 AHIMS site 45-5-2678 artefact details.**

Artefact #	Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Artefact Type
1	Silcrete	Red	10	16	4	Broken flake
2	Silcrete	Red	14	5	3	Flake
3	Silcrete	Red	2	15	7	Flaked piece
4	Silcrete	Pink	20	30	19	Core
5	Silcrete	Red	25	21	20	Core
6	Silcrete	Red	15	28	15	Core
7	Silcrete	Red	10	6	3	Flaked piece
8	Quartzite	White	8	7	3	Flake
9	Quartzite	White	15	11	9	Flaked piece
10	Silcrete	Red	18	13	6	Broken flake
11	Silcrete	Red	20	8	4	Bifacial blade
12	Silcrete	Red	26	9	5	Bifacial blade
13	Silcrete	Red	12	10	4	Flaked piece
14	Chert	Red/Grey	21	18	10	Core (with cortex)
15	Silcrete	Red	22	19	15	Core
16	Silcrete	Red	11	5	3	Flaked piece
17	Silcrete	Red	15	6	1	Flake
18	Silcrete	Red	10	11	6	Flaked piece
19	Silcrete	Red	17	12	5	Flaked piece
20	Mudstone	Orange	17	5	1	Flaked piece
21	Chert	Grey	14	16	5	Flake (with negative flake scar)
22	Mudstone	Orange	22	16	5	Flake (with negative flake scar)
23	Silcrete	Red	33	9	2	Flaked piece
24	Silcrete	Red	18	12	5	Flaked piece
25	Mudstone	Red/Brown	7	9	2	Flaked piece
26	Chert	Grey	22	15	5	Flake
27	Silcrete	Red	14	14	3	Broken flake
28	Silcrete	Red	11	8	3	Flake
29	Silcrete	Red	8	8	5	Flaked piece
30	Silcrete	Red	18	26	8	Broken Flake (with cortex)
31	Silcrete	Red	11	11	2	Flaked piece
32	Silcrete	Red	14	11	4	Flake
33	Chert	Red/Grey	7	9	5	Flaked piece (with cortex)
34	Chert	Red/Grey	18	13	5	Flaked piece (with cortex)
35	Silcrete	Red	16	10	7	Flaked piece (with cortex)
36	Silcrete	Red	9	15	4	Broken Flake
37	Mudstone	Red/Grey	34	30	9	Flake (with cortex)
38	Silcrete	Orange	14	8	3	Flake
39	Silcrete	Red	15	24	12	Core
40	Silcrete	Red	7	11	3	Broken Flake
41	Silcrete	Red	18	10	6	Flaked Piece
42	Silcrete	Red	11	5	3	Flake
43	Silcrete	Grey	17	25	10	Flaked Piece

Artefact #	Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Artefact Type
44	Mudstone	Red	10	18	5	Flaked Piece
45	Silcrete	Red	20	12	7	Broken Flake
46	Silcrete	Red	11	7	5	Flaked Piece
47	Mudstone	Red/Yellow	25	15	15	Flake
48	Mudstone	Red	10	12	3	Flaked Piece
49	Silcrete	Red	16	11	8	Flaked Piece
50	Silcrete	Red	10	18	12	Broken Flake
51	Silcrete	Red	5	14	4	Broken Flake
52	Silcrete	Red	8	8	3	Flaked Piece
53	Silcrete	Red	18	22	13	Flake
54	Silcrete	Yellow	13	15	5	Broken Flake
55	Silcrete	Yellow	11	12	5	Flaked Piece
56	Mudstone	Red/Grey	9	11	3	Flake
57	Silcrete	Pink/Cream	6	11	2	Broken Flake
58	Mudstone	Red	30	30	13	Flake (with cortex)
59	Silcrete	Red	10	20	4	Flake
60	Silcrete	Red	6	11	5	Flake
61	Silcrete	Red	13	11	3	Flaked Piece
62	Quartzite	Grey	12	13	4	Broken Flake (2 pieces)
63	Silcrete	Red	20	50	9	Flake
64	Mudstone	Red	12	16	6	Flake





Figure 5.37 AHIMS site 45-5-2678 artefacts 1-4.



Figure 5.38 AHIMS site 45-5-2678 artefacts 5-8.



Figure 5.39 AHIMS site 45-5-2678 artefacts 9-13.



Figure 5.40 AHIMS site 45-5-2678 artefacts 14-18.



Figure 5.41 AHIMS site 45-5-2678 artefacts 19-23.



Figure 5.42 AHIMS site 45-5-2678 artefacts 24-28.





**Figure 5.43** AHIMS site 45-5-2678 artefacts 29-33.



**Figure 5.44** AHIMS site 45-5-2678 artefacts 34-38.



**Figure 5.45** AHIMS site 45-5-2678 artefacts 39-43.



**Figure 5.46** AHIMS site 45-5-2678 artefacts 44-48.



**Figure 5.47** AHIMS site 45-5-2678 artefacts 49-53.



**Figure 5.48** AHIMS site 45-5-2678 artefacts 54-58.



**Figure 5.49** AHIMS site 45-5-2678 artefacts 59-62.



**Figure 5.50** AHIMS site 45-5-2678 artefact 63.



**Figure 5.51** AHIMS site 45-5-2678 artefact 64.

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.52 Location of AHIMS Sites 45-5-2678, 45-5-2679, and 45-5-2783, with current recorded location of AHIMS Site 45-5-2678 labelled in italics.**



#### 45-5-2679 – Isolated Artefact

**Property Address:** 40 Jackson Road, Luddenham (Figure 5.52)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** Creek bank

**Site Description & Current Condition:** AHIMS site 45-5-2679 comprised a single isolated quartz artefact recorded north of a dam adjacent to Oaky Creek. The artefact was recorded associated with a creek bed/bank exposure approximately 17x30m in size, and was being impacted by stock activity, ploughing and erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility is limited by low grasses. Although horses are present on the property in adjacent paddocks, none were actively grazing in the previously recorded vicinity of the site, and no evidence of impacts from horse tracks or erosion was observed during the current survey (see Figure 5.53).

#### *Interim Recommendation:*

*Consideration should be given to implementing erosion control measures to establish vegetation at site exposures. Although the property is currently unoccupied, site managers should be mindful of impacts that may arise from illegal access and use of the property.*



**Figure 5.53** AHIMS site 45-5-2679 location. View to south.



**Figure 5.54** AHIMS site 45-5-2689 location. View to north.

#### 45-5-2683 – Isolated Artefact

**Property Address:** 225 Longleys Road, Badgerys Creek (Figure 5.5)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** road easement

**Site Description & Current Condition:** AHIMS site 45-5-2683 comprised a single isolated silcrete artefact recorded within a cleared road easement, approximately 90m west of Badgerys Creek. The site was identified as being highly disturbed by the construction of the adjacent road, and as being impacted by vehicle activity.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility is

limited by low grasses, and the adjacent property is predominantly covered by an established lawn (see Figure 5.55 and Figure 5.56).

***Interim Recommendation:***

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impacts from erosion, stock movement or overgrazing. No active management of the site is currently recommended.***



**Figure 5.55** AHIMS site 45-5-2683 location. View to east.



**Figure 5.56** AHIMS site 45-5-2683 location. View to west.

***45-5-2685 – Isolated Artefact***

**Property Address:** 85 Leggo Street, Badgerys Creek (Figure 5.5)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** ploughed field

**Site Description & Current Condition:** AHIMS site 45-5-2685 comprised a single isolated quartz artefact recorded approximately 100m west of Badgerys Creek. When originally recorded, the paddock was being ploughed for cultivation, although the site card notes that impacts from this activity were shallow, and that subsurface archaeological deposits had potential to remain present at the site.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility is limited by low grasses. Although horses are present on the property in adjacent paddocks, none were actively grazing in the previously recorded vicinity of the site (see Figure 5.57 and Figure 5.58).

***Interim Recommendation:***

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impacts from erosion, stock movement or overgrazing. No active management of the site is currently recommended.***





**Figure 5.57** AHIMS site 45-5-2685 location. View to east.



**Figure 5.58** AHIMS site 45-5-2685 location. View to west.

#### *45-5-2690 – Isolated Artefact*

**Property Address:** 85 Leggo Street, Badgerys Creek (Figure 5.5)

**Landform:** flat

**Site Size:** (recorded during 1996 survey)

**Exposure:** road easement

**Site Description & Current Condition:** AHIMS site 45-5-2690 comprised a single isolated silcrete artefact within a road easement, approximately 200m west of Badgerys Creek. The artefact was being impacted by vehicle access along the unsealed road when originally recorded.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. The road remains unsealed, and the road verges are heavily vegetated, with very limited visibility (see Figure 5.59 and Figure 5.60).

#### *Interim Recommendation:*

***Stone artefacts at the site are not currently visible, and the location has experienced severe disturbance from the establishment of the unsealed road and adjacent stormwater trench. No active management of the site is currently recommended.***



**Figure 5.59** AHIMS 45-5-2690 location. View to south.



**Figure 5.60** AHIMS site 45-5-2690 location. View to west.

#### *45-5-2693 – Artefact Scatter*

**Property Address:** 75 Jagelman Road, Badgerys Creek (Figure 5.63)

**Landform:** simple slope

**Site Size:** 23x2m (recorded during 1996 survey)

**Exposure:** erosion area

**Site Description & Current Condition:** AHIMS 45-5-2693 comprised a mudstone and a silcrete artefact located on slope landforms approximately 100m north of Badgerys Creek. The artefacts were recorded within a clear area around an ant nest, and an eroded clay pan. The site was being impacted by erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility is limited by low grasses within the paddock, although there are several eroded areas adjacent to a wooded area along the southern extent of the paddock. Horses currently graze within the site location (see Figure 5.61 and Figure 5.62).

#### *Interim Recommendation:*

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing limited impacts from erosion, stock movement and grazing. No active management of the site is currently recommended.***



**Figure 5.61 AHIMS site 45-5-2693 location. View to east.**



**Figure 5.62 AHIMS site 45-5-2693 location. View to east.**

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.63 Location of AHIMS Site 45-5-2693.**

*45-5-2699 – Artefact Scatter*

**Property Address:** 1802 The Northern Road, Badgerys Creek (Figure 5.15)

**Landform:** simple slope

**Site Size:** 50x50m (recorded during 1996 survey)

**Exposure:** dam wall

**Site Description & Current Condition:** AHIMS site 45-5-2699 was originally recorded as comprising a scatter of 13 stone artefacts. The artefacts were identified along a dam wall, and within a water channel directly west of the dam. The site is located approximately 80m north of Badgerys Creek. During the original survey, the site was being impacted by water erosion.

One silcrete artefact was located during the current survey on top of the dam wall, on the southern side of the dam (see Table 5.5, Figure 5.64 and Figure 5.65). The property was unoccupied at the time of the current survey, and no livestock were present. The site is being impacted by erosion from water activity, particularly along the water channel.

***Interim Recommendation:***

***Consideration should be given to implementing erosion control measures to establish vegetation at site exposures. Although the property is currently unoccupied, site managers should be mindful of impacts that may arise from illegal access and use of the property.***

**Table 5.5 AHIMS site 45-5-2699 artefact details.**

Artefact #	Material	Colour	Length	Width	Thickness	Artefact Type
1	Silcrete	Red	15mm	13mm	5mm	Broken flake





Figure 5.64 AHIMS site 45-5-2699 artefact detail.



Figure 5.65 AHIMS site 45-5-2699 location of artefact on dam wall. View to east.

#### 45-5-2762 – Artefact Scatter

**Property Address:** 2420 Elizabeth Drive, Badgerys Creek (Figure 5.68)

**Landform:** flat

**Site Size:** 100x7m (recorded during 1996 survey)

**Exposure:** dam wall and drainage line

**Site Description & Current Condition:** AHIMS site 45-5-2762 was originally recorded as a scatter of six silcrete and chert artefacts associated with a dam wall and dam margin on the eastern side of Oaky Creek. The site was recorded as being impacted by erosion and rubbish dumping.

One silcrete artefact was located during the current survey, exposed along a drainage trench approximately 60m east of the dam, and 200m east of Oaky Creek (see Figure 5.66 and Figure 5.67). The artefact had been exposed by water erosion along the northern side of the trench approximately 1mx10m long. Visibility around the dam and drainage trench, including along the dam wall, was limited by low grasses.

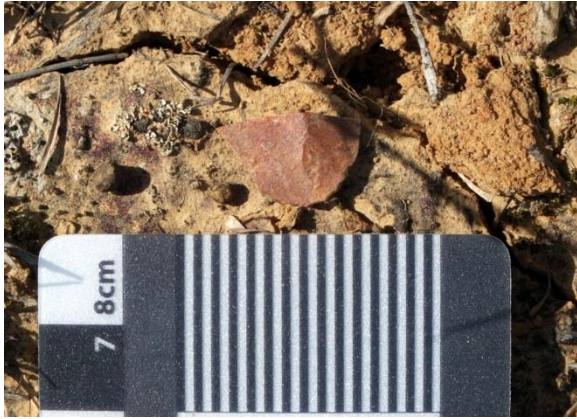
#### *Interim Recommendation:*

***Consideration should be given to implementing erosion control measures to establish vegetation at the site, supported by temporary fencing to prevent ongoing impacts from vehicle access around the site.***

Table 5.6 AHIMS site 45-5-2762 artefact details.

Artefact #	Material	Colour	Length	Width	Thickness	Artefact Type
1	Silcrete	Red	10mm	16mm	>1mm	Broken flake





**Figure 5.66 AHIMS site 45-5-2762 artefact detail.**



**Figure 5.67 AHIMS site 45-5-2762 location. View to north.**

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.68 Location of AHIMS Sites 45-5-2762, 45-5-2764, and 45-5-2789.**

#### 45-5-2764 – Artefact Scatter

**Property Address:** 2420 Elizabeth Drive, Badgerys Creek (Figure 5.68)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** dam wall

**Site Description & Current Condition:** AHIMS site 45-5-2764 was originally recorded as an isolated chert artefact on a dam wall, approximately 50m east of Oaky Creek. The exposure was recorded as being 5mx40m in size, and the area was being impacted by ploughing and erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility around the dam is limited by low grasses, and while thicker grasses cover the current dam wall. The site is not currently experiencing any significant impacts (see Figure 5.69 and Figure 5.70).

#### *Interim Recommendation:*

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impacts from erosion, stock movement or grazing. No active management of the site is currently recommended.***



**Figure 5.69** AHIMS site 45-5-2764 location. View to east.



**Figure 5.70** AHIMS site 45-5-2764 location. View to north west.

#### 45-5-2768 – Isolated Artefact

**Property Address:** 2060 Elizabeth Drive, Badgerys Creek (Figure 5.73)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** excavated trench

**Site Description & Current Condition:** AHIMS 45-5-2768 comprised an isolated quartz artefact exposed within an excavated trench approximately 100m west of Badgerys Creek. The site had been significantly impacted by excavation of the trench, which had been used to create an informal BMX jump.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Visibility around the site is limited by low grasses and riparian woodland. The property is not currently occupied, and the site is not currently experiencing any significant impacts (see Figure 5.71 and Figure 5.72).

***Interim Recommendation:***

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing limited impacts from erosion, stock movement and grazing. No active management of the site is currently recommended.***



**Figure 5.71** AHIMS 45-5-2768 location. View to north.



**Figure 5.72** AHIMS 45-5-2768 location. View to south.

(Confidential information relating to sensitive Aboriginal site locations removed)

**Figure 5.73 Location of AHIMS Site 45-5-2768.**



#### 45-5-2781 – Artefact Scatter

**Property Address:** 55 Taylors Road, Badgerys Creek (Figure 5.8)

**Landform:** flat

**Site Size:** 30x20m (recorded during 1996 survey)

**Exposure:** erosion area

**Site Description & Current Condition:** AHIMS site 45-5-2781 comprised a scatter of two quartz and three silcrete artefacts exposed in a 30x20m erosion area approximately 30m west of a tributary of Badgerys Creek. The site was being impacted by vehicle access, rubbish dumping, stock activity and erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Visibility around the site is limited by grasses and riparian woodland adjacent to the Creek. The only ground visibility on the property is within a 20x20m horse yard (see Figure 5.74 and Figure 5.75). Horses currently graze across the entire site.

#### *Interim Recommendation:*

***Stone artefacts at the site are not currently visible, and the majority of the location is well vegetated and experiencing limited impacts from erosion, stock movement and grazing. No artefacts are present within the horse yard. No active management of the site is currently recommended.***



**Figure 5.74** AHIMS site 45-5-2781 location. View to north.



**Figure 5.75** AHIMS site 45-5-2781 location. View to south.

#### 45-5-2789 – Isolated Artefact

**Property Address:** 2420 Elizabeth Drive, Badgerys Creek (Figure 5.68)

**Landform:** flat

**Site Size:** 1x1m (recorded during 1996 survey)

**Exposure:** salt scald/clay pan

**Site Description & Current Condition:** AHIMS site 45-5-2789 was originally recorded as an isolated silcrete artefact adjacent to a dam, approximately 100m east of Oaky Creek. The exposure area was recorded as being 1x2m in size, and the area was being impacted by rubbish dumping and erosion.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Ground visibility around the dam is limited by low grasses maintained as pasture. No erosion areas are visible in the vicinity of the originally recorded dam location, and the site is currently being impacted by ploughing and maintenance of the pasture (see Figure 5.76 and Figure 5.77).



***Interim Recommendation:***

***Stone artefacts at the site are not currently visible, and the location is well vegetated and experiencing no impacts from erosion, stock movement or grazing. No active management of the site is currently recommended.***



**Figure 5.76** AHIMS site 45-5-2789 view to north.



**Figure 5.77** AHIMS site 45-5-2789. View to south.

***45-5-2790 – Artefact Scatter***

**Property Address:** 1720 The Northern Road, Badgerys Creek (Figure 5.19)

**Landform:**

**Site Size:** (recorded during 1996 survey)

**Exposure:**

**Site Description & Current Condition:** AHIMS 45-5-2790 comprised a scatter of one silcrete and one chert artefact within an eroded gully on the edge of Badgerys Creek. The exposure within the gully was recorded as being 15mx30m in size, and the area was being impacted by erosion and stock movement.

No evidence of the Aboriginal site could be identified during the current survey, and no stone artefacts were visible at the originally recorded location of the site. Significant erosion was present along the creek verges, and the creek surrounds were being significantly impacted by stock movement and access to the creek. Visibility immediately surrounding the creek bank is limited by low grasses (see Figure 5.78 and Figure 5.79).

***Interim Recommendation:***

***Consideration should be given to implementing erosion control measures to establish vegetation at the site, supported by temporary fencing to prevent ongoing impacts from stock activity along the creekline.***



**Figure 5.78 AHIMS 45-5-2790 location. View to south.**



**Figure 5.79 AHIMS 45-5-2790 location. View to north.**

## 5.2 Survey Results Summary

Of the 21 Aboriginal heritage sites within areas of moderate and high archaeological potential, only 7 sites could be located and verified during the current survey. These were the two possible scarred tree sites and five stone artefact sites. Impacts recorded during the 1996 survey of the area have continued to affect the condition and visibility of the sites, and the majority of sites are now either being actively impacted by water or stock movements, or were overgrown and obscured by vegetation. These impacts appear to have either obscured the previously recorded artefacts, or to have removed them from the immediate location of the original site recording.

Of the previously recorded Aboriginal heritage sites within areas of moderate and high archaeological potential, the following observations were made during the current survey:

- AHIMS sites 45-5-2630 and 45-5-2634, comprising two possible scarred trees were found to be heavily impacted by ongoing rotting of the heartwood caused by previous damage, and stock impacts, respectively;
- No artefacts were visible at AHIMS sites 45-5-2685, 45-5-2683, 45-5-2764, 45-5-2768, 45-5-2789, 45-5-2679 and 45-5-2635 due to extensive vegetation, primarily pasture. As these sites were originally recorded as isolated artefacts, difficulty in relocating the artefact is not unexpected;
- No artefacts were visible at AHIMS sites 45-5-2665, 45-5-2693 and 45-5-2632, which were originally recorded as small artefact scatters, now obscured by extensive vegetation, primarily pasture;
- No artefacts were visible at AHIMS sites 45-5-2638 and 45-5-2690 which were being actively impacted by stock movement and water erosion likely to have removed surface artefacts from the immediate vicinity. As these sites were originally recorded as isolated artefacts, difficulty in relocating artefacts is not unexpected;
- No artefacts were visible at AHIMS sites 45-5-2699 and 45-5-2790, originally recorded as small artefact scatters. These sites were being actively impacted by stock movement and water erosion likely to have removed surface artefacts from the immediate vicinity;
- No artefacts were visible at AHIMS site 45-5-2781, originally recorded as a small artefact scatter. Portions of the site's location are partially overgrown by riparian vegetation and pasture, and portions are being heavily impacted by stock activity within a small enclosure;
- Three artefacts were recorded at AHIMS site 45-5-2633, a site associated with a dam originally recorded as comprising 12 artefacts. Impacts from water erosion recorded

during the current survey is likely to have removed surface artefacts from the immediate vicinity of the site;

- One artefact was recorded at AHIMS site 45-5-2637, originally recorded as an isolated artefact, now being heavily impacted by ploughing and erosion;
- One artefact was recorded at AHIMS site 45-5-2672, a site associated with a dam that was originally recorded as comprising six 6 artefacts. The site is now predominantly covered by pasture, obscuring vegetation almost completely;
- Only one site contained more visible artefacts than originally recorded. AHIMS site 45-5-2678 was recorded in 1996 as a scatter of 11 artefacts exposed within two small salt pan erosion areas, and during the current survey a total of 64 artefacts were recorded at the site, within extensive exposures caused by ongoing stock impacts and water erosion.

## 6 Conclusion

Heritage places contribute to the understanding and character of a community by providing tangible evidence of its history and identity. At times of change, they help to preserve a connection to the past, and can provide a point of reference for interpreting the past to future generations. Article 15 of the Burra Charter refers to managing Change, which should be guided by the cultural significance of the place and its appropriate interpretation. The Burra Charter process also recognises that the development of preferred conservation options requires consideration of a range of other factors which could affect the future of a place. These include:

- requirements of the owner, in this instance the Commonwealth;
- the physical condition of the place; and
- statutory obligations or issues related to heritage and safety requirements.

The aim of the current study has been to review the current Badgerys Creek Aboriginal heritage environment and to identify where there may be gaps in the current understanding of the site. No additional Aboriginal heritage objects or places have been identified within the Commonwealth owned land at Badgerys Creek since the preparation of the 1997 Draft EIS; however, the results of archaeological investigations undertaken in the surrounding region since that time suggest that the Aboriginal archaeological potential of the Commonwealth owned land is likely to be greater than previously assessed. Refinements to the understanding of the nature of the Aboriginal cultural heritage of the region since 1997 have suggested that the Commonwealth lands at Badgerys Creek have greater potential to contain subsurface archaeological deposits than previously indicated, and that landforms with potential to contain such deposits are likely to be larger than those accounted for by the 1997 predictive model. As such, a comprehensive investigation of Aboriginal cultural heritage should be completed to inform the appropriate management of the Commonwealth owned land at Badgerys Creek.

Under the EPBC Act, owners and managers of Commonwealth land are required to identify and assess items and places under their control for heritage value. Identification of heritage values is the first step in the process of developing management strategies to assist in conserving the heritage values of items and places for future generations.

The following gaps analysis and recommendations are based on the background archaeological and environmental review and research, the predictive model for Aboriginal heritage, and on the results of the targeted survey and review of previously recorded Aboriginal heritage sites within areas of moderate or high archaeological potential.

### 6.1 Key Findings & Information Gaps

Aboriginal cultural heritage investigations of the Commonwealth lands at Badgerys Creek were previously undertaken for the Second Sydney Airport Site Selection Programme (Department of Aviation 1985) and the 1997 Draft Environmental Impact Statement (Department of Transport and Regional Development 1997) predate the introduction of, and do not comply with, the OEH *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010), and current Commonwealth and State guidelines for Aboriginal community consultation, including *Ask First: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission 2002), and the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010).

The descriptions and locations of all Aboriginal sites identified within the Commonwealth owned land at Badgerys Creek were omitted from Technical Paper 11, *Aboriginal Cultural Heritage Proposal for a Second Sydney Airport at Badgerys Creek or Holsworthy Military Area*,

as it was being placed on public exhibition. As such, all Aboriginal site information recorded during the field investigations for the Draft EIS was obtained from Aboriginal Heritage Information Management System (AHIMS) site cards held by the NSW Office of Environment and Heritage. However, this information is in many cases limited: the recording forms used on the field survey were non-standard, and a number of them do not include any pertinent details or site descriptions.

Should any future investigations of the Commonwealth lands at Badgerys Creek require consideration of a wider area than that addressed by the current investigation, it may be necessary to apply for an Aboriginal Heritage Information License Agreement (AHILA) from OEH to obtain information for more than 120 Aboriginal heritage sites from AHIMS. If an AHILA is required, consultation will need to be undertaken with relevant Aboriginal stakeholders as per OEH Requirements. Such consultation could take a minimum of 8 weeks, and has potential implications for the program and timing of any future investigations.

The archaeological survey undertaken for the current study targeted 21 Aboriginal sites within zones assessed in the 1997 Draft Environmental Impact Statement (EIS) as having moderate and high archaeological potential. Two properties could not be accessed during the survey, and the condition of the Aboriginal sites registered on these properties, AHIMS Site 45-5-2783 (B43) and AHIMS Site 45-5-2682 (B75), could not be verified.

As consultation with representatives of the local Aboriginal community was not undertaken for this investigation, no assessment of the cultural heritage significance has been carried out. The Traditional Owners of the area have not been afforded the opportunity to provide input or discussion to this investigation as stakeholders for the area, nor to provide any relevant cultural knowledge relating to potential cultural or spiritual sites, objects or places within the Commonwealth owned land at Badgerys Creek.

Archaeological investigation of the Aboriginal cultural heritage of the Commonwealth owned land at Badgerys Creek has not, to date included archaeological excavations. Archaeological studies within the Cumberland Plain have shown that the presence or absence of surface archaeological materials, while a potentially significant source of archaeological information regarding past Aboriginal land use and activities, are not a wholly reliable indicator of the distribution of *in situ* archaeological deposits. Surface expressions of Aboriginal heritage sites reviewed during this the current study were entirely exposed through disturbance, and it is likely that substantial archaeological deposits may remain present in the Commonwealth owned land at Badgerys Creek within landforms that have not experienced significant disturbance.

## 6.2 Recommendations

### 6.2.1 Aboriginal Community Consultation

Archaeological and heritage management best practice requires that representatives of the local Aboriginal community are included as stakeholders in decisions concerning any heritage objects, archaeological places or Sacred Sites. In addition, assessments of cultural significance, the values of a site to the Aboriginal community itself, can only be carried out by the relevant Aboriginal communities. Commonwealth heritage management principles as set out in the EPBC Regulations specify that:

*Indigenous people are the primary source of information on the value of their heritage and that the active participation of indigenous people in identification, assessment and management is integral to the effective protection of indigenous heritage values.*



Aboriginal community consultation should be undertaken in accordance with the principles of the guiding document *Ask first: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission 2002), and address the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010), as appropriate.

A broad and inclusive consultation process should be established for the life of any assessment process addressing future land use activities. The process should seek to ensure that all potential Aboriginal community stakeholders have the opportunity to be involved in decision making, significance assessment, the development of archaeological assessment methodologies, and heritage impact mitigation and management planning.

The consultation process should include, but not be limited to:

- initial public consultation and advertising to identify traditional owners and other Aboriginal stakeholders with rights and interests in the area;
- community meetings to establish the appropriate Aboriginal community stakeholders to consult with, determine the appropriate level of consultation to be undertaken, and to agree on a formal protocol for ongoing consultation through the life of the assessment;
- community meetings to present the scope of potential land use activities and their assessment, and to seek comment and input from the community on proposed archaeological assessment methodologies;
- involvement and employment of Aboriginal community stakeholders in archaeological field assessment and investigation works, as appropriate; and,
- allowance for Aboriginal stakeholder review, comment and input in all Aboriginal heritage reporting and management recommendations.

#### **Recommendation 1**

***Aboriginal community consultation should be carried out to ensure the appropriate involvement of Aboriginal stakeholders in the assessment and decision making regarding their heritage. Consultation should comply with the Australian Heritage Commission's Ask First: A guide to respecting Indigenous heritage places and values (2002), and address the NSW Office of Environment and Heritage's Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW 2010), as appropriate.***

#### **6.2.2 Archaeological Survey & Assessment**

In order to assess the Aboriginal cultural heritage of the Commonwealth owned land at Badgerys Creek, an Aboriginal heritage survey is required to identify and record a representative sample of material traces and evidence of Aboriginal occupation within the Badgerys Creek area. The survey will provide the opportunity to test the predictive model of Aboriginal heritage developed for the region, and is essential to allow the development of an appropriate strategy and methodology for further impact mitigation planning.

While the survey methodology should respond to the current regional predictive model for Aboriginal sites, and examine areas predicted to contain sites, in order to establish a complete sample of the Commonwealth owned land at Badgerys Creek it should also inspect areas with low potential to contain sites. In particular, the survey should aim to sample all landform types across the Badgerys Creek area, establishing a reliable baseline for archaeological analysis of the results.

To ensure consistency and to allow comparison with other archaeological studies undertaken in the region, future archaeological surveys of the Commonwealth owned land at Badgerys Creek should be carried out as per the OEH Code of Practice. The survey should be undertaken in conjunction with representatives of the Aboriginal community stakeholders,

who should also be provided the opportunity to provide cultural knowledge and input into discussions of the assessment during the field process. In consultation with Aboriginal community stakeholders, the archaeological assessment should assess the heritage significance and values of sites identified within the Badgerys Creek area, in line with OEH guidelines and the CHL criteria.

### **Recommendation 2**

***Full archaeological survey of the Commonwealth owned land at Badgerys Creek should be undertaken in consultation and engagement with Aboriginal community stakeholders. The survey and assessment should seek to assess a representative sample of all landforms within the area, and should comply with the requirements of the NSW Office of Environment and Heritage's Code of Practice for Archaeological investigation of Aboriginal Objects in New South Wales (DECCW, 2010)***

#### **6.2.3 Archaeological Excavation**

The current investigation of previously recorded Aboriginal heritage sites undertaken has shown that surface visibility of Aboriginal stone artefact sites is variable across time. Of the 21 Aboriginal heritage sites inspected, Aboriginal cultural material was visible during the current survey at only 7 of the sites, 2 of which were scarred trees. As Aboriginal heritage sites experience ongoing impacts, development, or seasonal variations in vegetation growth, objects are exposed or obscured, illustrating that surface surveys are not a wholly reliable determinate of the presence or absence of Aboriginal heritage sites. In order to generate a holistic understanding of the Aboriginal cultural heritage of the Badgerys Creek area, archaeological excavations are recommended in the event that future works or developments are proposed within the Commonwealth owned land at Badgerys Creek.

Increased knowledge of the archaeology of the Commonwealth owned land will allow an appropriate management of the risks to Aboriginal heritage arising from future land use or development within the lands, and is in accord with recommendations made by the 1997 Draft EIS, the 1998 Auditor's Report on the Draft EIS, the 1999 Auditor's Report on the Supplement to the Draft EIS, and the 1999 Environment Australia assessment report.

The archaeological excavation methodology should respond to the results of the archaeological survey and assessment as appropriate. Excavations should be limited to those areas likely to be impacted by any land use activities.

The archaeological excavation should incorporate a staged process, allowing for archaeological test excavations to be carried out sampling landforms across the Badgerys Creek area, followed by salvage excavations where appropriate. Test excavations must examine locations without visible Aboriginal site exposures, and where the predictive model suggests sites are unlikely to be found, in order to test the Aboriginal heritage predictive model and the accepted understanding of the archaeology of the region.

Following initial archaeological test excavations, salvage excavations should be carried out to recover a representative sample of the archaeological resource of the Badgerys Creek area. Sufficient analysis of the archaeological materials recovered should be undertaken to allow comparison with other archaeological excavations in the region, and where appropriate, geomorphological analysis and chronological dating of the excavated areas should be prepared.

The program of archaeological testing and salvage must be of a scale appropriate to offset impacts to Aboriginal heritage and archaeology that may be caused by future development

or land use activities on the Commonwealth owned land at Badgerys Creek. All excavation must be carried out with the involvement of Aboriginal stakeholder representatives.

### **Recommendation 3**

***A program of archaeological test and salvage excavations should be carried out throughout impact areas resulting from future development or land use activities on the Commonwealth owned land at Badgerys Creek, in consultation and engagement with Aboriginal community stakeholders. The scope and methodology of the excavation should respond to the results of the archaeological survey and assessment, and should seek to recover and analyse an appropriate representative sample of the Aboriginal archaeological resource of the area.***

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