

19 Aboriginal heritage

Since the early 1800s, land use at the airport site has consisted of varying phases of stock grazing, cropping, orcharding, dairying, market gardening, poultry farming and some light industrial functions. Consequently, most of the original native vegetation has been cleared and the airport site is now dominated by agricultural grasslands or cultivated fields with small pockets of open eucalypt woodland or shrubland. These activities are expected to have had a substantial impact on the Aboriginal archaeological resource, especially in the top soil and the plough zone at the airport site.

The airport site has been the subject of a number of previous archaeological assessments as part of the search for an appropriate site for a second Sydney airport. These previous assessments date back to 1978, with the most recent being undertaken in 2014. Fifty-one Aboriginal heritage sites have been recorded during these surveys, consisting of surface artefact occurrences and a modified tree. Twenty-three additional sites were recorded at the airport site during the course of the current assessment, which focused on test excavation and characterising the sub-surface archaeological resource. The new recordings comprised nine sites with surface artefacts (including a grinding groove site) and 14 sites where subsurface artefacts were confirmed through test pit excavations.

The test excavation programme included a representative sample of landform types and zones within the airport site. It was determined that a relatively high average artefact incidence occurred across valley floors, basal slopes, first-order spurlines and within 100 metres of second, third and fourth order streams. These findings are generally consistent with numerous other investigations in the vicinity of the airport site that have confirmed that Aboriginal heritage sites occur widely across the landscape, but particularly on elevated level ground and slopes within relative proximity of a water source. These investigations also indicate that larger sites with higher artefact densities are more likely to be found near permanent water.

Aboriginal stakeholder consultation undertaken for the current assessment identified the airport site as a place of cultural significance and continuing cultural connection. The reasons for this include the site's material evidence of occupation, its cultural landscape values, and culturally significant plants, animals and resources. All of these contribute to a sense of place and cultural identity, and are considered to be a valuable educational resource. In addition, the remaining Aboriginal sites across the Sydney hinterlands may be considered to have an intrinsic value because of their endurance amid concerns about disappearing heritage. The cumulative impacts on Aboriginal heritage sites caused by continuing urban and industrial development of the Cumberland Plain, of which the proposed airport would be a part, effectively impose a greater significance on those sites that remain.

All of the Aboriginal heritage sites recorded at the airport site are considered to have significance. Many sites contain archaeological material which has both cultural and scientific value, and all sites, irrespective of their scientific or other values, are considered to be culturally significant by the Aboriginal community. The predicted archaeological resource of the airport site, as revealed by the test excavation programme, is also assessed to be significant.

Construction of the proposed Stage 1 development would affect at least 39 sites recorded at the airport site, all of which comprise artefact occurrences. Construction activities would also impact approximately 514 hectares of archaeologically sensitive landforms. Impacts during operation of the proposed airport would be limited to indirect impacts on adjacent and nearby sites. The heritage values of these sites are unlikely to be vulnerable to indirect impacts such as loss of context. Consequently, the operational impacts of the proposed Stage 1 development would be low.

Mitigation and management measures would be implemented to minimise the impacts on Aboriginal cultural heritage. These measures include the conservation of heritage sites, recording and salvaging of heritage sites, the commemoration of cultural heritage values at the airport site, curation and repatriation of heritage items and protocols for the discovery of artefacts and human remains.

19.1 Introduction

This chapter provides a review of the Aboriginal cultural heritage values that may be potentially affected by the development of the proposed airport. In doing so, it draws on a comprehensive Aboriginal cultural heritage impact assessment, which is included as Appendix M1 (Volume 4). This chapter describes the Aboriginal cultural heritage values of the airport site and assesses the potential impacts of the proposed Stage 1 development on these cultural heritage values. Mitigation and management measures are identified to reduce potential impacts. The assessment has been carried out in accordance with the *Guidelines for the Content of a Draft Environmental Impact Statement – Western Sydney Airport* (EIS guidelines) for Western Sydney Airport.

19.2 Methodology

The methodology for the Aboriginal cultural heritage impact assessment included consultation, a database and literature review, field surveys and assessments of significance.

The adopted methodology builds upon data obtained from previous site studies which focused predominantly on the investigation of surface sites. All field data generated by the archaeological survey undertaken as part of the 1997–99 *Second Sydney Airport Proposal Environmental Impact Statement* (1997–99 EIS) (PPK 1997), were reviewed, together with the results of the 2014 environmental survey, which reinspected a selection of the 1997 recordings (AMC 2014). The environmental survey reported low levels of ground surface visibility and revealed that only a small proportion of the 1997 recordings was still identifiable from surface artefacts. This finding indicated that the current assessment should focus on the investigation of the potential subsurface archaeological resource, rather than repeat surface archaeological survey in low visibility conditions. Emphasis was also placed on recording cultural values and the views of the Aboriginal stakeholder community.

The investigation of the potential subsurface resource employed a landscape-based approach and involved the development of a predictive model and a programme of archaeological test excavation within a sample of locations. This complemented the site-based approach of previous studies. Optimal test excavation locations were selected through a field survey programme conducted with Aboriginal stakeholders.

The predictive modelling now allows the extrapolation of surface and subsurface artefact incidence data to untested landforms of the same type, and the nature of the predicted archaeological resource to be mapped in terms of broad area landforms and topographic variables. This integration of surface and subsurface information characterises current best practice, and represents a shift in paradigm – from one which is site-based and focused on surface evidence, to one focused on the subsurface resource that may be revealed by both surface sites and test excavation.

19.2.1 Consultation

Consultation was undertaken with reference to *Ask First, A Guide to Respecting Indigenous Heritage Places and Values* (Australian Heritage Commission 2002) and was guided by the requirements set out in the document *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH 2010b). This included:

- **Stage 1 – Notification of the project proposal and identification and registration of stakeholders.** A public notice advising of the Aboriginal cultural heritage assessment and inviting registrations from interested parties was placed in several local newspapers in February 2015. The newspapers were the *Blacktown Advocate*, *Liverpool Leader*, *Fairfield City Champion*, *Camden Advertiser*, *Penrith Press* and *Macarthur Chronicle*. Letters were also sent to organisations seeking the identification of Aboriginal stakeholders for the purpose of inviting their participation in the consultation programme. There are 50 registered Aboriginal stakeholders for the airport proposal. A list of registered stakeholders is provided in Appendix M1 (Volume 4).
- **Stages 2 and 3 – Presentation of information about the project and proposed assessment methodology, and gathering of information about cultural significance.** A combined background paper and draft methodology for the Aboriginal cultural heritage assessment was sent to all registered Aboriginal stakeholders in March 2015 with an invitation to provide comment on both the methodology and any known cultural heritage values relevant to the airport site. Two meetings were also held with the registered stakeholders in April 2015 to discuss the airport proposal, outline previous assessment work at the airport site and explain the proposed methodology for the Aboriginal cultural heritage assessment. All Aboriginal stakeholders who were registered at the time opted to participate in the fieldwork programme.
- **Stage 4 – Review of Aboriginal cultural heritage assessment.** Meetings to present the findings of the Aboriginal cultural heritage assessment were held with Aboriginal stakeholders in October and November 2015. All registered Aboriginal stakeholders were notified on 23 October 2015 once the draft EIS was published and invited to provide written submissions. Stakeholders were advised where to access hard copies and electronic copies of the draft EIS. Submissions were received over the statutory public display period ending on 18 December 2015. All submissions were reviewed and addressed through the EIS finalisation process.

Two separate meetings were held with Liverpool City Council and the NSW OEH in May 2015. A general outline of the airport proposal and the Aboriginal cultural heritage assessment approach was provided followed by a discussion of potential issues and priorities.

Further detail of the consultation undertaken is provided in Appendix M1 (Volume 4). The results of the consultation activities are summarised in Section 19.3.5.

19.2.2 Database and literature review

A desktop assessment was undertaken to determine the nature and status of known Aboriginal heritage sites within and around the airport site, to facilitate site prediction on the basis of regional and local site patterns, and to place the area within an archaeological and heritage management context.

The desktop assessment included searches of heritage registers and schedules and a review of local histories and archaeological reports. Searches were undertaken of the following heritage registers and schedules:

- World Heritage List (United Nations Educational, Scientific and Cultural Organization (UNESCO));
- Commonwealth Heritage List (Australian Heritage Council);
- National Heritage List (Australian Heritage Council);
- Register of the National Estate (Australian Heritage Council); and
- Aboriginal Heritage Information Management System (AHIMS) (NSW OEH).

The results of previous archaeological assessments undertaken at the airport site and in the vicinity were reviewed. These included:


- Major Airport Needs of Sydney (MANS) Study (Haglund 1978);
- Second Sydney Airport Site Selection Programme Draft Environmental Impact Statement (Kinhill Stearns 1985);
- Draft Environmental Impact Statement Second Sydney Airport Proposal (PPK 1997);
- Draft Environmental Impact Statement Second Sydney Airport Proposal, Auditor's Report (SMEC 1998);
- Supplement to Draft Environmental Impact Statement Second Sydney Airport Proposal (PPK 1999);
- Supplement to Draft Environmental Impact Statement Second Sydney Airport Proposal, Auditor's Report (SMEC 1999);
- Proposed Second Sydney Airport at Badgerys Creek Environmental Assessment Report (Environment Australia 1999); and
- Environmental Field Survey of Commonwealth Land at Badgerys Creek (SMEC 2014).

A comprehensive list of the literature that was reviewed is provided in Appendix M1 (Volume 4).

19.2.3 Field surveys

19.2.3.1 Overview

A three week fieldwork programme was conducted from 4 to 22 May 2015. This programme reflected the objectives of the assessment, which included the identification of Aboriginal cultural values and the testing of the subsurface archaeological resource. A decision not to systematically revisit or test previously identified sites was made based on the findings of the 2014 environmental field survey conducted by Australian Museum Consulting (AMC 2014). The AMC study encountered low ground surface visibility and found that a low proportion of previously recorded surface artefacts remained visible.



The first week of fieldwork was devoted to site walkovers with Aboriginal parties, which provided an opportunity for stakeholders to identify and discuss cultural and intangible values associated with the airport site. This included a broad scale review of the site characteristics and diversity of landforms, and the identification and prioritisation of potential test pit locations. An archaeological test pit programme was undertaken over the subsequent two weeks of the fieldwork programme.

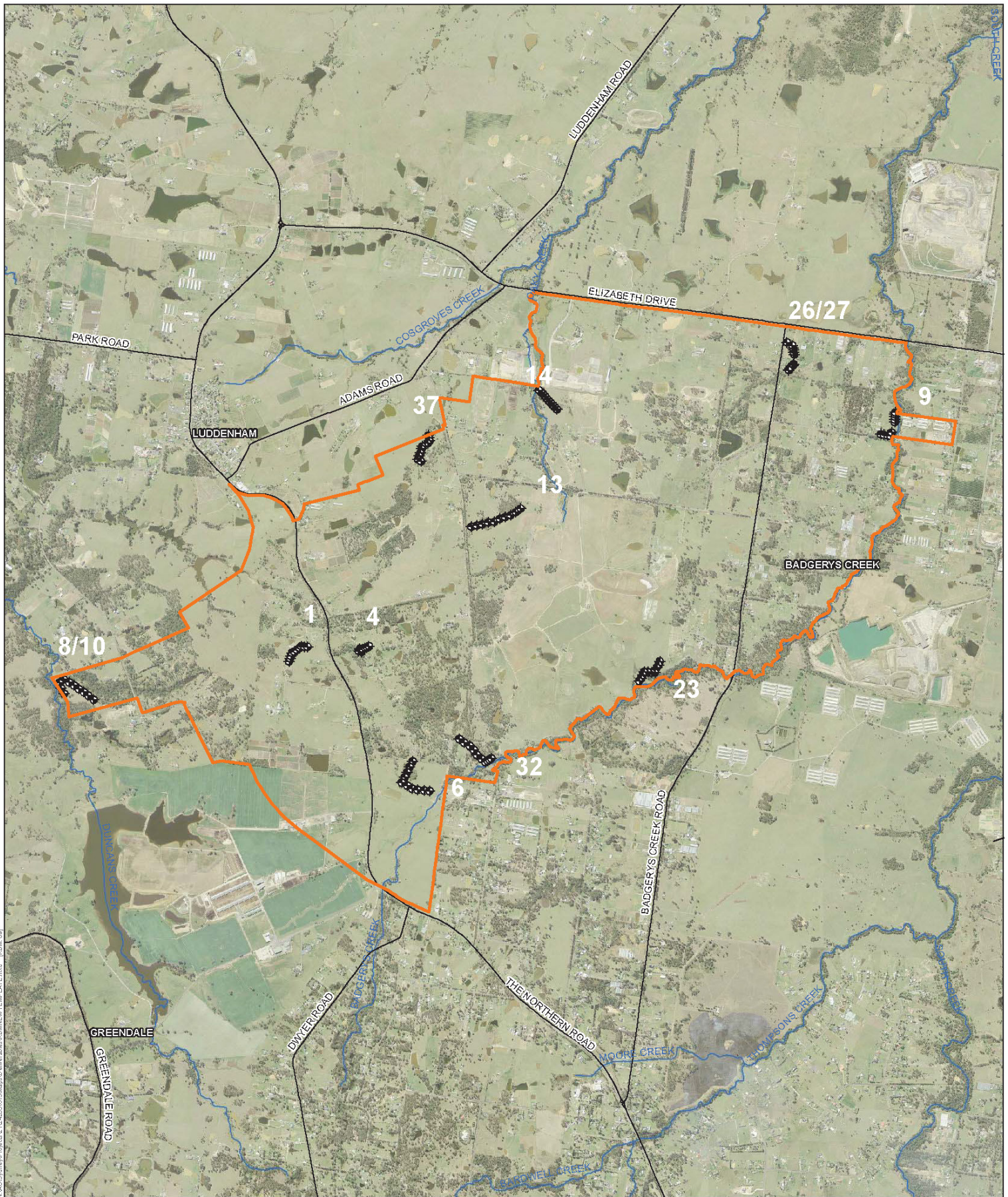
19.2.3.2 Test excavations

The aim of the test excavation programme was to characterise the nature and occurrence of the subsurface archaeological resource, by conducting archaeological test excavations within a representative selection of landform types present within the airport site.

Thirty-eight possible archaeological test locations were identified through a desktop assessment. Potential locations were identified based on landform representativeness, access constraints and degree of disturbance. Previously recorded sites were not prioritised in the selection process. Following on-site review and a field inspection of each location with Aboriginal stakeholders, the test locations were prioritised and a shortlist developed. Archaeological test excavations (test pits) were conducted at 13 of the 38 locations. Four of these locations were paired, resulting in a total of 11 test locations. The test locations are shown in Figure 19–1.

Ten test pits (each 1 x 0.5 square metres in area and totalling approximately five square metres) were conducted at each test location, with the exception of Test Location 26/27, where 13 pits were conducted (see to Figure 19–1).

All test pits were excavated by hand, using spades, hand trowels and, where necessary, picks. The end depth of each pit varied depending on when stiff clay, rock or other constraints were encountered. All sieving was conducted by hand using pressurised water sourced from a water truck. All artefactual material was recovered and subject to itemised description in the laboratory. All pits were backfilled with sieved spoil and/or imported clean fill.



LEGEND
 [Orange outline] Airport site [Black symbol] Test pits

Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

Figure 19-1 - Test excavation locations



19.2.4 Assessments of heritage values

Assessments of significance were prepared for all Aboriginal heritage sites recorded at the airport site. The assessments of significance were prepared with reference to the Burra Charter and the heritage provisions of the EPBC Act.

The EPBC Act defines three tiers of significance through the establishment of the World Heritage List, the National Heritage List and the Commonwealth Heritage List. World Heritage properties are places of outstanding universal value that are inscribed on the World Heritage List administered by UNESCO. National Heritage places are places of outstanding value to the nation and are listed on the National Heritage List. Commonwealth Heritage places are places with significant heritage values that are owned or controlled by the Commonwealth or a Commonwealth agency and are listed on the Commonwealth Heritage List.

The EPBC Act prescribes obligations for Commonwealth agencies that own or control properties that have, or might have, National Heritage or Commonwealth Heritage values. Obligations include taking all reasonable steps to assist in the identification, assessment and monitoring of values, and preparation of management plans for any identified values in line with the National Heritage management principles and Commonwealth Heritage management principles. Commonwealth agencies must similarly take all reasonable steps to ensure their actions are not inconsistent with the Australian World Heritage management principles or any plans in force for a World Heritage property.

The EPBC Act also provides for the protection of the environment generally, where actions are undertaken by the Commonwealth or on Commonwealth land. The environment includes heritage values. The heritage values of a place include the place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians.

No heritage values consistent with World Heritage or National Heritage listing were identified within the airport site. Assessments of Commonwealth Heritage values within the airport site were undertaken for this EIS, and are described in Section 19.3.6. According to guidelines issued by the Australian Heritage Council, the relevant significance threshold for the satisfaction of Commonwealth Heritage criteria is local heritage significance.

The Commonwealth Heritage List is an instrument for managing places on Commonwealth owned or leased land with Commonwealth Heritage values. This assessment has not been undertaken for the purpose of any actual or proposed decision about whether to nominate a place for listing on the Commonwealth Heritage List and it is not presently intended that any items identified in this assessment as having Commonwealth Heritage values would be nominated for inclusion on the Commonwealth Heritage List.

19.2.4.1 *The Burra Charter*

The Burra Charter defines cultural significance as 'aesthetic, historical, scientific or social value for past, present and future generations' (Australia ICOMOS 1987). The Burra Charter outlines five broad categories applicable to the assessment of the significance of Aboriginal sites. These are:

- significance to contemporary Aboriginal people;
- scientific or archaeological significance;

- aesthetic value;
- representativeness; and
- value as an educational and/or recreational resource.

All Aboriginal heritage sites located within the airport site have been assessed with reference to the Burra Charter.

19.2.4.2 Heritage assessment criteria

The criteria for National Heritage values and Commonwealth Heritage values consist of nine similar assessment criteria but attach different thresholds. The National Heritage criteria specify a threshold of 'outstanding heritage value to the nation'. None of the cultural values identified at the airport site are considered to fulfil this threshold, and further detail regarding National Heritage values is not presented here.

The threshold for identification of Commonwealth Heritage values is 'significant' heritage value (Department of the Environment, Heritage website, accessed June 2015). In accordance with the EPBC Act, a place has a Commonwealth Heritage value if it meets one of the following criteria:

- a. the place has significant heritage value because of the place's importance in the course, or pattern, of Australia's natural or cultural history;
- b. the place has significant heritage value because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;
- c. the place has significant heritage value because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history;
- d. the place has a significant heritage value because of the place's importance in demonstrating the principal characteristics of:
 - i. a class of Australia's natural or cultural places, or
 - ii. a class of Australia's natural or cultural environments;
- e. the place has significant heritage value because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. the place has significant heritage value because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. the place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. the place has significant heritage value because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history; and
- i. the place has significant heritage value because of the place's importance as part of Indigenous tradition.

In guidelines prepared by the Australian Heritage Council it is stated that 'the threshold for inclusion on the Commonwealth Heritage List is local heritage significance'.

As indicated above, this assessment against Commonwealth Heritage criteria has not been undertaken for the purpose of any actual or proposed decision about whether to nominate a place for listing on the Commonwealth Heritage List.

19.3 Existing environment

This section describes the landscape and cultural context of the airport site. The results of previous archaeological assessments at the airport site are summarised and the results of the field surveys for the current assessment are presented. The outcomes of the stakeholder consultation are outlined and a summary of the assessments of significance is also provided.

19.3.1 Landscape context

19.3.1.1 *The regional landscape*

The airport site is located on the central western margin of the Cumberland Plain. This section of the Cumberland Plain is where the creek lines drain north and west to the Hawkesbury River (McDonald and Rich 1993). The Cumberland Plain is in a centrally positioned portion of the inner Sydney Basin, which consists of rolling and low gradient topographies that have developed on the shale-dominated bedrocks of the Wianamatta Group of the middle Triassic age.

The Wianamatta Group makes up the uppermost portion of the Triassic depositional sequence and was laid down as epimarine, intertidal, back-swamp and alluvial sediments during a period of marine regression (the exposure of former seabed), and progradation (the seaward and progressive deposition of shoreline deposits) (Smith 1979; Jones and Clarke 1991). The topography of the airport site reflects the underlying geology, which is dominated by the Bringelly Shale, the upper most unit of the Wianamatta Group.

The Cumberland Plain comprises three broad physiographic units:

- the River Plain, comprising the alluvial flats associated with the Nepean-Hawkesbury River, and the Eastern, South and Ropes Creeks (approximately 11 per cent of the plain);
- the Dissected Plateau, where stream incision into the underlying sandstone has occurred, particularly around the margins of the Plain (approximately 33 per cent of the plain); and
- the Shale Slopes, formed on the Ashfield and Bringelly Shales (approximately 56 per cent of the plain) (Department of Environment and Planning 1984).

The airport site falls within the Shale Slopes unit. The airport site, which covers approximately 1,780 hectares, comprises around 1.2 per cent of this unit. Some characteristics of the Shale Slopes unit include:

- gently undulating, rounded hills and valleys with a low degree of vertical differentiation – this has a consequence that in the more elevated country, the network of ridges and spurlines (also known as interfluves) do not pose a major obstacle to, and have less strategic value in, cross-country movement and control;
- mature landforms;
- deep texture contrast soils which are clayey and stiff;
- surface hydrology characterised by a dendritic pattern of drainage lines;

- native vegetation structures dominated by grassy woodland and open forests; and
- broad area flooding and associated aggradation of sediments across valley floor contexts.

19.3.1.2 The airport site

The landscape of the airport site is typical of the Shale Slopes component of the Cumberland Plain. It has low relief, undulating and low gradient topography, and a medium drainage line density. Ground elevation varies from 43 to 118 metres above Australian Height Datum (AHD). The Bringelly Shale outcrops throughout the area. Surface exposures of Minchinbury Sandstone also occur in isolated locations. A post-Triassic basaltic dyke outcrops along a north-west/south-east alignment in the western half of the airport site. The resistant nature of this rock has formed higher slope gradients and a small area of moderately graded undulating terrain. The steeper slopes contain screes of volcanic gravels.

Small areas of naturally occurring surface silcrete gravels occur across some portions of the airport site. These may constitute a surface lag (ancient remnant gravels from a now fully eroded deposit), or relate to as yet poorly mapped subsurface remnants of ancient weathering.

The mapped soil landscapes within the airport site are Blacktown, Luddenham and South Creek (Bannerman and Hazelton 1990).

Most of the airport site falls within the upper catchment of South Creek, a north draining tributary of the Hawkesbury River with a course length of approximately 64 kilometres and a catchment area of around 620 square kilometres (Rae 2007). The far western portion of the airport site forms part of the immediate catchment of the Nepean River, via the north and west draining minor tributary of Duncans Creek. This watershed is significant in terms of the hydrology of the Cumberland Plain but, for most of its length, provides an unimposing topographic feature as a broad and low gradient ridgeline.

The airport site is dominated by upper catchment terrain, with most of its drainage lines originating from headwaters situated within the airport site and reaching third and fourth order streams. The exceptions are Badgerys Creek along the southern and eastern boundary and Duncans Creek just outside the western site boundary. For the purposes of modelling the potential archaeological resource, these two streams have a fifth order status when they leave the site. It should be noted that stream orders identified in this heritage analysis differ marginally from those in other assessments presented in this EIS. This is a consequence of different disciplinary objectives and do not indicate errors in fact. The headwaters of Badgerys Creek are situated about three kilometres upstream of the airport site, and its confluence with South Creek occurs approximately four kilometres downstream. The southern and eastern fall of the Badgerys Creek catchment occupies the southern margin of the airport site. Two tributaries of Cosgroves Creek, including Oaky Creek, drain to the north.

The vegetation across most of the Cumberland Plain prior to European land use comprised open eucalypt woodland in which the trees were widely spaced and the ground cover was dominated by grasses (Perry 1963). Most of the original native vegetation has been cleared and the airport site is now dominated by agricultural grasslands or cultivated fields, with scattered eucalypt and exotic trees and pockets of open eucalypt woodland or shrubland. The remaining native vegetation includes pockets of native grassland and mostly regenerating woodland or forest. Older eucalypts, dating from the early twentieth century, may remain as isolated occurrences.

Since the early 1800s, non-Aboriginal land use of the airport site has been primarily agricultural and has consisted of varied phases of stock grazing, cropping, orchards, dairying and market gardening. A pattern of increasingly smaller subdivision commenced in the mid-nineteenth century and culminated in the delineation of numerous rural residential lots associated with post war immigration. A broader spectrum of activities characterised the middle and later twentieth century including market gardening, hobby farming, animal husbandry such as poultry farming, horse and dog breeding and training, and some light industrial functions.

All of these activities can be expected to have had a substantial impact on the Aboriginal archaeological resource, especially where resident in the top soil and the plough zone. Vegetation clearance and repeated ploughing and cropping will have removed nearly all trees with the potential for Aboriginal scarring. Artefact occurrences will have been affected by soil loss and lateral and vertical soil movement across the land surface, to the depth of the relevant plough zone.

19.3.1.3 Landform classification of the airport site

The following landform categories have been applied in the mapping and analysis of topographic variables across the airport site. This classification has simplified landscape variations into a concise set of types relevant to the archaeological modelling. The classification system includes large scale independent landform categories and a series of sub-categories which only occur in conjunction with a large scale landform category (for example, fluvial corridor within a valley floor).

Table 19–1 summarises the proportion of various landforms within the airport site. The landform categories within the airport site are also defined in Appendix M1 (Volume 4), and shown on Figure 3.3 in that appendix.

Table 19–1 Landform categories within the airport site

Landform category or feature	Area within airport site (hectares)	Net linear distance (kilometres)
Riparian corridor (100 metres either side of drainage line)	711	41.3
Ridge and spur crests	392.3	66.4
Broad scale landforms		
<i>Valley floor</i>	184.0	-
<i>Basal slopes</i>	214.2	-
<i>Mid and upper slopes</i>	1,324.4	-
<i>Total area of 3rd, 4th and 5th order crests</i>	122.5	18.8
Total broad scale landforms within airport site	1,845.1	-

Note: Some of these categories overlap and the area total includes Australian Government owned lands which are non-contiguous with the airport site.

19.3.2 Cultural context

19.3.2.1 Historical context

References to the Aborigines of the Sydney region are found in the journals, diaries and general writings of the early colonists, explorers and settlers.


The location and nature of boundaries between Aboriginal groups in the Sydney region that existed in 1788 are difficult to reconstruct because of the lack of reliable data from that time. A number of authors have variously interpreted the available evidence and drafted maps of the pre-contact and contact territories of Aboriginal people in the Sydney region (Mathews 1901a and 1901b, Capell 1970, Tindale 1974, Eades 1976, Kohen 1986 and 1988, Ross 1988). The identification of tribal boundaries by the early anthropologists, later ethnographers and subsequent linguists have often involved contrasting conclusions, both regarding geographic extent, and whether a distinction relates to a clan, dialect or language (Mathews 1901a and 1901b, Capell 1970, Tindale 1974, Eades 1976, Kohen 1986, Ross 1988).

Since the 1970s, archaeologists and anthropologists working in the Sydney region have adopted the nomenclature for linguistic groups compiled by Capell (1970) and amended by Eades (1976) and Attenbrow (2010). These schemes all place the airport site within the area of the Darug linguistic group. Debate continues whether the use of Darug was exclusively inland or extended in dialect form to the coast on the Sydney Peninsula (Ross 1988, Kohen 1993, Attenbrow 2010).

The Darug peoples bore the first impact of Sydney's European settlement, because their lands were situated on the Sydney peninsula and the adjoining hinterlands of the Cumberland Plain. The peninsula and its embayments became the residential and commercial focus of the settlement, while the fertile lowlands and woodland of the hinterland were developed for agricultural production and the granting of freehold lands. The Cumberland Plain was an integral component of Darug territory and cultural identity, from which they were incrementally excluded and dispossessed by European land-use and occupation.

In the five decades following the establishment of the Sydney Cove colony, the impact of European incursion saw a steep decline in the Darug population, along with loss of economic autonomy, and a break-down in traditional social organisation and practice. Despite this, the Darug and their descendants maintained their local presence and adapted as necessary to survive as a minority in a drastically changed cultural and social landscape.

Aboriginal people were granted small portions of land in some parts of the Sydney region; however, no references have been found to grants at or within the vicinity of the airport site (Kohen 1993). In fact, by 1821 all of the airport site had been the subject of European land grants, with a majority of the area falling within a 6,710-acre grant made to John Blaxland in 1813 (Robinson 1953). This pattern of land alienation was repeated across most of the Darug lands. The establishment of European ownership imposed a cumulative sequence of constraints on traditional Aboriginal land use. The effect, over the course of a relatively short period of time, was to severely limit access to traditional food and habitation sites and to disrupt the normal seasonal round of movement which formed part of social and territorial life. As a consequence, the Sydney Aborigines displaced by European settlement became increasingly dependent on European food sources, estates to live on, and employment.



Darug people are known to have lived on nearby estates, such as at 'Mamre Farm', Orchard Hills, and at Mulgoa (Martin 1988, Keating 1996). Closer to the airport site, oral history recounts how Aboriginal people were living on the Badgery Estate 'Exeter Farm' in the mid-nineteenth century (AHIMS site card 45-5-215 27 Jan 1978). Darug descendants continued to have an association with Badgerys Creek into the twentieth century, with families resident in the local district (pers. comm. Ms Sharyn Halls 24 April 2015) and as part of rabbiting expeditions into the 1960s (letter from Colin Gale (DTAC) to Kerry Navin 17 Feb 1997). Further detail regarding early post-European Aboriginal history is provided in Appendix M1 (Volume 4).

19.3.2.2 Archaeological context

The Sydney region has been the subject of detailed archaeological survey and assessment since the passing of legislation protecting Aboriginal sites in 1974. The focus of this assessment has shifted in the last two decades to Western Sydney and in particular to the new urban and industrial developments across the Cumberland Plain. Such research has resulted in thousands of site recordings and a wide range of site types and features. The most prevalent recordings comprise surface occurrences of stone artefacts (ranging from single items to hundreds of artefacts), shell middens, rock shelters containing occupation evidence (including deposits and rock art), grinding groove sites and open context engraving sites. Rare site types include culturally modified trees, quarry and procurement sites, burials, stone arrangements, and traditional story or other ceremonial places.

Hundreds of Aboriginal sites, predominantly open artefact scatters (also referred to as open camp sites), have been recorded within the Cumberland Plain. The camp sites vary greatly in size from small sparse scatters to large concentrations of artefacts. Rare site types that have been recorded include scarred trees, raw material extraction/procurement sites, stratified deposits and grinding groove sites. Unlike the majority of grinding groove sites across the Sydney Basin, which occur on Hawkesbury sandstone, the few recordings on the Cumberland Plain occur on Minchinbury sandstone, making them a rare site type.

The picture of Aboriginal utilisation and occupation of the Cumberland Plain is constantly being revised and refined as archaeological methods improve and more archaeological data become available.

Recent investigations have confirmed that sites occur widely across the landscape, particularly on hilltops and slopes and near creeks. Larger sites with higher artefact densities are more likely to be near permanent water (Haglund 1980, Kohen 1986, Smith 1989a and 1989b, Kohen 1996, McDonald and Rich 1993, Rich and McDonald 1995, Comber 2014). Recent excavations on the Cumberland Plain have also demonstrated that surface sites are generally an inaccurate representation of subsurface deposits (McDonald and Rich 1993, Rich and McDonald 1995, Comber 2014). Subsurface deposits have been found to be present even when there has been no surface indication of a site.

19.3.3 Previously recorded sites at the airport site

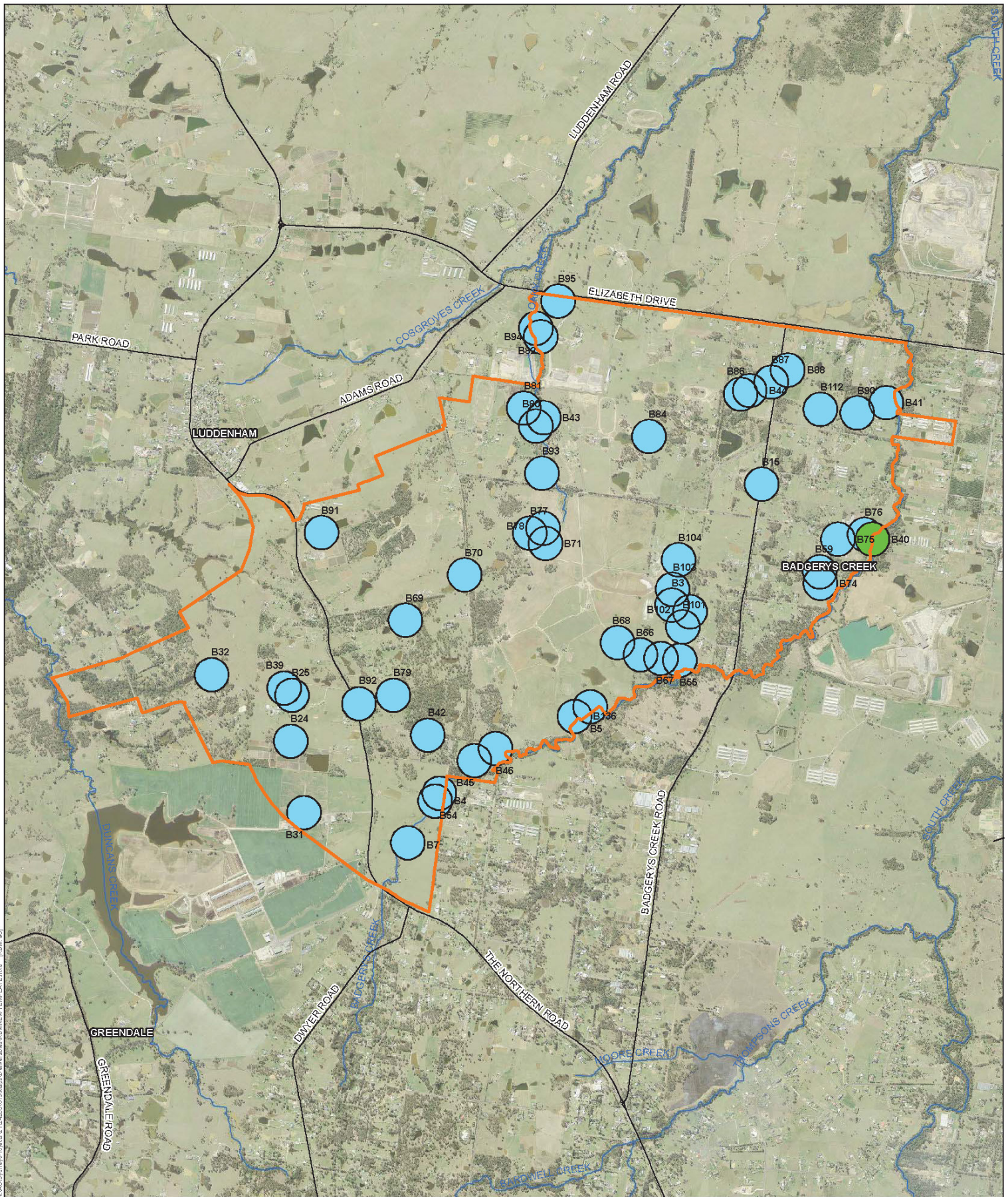
The airport site has been the subject of a number of previous archaeological assessments as part of investigations into the potential location for a second Sydney airport. A comprehensive review of these previous assessments is provided in Appendix M1 (Volume 4).

Fifty-one confirmed Aboriginal heritage sites have been recorded within the airport site as a result of previous heritage assessments. These consist of surface artefact occurrences and a modified tree. None of the sites are registered on National or Commonwealth Heritage Lists, but all are registered on the AHIMS. It should be noted that, at the time of the assessment, the AHIMS listed 52 Aboriginal recordings within the airport site.

The general location of the sites is shown in Figure 19–2.

An additional three sites previously recorded were re-inspected to confirm the findings of the previous assessments. The results of these inspections are as follows:

- Possible Aboriginal Scarred Tree, AHIMS 45-5-2634. This site was found to be located outside of the airport site and would not be affected by the construction or operation of the proposed airport. It was, therefore, not considered further in the assessment;
- Possible Aboriginal Scarred Tree, AHIMS 45-5-2630. This site was noted in previous assessments at the airport site to have significant damage. The site was re-inspected and it was found that the condition of the scar was poor, as was that of the tree, which had a hollow trunk and a missing crown. Despite the poor condition of the heartwood and the un-occulated scar, the regrowth around the margin of the scar appeared to be intact. This means that the tree retains a tree-ring record of regrowth following the scarring event; and
- Surface Artefact Occurrence. This site was originally recorded as a single surface artefact by Australian Museum Consulting (AMC) in 2014 and ascribed to the previously recorded site B5 (AHIMS 45-5-2637). Following a refinement of the 1997 grid reference for B5, based on original recording data, it has been determined that the AMC find is located more than 100 metres from the original B5 recording. As a consequence, this is considered to be a new recording of a separate site and has been designated as B136.



Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

Figure 19-2 - Previously recorded Aboriginal sites at the airport site



19.3.4 Results of EIS field surveys

Twenty-three new recordings of Aboriginal heritage sites were made during the course of the field investigations for the current assessment. These comprised:

- nine recordings with surface artefacts only, including one grinding groove site (B113 to B120 and B122); and
- 14 recordings where subsurface artefacts were confirmed through test excavation (B121, B123 to B135).

Within the latter category, one site also included surface artefacts (B121 at Test Location 9).

A summary of the new site recordings is provided in Table 19–2. The locations of all site recordings to date at the airport site are shown in Figure 19–3.

Table 19–2 Summary of new Aboriginal heritage sites recorded at the airport site during field investigations

Site number/type	Number of surface stone artefacts recorded	Test location and test pit numbers	Type of ground surface exposure
B113 - Surface artefact occurrence	20	-	Eroded track and dam wall
B114 - Surface artefact occurrence	10	-	Eroded track, creek edge
B115 - Surface artefact occurrence	20	-	Erosion and disturbance
B116 - Surface artefact occurrence	2	-	Track
B117 - Surface artefact occurrence	2	-	Erosion scald
B118 - Surface artefact occurrence	2	-	Edge of ploughed field
B119 - Surface artefact occurrence	2	-	Gate exposure
B120 - Grinding grooves	at least 4 grooves	-	Sandstone outcrop
B121 - Surface and subsurface artefact occurrence	3	TL9, test pits 2-10	Track/gate exposure
B122 - Surface artefact occurrence	1	-	Dam wall
B123 - Subsurface artefact occurrence	-	TL6, test pits 1-4	-
B124 - Subsurface artefact occurrence	-	TL6, test pits 9, 10	-
B125 - Subsurface artefact occurrence	-	TL8/10, test pits 3, 4	-
B126 - Subsurface artefact occurrence	-	TL8/10, test pits 7, 9	-
B127 - Subsurface artefact occurrence	-	TL13, test pit 3	-
B128 - Subsurface artefact occurrence	-	TL14, test pits 1, 3	-
B129 - Subsurface artefact occurrence	-	TL14, test pit 8	-
B130 - Subsurface artefact occurrence	-	TL23, test pit 9	-
B131 - Subsurface artefact occurrence	-	TL26/27, test pit 11	-
B132 - Subsurface artefact occurrence	-	TL32, test pits 3,4	-

Site number/type	Number of surface stone artefacts recorded	Test location and test pit numbers	Type of ground surface exposure
B133 - Subsurface artefact occurrence	-	TL32, test pits 9, 10	-
B134 - Subsurface artefact occurrence	-	TL37, test pits 1,2,4, 5	-
B135 - Subsurface artefact occurrence	-	TL4, test pit 5	-

19.3.4.1 Surface recordings

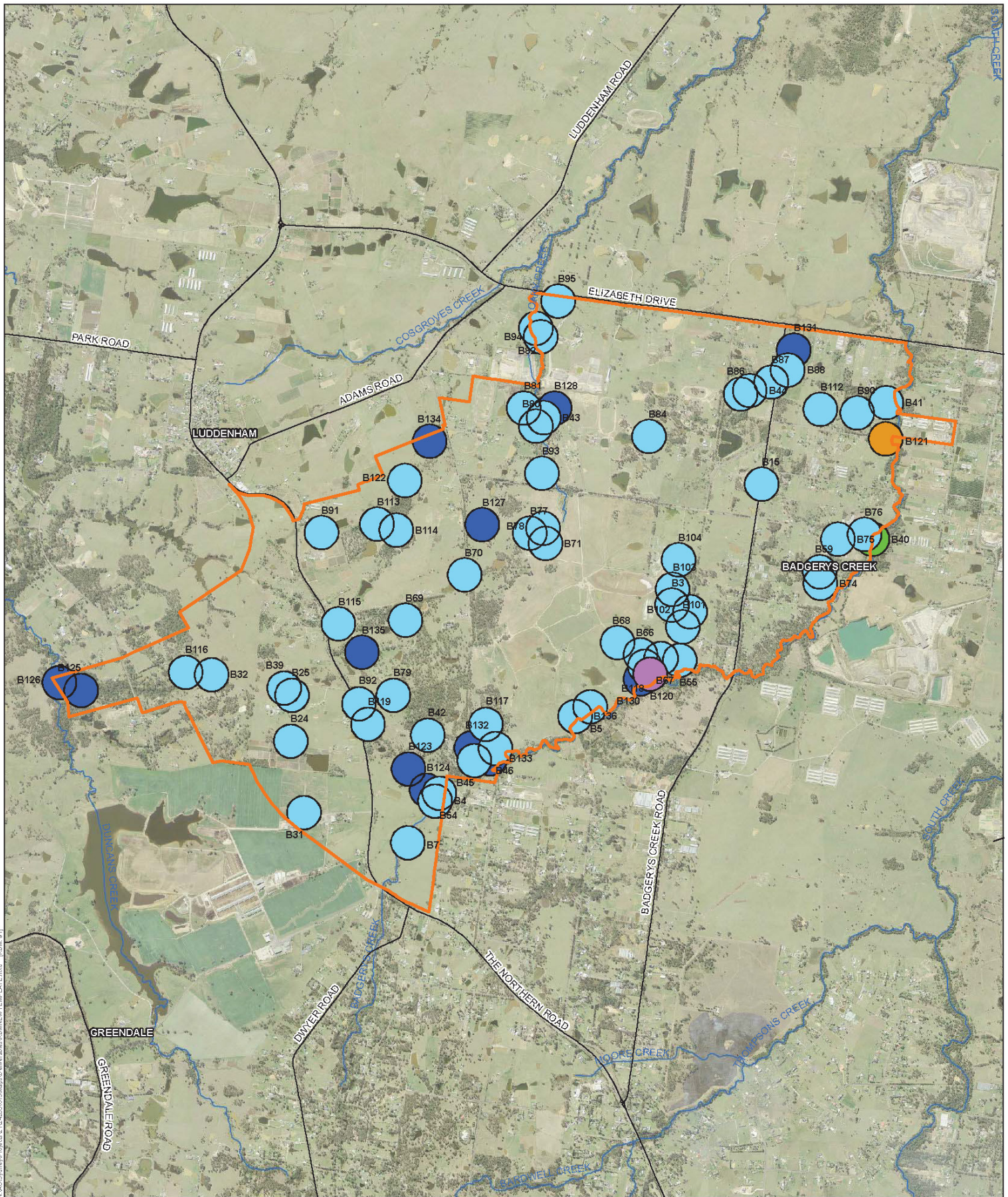
Details of the nine new surface sites recorded during the field surveys are provided in Table 19–3.

Table 19–3 Details of new surface recordings

Site number/type	Description	Artefacts
B113 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least 20 surface artefacts exposed along an eroded vehicle track and dam wall. Artefacts situated on a low gradient minor (first order) spurline, and low rise, situated between and just upstream of the confluence of two second order streamlines (tributaries of Cosgroves Creek). Situated in a basal slope valley context. Artefacts located over an area of approximately 150 x 30 metres. Subsurface archaeological potential away from exposures and eroded surfaces assessed to be high. 	Chert flakes, silcrete flakes, quartz flake and possible axe
B114 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least ten surface artefacts exposed along an eroded track and creek edge. Artefacts situated on low gradient slopes adjacent to, and the western banks of, a secondary order streamline (a tributary of Cosgroves Creek). Situated in a basal slope valley context. Artefacts located over an area of approximately 110 x 20 metres. Subsurface archaeological potential away from exposures and eroded surfaces assessed to be high. 	Chert and silcrete flakes
B115 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least 20 artefacts exposed within a disturbed area in a former church yard. Artefacts situated on the crest of a prominent fourth order ridgeline where it intersects with a major watershed fifth order ridgeline. Artefacts located over an area of approximately five by five metres. Subsurface archaeological potential away from exposures and disturbed ground is assessed to be high. 	Quartz flakes
B116 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least two artefacts exposed on an eroded vehicle track which steeply traverses low to moderately graded mid slopes on the side of a spurline. Site situated upslope of a dam which impounds a second order streamline (tributary of Duncans Creek). Artefacts located approximately five metres apart. Subsurface archaeological potential away from exposures and eroded surfaces is assessed to be low. 	Quartz flake, chert flakes

Site number/type	Description	Artefacts
B117 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact scatter of at least three surface artefacts exposed in erosion scalds along a low gradient crest of a first order spurline. Exposures situated along the edge of a group of trees. Spurline crest faces south and descends to a narrow portion of the Badgerys Creek valley floor. Site is situated in a mid-slope valley context. Artefacts located approximately eight metres apart. Subsurface archaeological potential away from exposures and eroded surfaces is assessed to be high. 	Basalt flake, basalt hammerstone, silcrete flake
B118 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least two surface artefacts exposed on a recently ploughed track on the southern edge of a ploughed field. Site is situated just above the break-of-slope of a broad crest of a third order ridgeline, approximately 150 metres north of Badgerys Creek. Artefacts located approximately one metre apart. Subsurface archaeological potential is assessed to be moderate, although repeated ploughing of this landform may have significantly disturbed the vertical context of subsurface artefacts. 	Quartz flakes
B119 – Surface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least two artefacts exposed in a scoured area on the eastern side of a gate situated between a house paddock and the paddock behind (to the east). Artefacts situated on a first order spurline located between, and just upstream of, the confluence of a third and a second order streamline (tributaries of Badgerys Creek). Site situated in a basal slope valley context. Subsurface archaeological potential away from exposures and eroded surfaces is assessed to be moderate to high. 	Chert flake
B120 – Grinding grooves	<ul style="list-style-type: none"> Four grinding grooves located on a series of small sandstone outcrops situated on, and just below, the break-of-slope of a mid-valley context ridge-side bench. Bench is relatively narrow (around 40 metres wide), faces south, and extends for approximately 400 metres along the middle portion of a third order ridgeline which rises 26 metres above the creek. Grinding grooves are located on a discontinuous and low surface outcrop of Minchinbury sandstone which is mostly exposed on the steep slope immediately downslope of the bench. Grooves are located on three separate sandstone outcrops, two with one definite groove each and the (western most) third with two definite and two probable grooves. Sandstone outcrops form part of an east–west aligned group of low, near ground level outcrops, and extend across a distance of 33 metres. Located in Test Location 23. No subsurface artefacts were detected on the bench. One stone artefact was detected at this test location, and this was situated on basal slopes 4.5 metres above Badgerys Creek (site B130). 	
B121 – Surface and subsurface artefact occurrence	<ul style="list-style-type: none"> Open context artefact occurrence of at least two surface artefacts. Site located on alluvial flats adjacent to Badgerys Creek, in a valley floor context. Artefacts, approximately five metres apart, visible in erosion scalds in a road reserve at 	Silcrete flakes

Site number/type	Description	Artefacts
B122 – Surface artefact occurrence	<p data-bbox="443 371 703 398">the eastern end of Pitt Street.</p> <ul style="list-style-type: none"> <li data-bbox="408 421 1222 479">• Open context artefact occurrence of a single surface artefact exposed on the wall of an agricultural dam which impounds a third order streamline (tributary of Cosgroves Creek). <li data-bbox="408 495 1222 553">• Site situated in a valley floor context and in relative proximity to the natural course of the creek line. <li data-bbox="408 568 1222 629">• Subsurface archaeological potential away from the disturbed ground of the dam wall and impoundment is assessed to be moderate to high. 	Silcrete flake



Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

Figure 19-3 - Total Aboriginal sites recorded at the airport site, to date



19.3.4.2 Subsurface recordings

Aboriginal artefacts were recovered from 10 of the 11 test locations. A total of 91 artefacts were recovered from the 39 test pits. A summary of the test location artefact numbers is provided in Table 19–4.

Table 19–4 Summary of artefact recovery data from test locations

Test location	Number of artefacts	Broad scale landform	Fine scale landform
1	0	Major watershed ridgeline	Crest/upper slope
4	1	Secondary watershed ridgeline	Crest
6	10	Mid slope, basal slope, valley floor	Minor spur crest, slope, alluvial flats
8/10	4	Mid slope, basal slope, valley floor	Minor spur crest, alluvial flats
9	36	Basal slope, valley floor	Slope, alluvial flats
13	1	Secondary spurline crest	Knoll, crest, shoulder
14	8	Mid slope, basal slope, valley floor	Minor spur crest, elevated rise
23	1	Upper slope, mid slope, basal slope	Break-of-slope, slope, minor spur crest, fan
26/27	17	Floor, valley floor, basal slope, upper slope	Alluvial flats, slope
32	7	Mid slope, basal slope, valley floor	Minor spur crest, alluvial flats, alluvial terrace
37	6	Valley floor, basal slope	Elevated rise/terrace, minor spur crest

19.3.4.3 Artefact analysis

A detailed analysis of the stone artefacts recovered during the test pit excavations is presented in Appendix M1 (Volume 4). The conclusions of the analysis are summarised below.

- Subsurface artefacts were unevenly distributed between the different excavated areas, with the majority of areas yielding relatively few artefacts, and a small number of the excavated areas being relatively rich.
- Assemblages from all excavated areas were dominated by silcrete over other raw materials and by unretouched flakes over other artefact types.
- Retouched artefacts make up 12 per cent of the combined artefact assemblage, with the majority of these being backed artefacts.
- The majority of flakes in the combined assemblage have little or no dorsal cortex. Flakes are generally small in size, with a diverse variety of platform types. It is inferred from this that the flake assemblage was produced from small parent rocks, which had been heavily reduced in size and were being exploited as a valuable resource.
- There is no evidence that the production of flakes within the study area was geared toward the preferential production of any particular flake morphology.

- The analysis of landform variables relative to the tested subsurface archaeological resource provided the following findings:
 - subsurface artefact density is unevenly distributed between landform categories, with valley floors and alluvial flats having significantly higher artefact densities than other landforms;
 - subsurface artefact density is significantly higher in lower valley contexts than it is in middle and upper valley contexts;
 - subsurface artefact density is positively correlated with the order of the closest drainage line, and with the order of the largest drainage line within 100 metres;
 - subsurface artefact density is inversely correlated with elevation, with lower lying areas having higher densities of subsurface artefacts. These areas are also associated with higher order drainage lines;
 - subsurface artefact density is inversely correlated with watershed spurline order, with areas associated with lower spurline orders having higher artefact densities. Low order spurlines are generally associated with higher order drainage lines; and
 - as a general inference from multiple lines of data, subsurface artefacts are associated with areas likely to have had easier access to sources of water.

19.3.4.4 Archaeological sensitivity of the airport site

The average areal incidence of subsurface artefacts (artefacts per square metre) according to key landform units was found to provide an effective means of gauging archaeological sensitivity across the airport site. Landforms with a relatively high average artefact incidence (defined to be equal to or greater than one artefact per square metre) at the airport site are:

- valley floor;
- basal slopes;
- first order spurlines;
- within 100 metres of a second order streamline;
- within 100 metres of a third order streamline; and
- within 100 metres of a fourth order streamline.

See Section 19.3.1 for further detail on these landform units.

19.3.5 Consultation

This section presents the results of the stakeholder consultation undertaken for the current assessment.

19.3.5.1 *Aboriginal cultural values*

The Aboriginal stakeholders consulted for this assessment have identified the airport site as a place of Aboriginal cultural significance and continuing cultural connection.

The reasons for this include:

- **Material evidence of occupation.** The presence of archaeological sites throughout the airport site is a manifest link with their ancestors, with a past way of life and with a continuing cultural association with the land. Archaeological sites are a tangible component of cultural identity and traditional ownership. In this regard, all archaeological sites are considered by stakeholders to have cultural significance, regardless of their size, complexity or archaeological interpretation. The relationship between the position of an artefact and its surrounding landscape also has cultural significance. This is often expressed by stakeholders when they specify that after analysis, salvaged artefacts should be returned to ‘their country’.
- **Cultural landscape values.** Although information relating to remembered traditional events in specific places has not been provided, many stakeholders state that the airport site landscape has cultural significance according to traditional lore. A number of landscape features, including prominent ridgelines and the Badgerys Creek corridor, can be interpreted with reference to traditional knowledge held by various custodians. Many stakeholders expressed the view that there would have been areas and features that would have held special significance, including relationships to stories and lore associated with gender roles.
- **Significant plants, animals and resources.** The continuing presence of native animals and plants, and the habitat they require, is considered to be an important part of the cultural significance of the airport site. These are important as traditional sources of food, medicine and raw materials, and for the specific stories and lore associated with them. Some stated examples of significant resources were yams, fresh water mussel, possums, tree timber and bark, and the water from Badgerys Creek. Areas of remnant native vegetation and the riparian corridors of the main creek lines were specifically referenced in this regard.
- **Educational value.** Many stakeholders made reference to the need to educate young people about their culture, lore and traditions. The conservation of Aboriginal sites so that they can be accessed for teaching and interpretation is considered to be an important part of maintaining cultural identity, practice and continuity. The educational values of the Badgerys Creek sites in general, and of the grinding groove site (B120) and the scarred tree (B40) in particular, were recognised by many stakeholders. Similarly, the remnant natural vegetation and riparian corridors across the study area were seen as important educational resources.
- **A disappearing heritage.** A repeated concern expressed by stakeholders was the cumulative impact on Aboriginal sites caused by the continuing urban and industrial development of Sydney across the Cumberland Plain. Given the loss of sites to date, the remaining sites, such as those at the airport site, are now recognised to have cultural value because of their increasing rarity, the need to retain artefacts and sites in their natural landscapes and original locations, and their ability to support the relationship with the land and the sense of cultural identity.

The Aboriginal stakeholders were consistent in acknowledging the importance of information gained from archaeological recording and analysis. Examples given include the evidence of radiocarbon dating, and the ability to identify past patterns of behaviour, occupation, adaptation, and technological and social change. Archaeological information is seen as complementary to remembered tradition and lore, and evidence from historical records.

While the value of the archaeological method, and the information it generates, is recognised as clearly distinct from Aboriginal cultural evaluation, it is also acknowledged by Aboriginal stakeholders that the potential of a site or an archaeological deposit to provide information about the past has high Aboriginal cultural value.

19.3.5.2 Non-Aboriginal stakeholder views

Liverpool City Council and the NSW OEH recommended the following issues be considered in the Aboriginal cultural assessment:

- cultural landscape and recording of social history;
- cumulative impacts;
- managing artefacts which would remain on-site during the proposed development of the airport site; and
- potential provision of a keeping place and alternative forms of cultural interpretation.

Further details regarding the issues raised during consultation are included in Appendix M1 (Volume 4). Additional comments received during the public consultation process for the EIS are summarised in Volume 5.

19.3.6 Assessments of heritage value

The results of the assessments of heritage value are summarised below, with further detail provided in Appendix M1 (Volume 4).

19.3.6.1 Individual site assessments

Artefact occurrences comprise 72 of the 74 recorded sites at the airport site. Fifteen of these include confirmed subsurface archaeological deposits and 48 have been assessed as having moderate or high subsurface archaeological potential.

Thirty-five of these recordings (49 per cent of artefact occurrences) comprise a single artefact and nine recordings include more than 10 artefacts. The highest number of artefacts recorded is 64, from the 2014 surface reinspection of site B80 by AMC (AMC 2014). The next highest is 38 from site B121, of which 36 were recovered from test pits. Based on the maximum artefact count across the various inspections and tests at each site, there are 371 stone artefacts associated with the recorded sites within the airport site.

Fifty-one of the artefact recordings are assessed as having the potential to yield information that will contribute to an understanding of Australia's cultural history. All are considered to have a strong association with a cultural group for social, cultural or spiritual reasons, and form part of indigenous tradition.

There is one recording of a scarred tree at the airport site (B40) which has been assessed as being of possible Aboriginal origin. Although the condition of the tree and the scar is poor, the tree retains a tree-ring record of regrowth following the scarring event. Scarred trees are relatively rare on the Cumberland Plain and represent strong cultural associations and connection with indigenous tradition. Despite the poor condition of the tree and scar, it is still considered to have potential to yield information that will contribute to the understanding of Australia's culture.

There is one recording of a grinding groove site at the airport site (B120). This site consists of at least four grinding grooves on a series of small sandstone outcrops on the edge of a hill side bench, 14 metres above, and around 100 metres from Badgerys Creek. The site is a rare example of grinding grooves located on Minchinbury sandstone within the Cumberland Plain.

An assessment of each site is provided in Table 8.1 in Appendix M1 (Volume 4).

19.3.6.2 The archaeologically sensitive landscape

The results of the test excavation programme, in combination with the surface survey results, have confirmed an interrelated distribution of archaeological sensitivity which is graded and distributed according to key landform variables. Key factors in combination are proximity to water, the order (here used as an approximation of size and degree of permanence) of the water source, locally elevated ground and first order spurlines within valley floor and basal slope contexts, low gradients and aggrading depositional contexts.


Landforms and zones in which relatively higher subsurface artefact incidences have been detected (defined in this study as one or more artefacts per square metre) comprise just under half (48 per cent) of the airport site. The highest average subsurface artefact incidence was 3.1 artefacts per square metre, from select topographic contexts on the valley floor. The valley floor accounts for 10 per cent of the airport site.

Highest potential artefact occurrences on the valley floor are predicted to occur within 100 metres of third, fourth and fifth order streamlines. These fluvial corridors account for 17 per cent of the airport site (approximately 316 hectares) and occur roughly equally across the valley floor and basal slope landform categories. The latter two categories also contain the greatest potential for subsurface archaeological deposits, and for potentially rare and higher value archaeological deposits.

A total of 280 stone artefacts have been recorded from the surface of the airport site. The predicted assemblage of subsurface artefacts within the landforms with relatively high artefact incidence would far exceed this number. The predicted archaeological resource within the identified sensitive archaeological landscape must, therefore, be a foundation component of any assessment of the cultural heritage values within the airport site.

Uncommon, rare or endangered aspects of Australia's cultural history

The predicted and collective subsurface archaeological resource present across the airport site is not considered to be outstanding in terms of artefact incidence or the technological diversity of the sampled assemblages. The content and variability of the analysed artefact assemblage remains consistent with the predictive model for the Cumberland Plain, and the resource can generally be regarded as characteristic of archaeological material from upper catchment and watershed regions of the Cumberland Plain.



The planned and continuing urban development of the Cumberland Plain will further affect the upper catchment landscapes that include the airport site. As the proportion of undeveloped land decreases, this cumulative impact is expected to confer an increasing degree of rarity to the remaining archaeological record. Based on this outline, the predicted archaeological resource of the airport site is assessed as an endangered aspect of Aboriginal cultural history.

Potential to yield information that will contribute to an understanding of Australia's cultural history

The predicted archaeological resource within the airport site has considerable potential to yield information that will contribute to an understanding of the Aboriginal cultural history of the Sydney Basin. Based on the evidence of the sampled archaeological deposits, the airport site provides a potential opportunity to conduct systematic archaeological research on a representative sample of sites within an upper catchment landscape. This resource, and the opportunity to investigate it as a whole, will become increasingly limited in the future. Such research would complement previously conducted large area archaeological investigations that have typically occurred in lower catchment landscapes and in association with higher order drainage lines.

The distribution of aggrading landforms across the valley floor and basal slopes, and at a lesser and finer scale across the remainder of the airport site, provides potential for encountering rarer sites, such as cultural deposits associated with buried former land surfaces. Although this potential is considered to be highly limited and difficult to quantify using stage one test excavation methodologies, a review of geotechnical borehole data indicates scope for addressing this potential in future studies (see to Appendix M1 (Volume 4) for further detail).

Association with a cultural group for social, cultural or spiritual reasons

Based on statements made consistently by all stakeholders, the remaining Aboriginal archaeological record across the airport site has a strong association with persons who identify as Darug, or as Darug descendants. This association is expressed both in terms of cultural identity and a spiritual dimension. The latter may relate to the memory or 'presence' of Darug ancestors, and a belief that artefacts 'belong to', and should remain in, the 'country' where their makers and users left them. The presence of artefacts within the soil matrix, and as a part of the landscape itself, is often referenced as evidence of traditional ownership and a cultural relationship with country. Aboriginal stakeholders frequently state that all archaeological sites, ranging from single artefacts to large assemblages, are considered to have cultural significance in this way.

Importance as part of Indigenous tradition

Based on statements by Darug stakeholders, all Aboriginal sites within the airport site, including those not yet detected (the predicted archaeological resource) are important to a wider regional tradition that remembers and celebrates the Darug relationship with their land. This relationship is described both in terms of a long history (thousands of years), and as a continuing living tradition. The Macquarie Dictionary defines 'tradition' to be 'the handing down of statements, beliefs, legends, customs, etc., from generation to generation, especially by word of mouth or by practice' (Butler 1988:1798). The Aboriginal sites on the airport site are an integral part of a cultural landscape which acts as the foundation for this remembrance.

19.4 Assessment of impacts during construction

Construction of the proposed Stage 1 development would affect at least 39 Aboriginal sites, as listed in Table 19–5. All of these sites contain artefact occurrences.

Table 19–5 Aboriginal heritage sites directly affected by construction of the Stage 1 development

Development area	Affected surface sites	Total
Construction impact zone	B15, B24, B25, B32, B39, B43, B44, B69, B70, B71, B77, B78, B79, B80, B81, B82, B84, B86, B87, B88, B91, B92, B94, B95, B101, B102, B104, B112, B113, B114, B115, B116, B119, B122, B127, B128, B129, B131, B134	39

With regard to the predicted subsurface archaeological resource, construction of the proposed Stage 1 development would directly affect approximately 514 hectares of archaeologically sensitive landform. This constitutes about 29 per cent of the airport site. These landform categories, and their affected proportions, are presented in Table 19–6.

The Stage 1 development would directly affect all of the archaeologically sensitive landforms associated with the airport site’s three north flowing, third and fourth order tributary drainage lines. A portion of the riparian corridor within the airport site along Badgerys Creek would be protected within an environmental conservation zone. The archaeological resource within this zone would also be protected by this zoning.

All of the higher relief and prominent topography of the airport site would be transformed into a level and graded platform. This would alter and remove the natural topography that acts as a medium for Aboriginal people to ‘read’ and experience the Aboriginal cultural values of the land.

Table 19–6 Archaeologically sensitive landforms within the airport site

Landform	Extent within airport site (hectares)	Extent within Stage 1 construction impact zone (hectares)
Riparian corridor (100 metres either side of drainage line)	369.6	261.0
Ridge and spur crests	120.3	69.0
Valley floor	184.0	50.4
Basal slopes	214.2	133.7
Total	888.1	514.1

19.5 Assessment of impacts during operation

Impacts during operation of the proposed Stage 1 development would be limited to indirect impacts on adjacent and nearby sites. All known sites within approximately 500 metres of the construction impact zone of the Stage 1 development consist of artefact occurrences. The heritage values of sites of this type are unlikely to be vulnerable to indirect impacts such as loss of context. Consequently, the operational impacts of the Stage 1 development would be low.

19.6 Greater Blue Mountains World Heritage Area

The Aboriginal cultural heritage values of the Greater Blue Mountains World Heritage Area are not included within the area's currently registered World Heritage values. They do, however, complement the world heritage area's listed biological values. There is little potential for the proposed airport to directly affect the Aboriginal cultural heritage values of the Greater Blue Mountains Area.

Indirect impacts on values potentially include those associated with the temporary loss of contextual value from periodic exposure to low level aircraft noise or visual intrusion of aircraft arriving at or departing from the proposed airport. These impacts could potentially affect the experience of those visiting sites, such as rock shelters and open sites, where there is an expectation or requirement for a quiet and natural surrounding environment. Aboriginal sites within this category could include publicly accessible sites, sites at which traditional Aboriginal activities are performed and sites within wilderness zones.

A limited number of sites have been developed or interpreted for public visitation in the Blue Mountains National Park, including Shaws Creek, Buralow, Red Hands Cave, Campfire Creek, Kings Tableland, Lyre Bird Dell and Asgard Swamp (DECC 2009c; Attenbrow 2010).

Wilderness zones form part of the current management zoning in the Greater Blue Mountains Area and incorporate objectives such as the conservation of 'pre-European' landscapes with minimal historical and European intrusion, including aircraft noise and vapour trails (DECC 2009c).

Based on the above discussion, any potential impacts from the proposed airport that may affect Aboriginal cultural heritage values of the Greater Blue Mountains Area would be indirect in nature and would likely relate to low levels of aircraft noise and visual intrusion from aircraft.

Impacts on the Greater Blue Mountains World Heritage Area are assessed in detail in Chapter 26.

19.7 Mitigation and management measures

An Aboriginal Cultural Heritage Construction Environmental Management Plan (CEMP) will be prepared and approved prior to commencement of the survey and salvage programmes detailed in Table 19–7. The plan will be developed in consultation with Aboriginal stakeholders and relevant government agencies. The plan will include both short and long term strategies, and address actions required prior to, during and after construction.

Mitigation and management of impacts during operation will also be incorporated into the Biodiversity, Land and Safety Operational Environmental Management Plan (OEMP) to be approved prior to commencement of operation of the proposed airport.

The plans will collate the mitigation and management measures itemised in Table 19–7. These and other environmental management plans are discussed in further detail in Chapter 28 (Volume 2b).

Table 19–7 Mitigation and management measures

Issue	Mitigation measures	Timing
Aboriginal stakeholder consultation	<p>The Aboriginal Cultural Heritage CEMP will contain an Aboriginal stakeholder consultation and engagement plan that specifies the nature and frequency of consultation throughout the design and construction phase for the proposed airport. The aims of the consultation are to:</p> <ul style="list-style-type: none"> • inform on, and provide an opportunity for feedback regarding, all matters relating to the mitigation and management of Aboriginal cultural heritage values across the airport site; • provide a forum for organising future stakeholder participation in mitigation and management activities; • provide opportunities to comment on all policy and documentation drafted in regard to the mitigation and management of Aboriginal cultural values; and • provide an opportunity for Aboriginal stakeholders to participate in field actions involving the mitigation and management of Aboriginal cultural values. <p>The Aboriginal stakeholder consultation and engagement plan will be developed in conjunction with the broader Community and Stakeholder Engagement CEMP as outlined in Chapter 28 (Volume 2b) Table 28–20.</p>	Pre-construction Construction
Conservation of heritage sites	<p>The possible scarred tree (B40) and the grinding groove site (B120) will be conserved in situ within an Environmental Conservation Zone at the airport site. A low barrier fence, which does not obstruct pedestrian traffic, would be erected around specific heritage sites as is necessary to demarcate the area as a no-go zone for vehicles. The barrier would be situated so that it does not intrude upon the immediate visual and landscape quality of the heritage sites and their surrounds.</p>	Pre-construction Operation
	<p>The Environmental Conservation Zone will be managed for the protection and conservation of known and predicted Aboriginal heritage sites and values consistent with the objectives of that zone to enhance, restore and protect the cultural values of the land.</p>	Pre-construction Operation
	<p>The Environmental Conservation Zone will be managed in accordance with the Aboriginal cultural heritage mitigation and management measures established in the Aboriginal Cultural Heritage CEMP with the conservation of known and predicted Aboriginal heritage sites as one of the principal objectives</p>	
Recording and salvage of heritage sites	<p>A targeted and selective archaeological surface survey would be conducted within those areas of the construction impact zone not previously subject to surface survey (and excluding highly disturbed areas) before commencement of Main Construction Works. The aim of this survey is to identify all visible surface Aboriginal sites for recording and management prior to commencement of Main Construction Works.</p>	Pre-construction Construction
	<p>A comprehensive archaeological inspection of surface sandstone outcrops across the construction impact zone would be conducted before activities related to Main Construction Works. This action has the aim of appropriately recording and salvaging stone surfaces with evidence of Aboriginal markings.</p>	Pre-construction
	<p>Archival recording of the possible scarred tree (B40) and grinding groove site (B120) would occur before the start of any ground disturbance works within the area of these Aboriginal heritage sites or before Main Construction Works commence, whichever occurs first. This has the objective of providing a baseline record and information upon which to develop a conservation management plan for these sites.</p>	Pre-construction

Issue	Mitigation measures	Timing
	An oral history will be recorded with the aim of preserving memories and stories from Aboriginal people relating to the airport site and its district. It is intended that this record would serve as an archive and a resource for future interpretation of the Aboriginal heritage values of the site.	Pre-construction Construction
	A selective salvage programme will be conducted of surface artefacts recovered across known Aboriginal artefact occurrences in the construction impact zone, with the aim of avoiding damage from activities related to Main Construction Works. This action would address strongly held concerns of Aboriginal stakeholders about the protection of artefacts from construction impacts. The collection programme would be conducted using an archaeological methodology and the resulting assemblage would be integrated into the archaeological analysis of salvaged material, where appropriate.	Pre-construction Construction
	<p>A selective archaeological salvage programme will be conducted in the construction impact zone. The objective of the programme is to manage impacts to archaeological or scientific values by recovering and analysing a representative sample of surface and subsurface archaeological material from the areas subject to construction impact.</p> <p>The programme will aim to:</p> <ul style="list-style-type: none"> recover archaeological material from all landform types based on a systematic and representative sampling matrix; recover additional archaeological material from areas with assessed relatively higher archaeological value, with the objective of providing a large enough artefact population for statistical analysis and from which robust results can be derived; and apply archaeological excavation methodologies which are appropriate to the expected archaeological resource and the objectives of the salvage. <p>As part of designing the salvage programme, consideration will be given to the feasibility of integrating relevant and existing geotechnical data into the process of determining the location and scope of the salvage programme.</p>	Pre-construction Construction
Protocols for discovery of artefacts and human remains	Protocols will be developed and implemented for the unanticipated discovery of Aboriginal objects, and for the discovery of any suspected human remains for all Main Construction Works involving ground disturbance.	Pre-construction Construction
	A protocol will be developed for the management of topsoil assessed as likely to contain a relatively high density of Aboriginal artefacts, and which would otherwise be impacted by construction activities. The aim of this protocol is to manage excavation, storage and placement of this material in a culturally appropriate manner that minimises potential impact to the Aboriginal cultural values resident in these artefacts from activities related to Main Construction Works. Any excavated material will be placed within the Environmental Conservation Zone where possible. The protocol will be developed in consultation with Aboriginal stakeholders.	Pre-construction Construction
Induction training	Training in the identification of Aboriginal artefacts and management of Aboriginal heritage values will be included in compulsory induction courses for site workers. The content of this component will vary according to the stage of construction. After the completion of major cut and fill actions, training may focus on the management of spoil where there is a risk of impacting artefacts, and on no-go areas, where relevant.	Pre-construction Construction

Issue	Mitigation measures	Timing
Commemoration of Aboriginal heritage	<p>The Aboriginal cultural heritage values of the airport site will be commemorated. Options for consideration may include:</p> <ul style="list-style-type: none"> the use of Darug words and language in the naming of places and infrastructure; the dedication of various spaces and places for the placement of art and interpretive elements, storage and display of cultural items, and/or the conduct of cultural activities; and the provision of public access and interpretive facilities at Aboriginal sites conserved in situ within the Environmental Conservation Zone (such as for sites B40 and B120), subject to safety and security requirements. 	Pre-construction
Curation and repatriation of heritage items	<p>One or more areas of open ground will be reserved within the Environmental Conservation Zone, as required, and managed for the primary purpose of repatriation of salvaged Aboriginal cultural material through reburial. The area(s) will be selected and managed in consultation with Aboriginal stakeholders. This provision is to accommodate the repatriation of cultural material for which it is not considered necessary by Aboriginal stakeholders to store above-ground, or to retain access for cultural purposes, interpretation, education or research.</p> <p>Following the completion of archaeological description and analysis, Aboriginal cultural material salvaged from the airport site will, in the first instance, be stored at an appropriate place to be determined in consultation with Aboriginal stakeholders and relevant government agencies.</p> <p>The longer term storage of material not to be repatriated through reburial, and potentially material salvaged from other developments in Western Sydney and the Cumberland Plain, will be managed in consultation with Aboriginal stakeholders, the NSW Office of Environment and Heritage, and relevant Australian and local government agencies, with the aim of establishing, with the support and collaborative action of governments and other stakeholders, an Aboriginal cultural heritage 'keeping place' that would provide secure, above ground storage of artefacts and enable future access for cultural purposes, interpretation, education or research.</p>	<p>Pre-construction</p> <p>Construction</p> <p>Construction</p>

19.8 Conclusion

Construction of the proposed Stage 1 development will affect at least 39 Aboriginal heritage sites recorded at the airport site, all of which comprise artefact occurrences. Construction activities will also affect approximately 514 hectares of archaeologically sensitive landforms.

Impacts during operation of the Stage 1 development will be limited to indirect impacts on adjacent and nearby sites. The heritage values of these sites are unlikely to be vulnerable to indirect impacts such as loss of context. Consequently, the operational impacts of the Stage 1 development will be low.

Mitigation and management measures will be implemented to minimise the impacts on cultural heritage. These measures include the conservation of heritage sites, recording and salvage of heritage sites, the commemoration of cultural heritage values at the airport site, curation and repatriation of heritage items, and protocols for the discovery of artefacts and human remains.