



Appendix G

Aboriginal cultural heritage assessment



HEATHCOTE ROAD BRIDGE WIDENING

**Aboriginal Archaeological Survey Report
Stage 2 PACHCI**

Prepared for Transport for NSW

Sutherland Local Government Area

November 2020

Ref. 2005

KELLEHER NIGHTINGALE CONSULTING PTY LTD
Archaeological and Heritage Management

ACN 120 187 671

Level 10
25 Bligh Street
SYDNEY NSW 2000
Phone 02 9232 5373

Document Information

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Prepared by	Dr Matthew Kelleher; Mark Rawson; Ben Anderson; Madeline Harding
Approved by	Dr Matthew Kelleher

Executive Summary

Transport for NSW propose to widen Heathcote Road Bridge over Woronora River (also referred to as Narrow Bridge No. 152) on Heathcote Road. The proposal is located along the A6 section of Heathcote Road corridor which is a section between new Illawarra Road, Lucas Heights and Princes Highway, Heathcote. The proposal is located in the Sutherland Local Government Area. The main objective of the proposal is to improve safety on the bridge. The proposal includes widening of the bridge by approximately 1.5 metres on each side to provide one wide through lane in each direction with a shoulder. The proposal will also involve widening of the northern and southern bridge approaches for approximately 250 metres either side to improve alignment and provide safer lane widths on approach to the bridge. Additional repair and maintenance works to the bridge are also included within the scope of works.

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by TfNSW to prepare an Aboriginal archaeological survey report to inform the strategic design development and environmental assessment for the proposed works. This assessment was prepared in accordance with the Stage 2 requirements of the TfNSW *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (Roads and Maritime 2011) and the Heritage NSW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010).

Background research and archaeological survey identified one Aboriginal archaeological site comprising Aboriginal objects within the study area: Scouters Mountain Engadine (AHIMS 52-2-0742). In addition, the Cubbitch Barta National Estate Area heritage place (Place ID. 105405) has also been identified within the study area. The heritage place was listed in part for its Indigenous values.

Significance assessment was undertaken of Scouters Mountain Engadine (AHIMS 52-2-0742) on the basis of site intactness/integrity, landform context and archaeological research potential. The site was found to exhibit moderate-high archaeological significance.

Based on a study area wide impact assessment,

- the Cubbitch Barta National Estate Area will be at least partially impacted by the proposed works. The portion of the Cubbitch Barta National Estate Area impacted by the proposal does not contain Aboriginal objects and some disturbance exists within the general landscape. For these reasons the impact to the Cubbitch Barta National Estate Area was assessed as minor.
- Impact to Scouters Mountain Engadine can be avoided as the proposal area was revised to exclude all works within five metres of the rock overhang associated with the AHIMS record. This exclusion area has been overlaid onto the design and provided in Figure 9. As a result of this exclusion area, the proposal would not trigger the need to obtain an AHIP.

Any change to the proposed exclusion area would trigger the need for further assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and TfNSW PACHCI would be required.

No further heritage assessment of the Cubbitch Barta National Estate Area is arranged, however if the estate area cannot be avoided consultation with the Tharawal Local Aboriginal Land Council should be undertaken.

1 Introduction

1.1 Project background

Transport for NSW (TfNSW) propose to widen Heathcote Road Bridge over Woronora River (also referred to as Narrow Bridge No. 152) on Heathcote Road. The proposal is located along the A6 section of Heathcote Road corridor which is a section between new Illawarra Road, Lucas Heights and Princes Highway, Heathcote. The proposal is located in the Sutherland Local Government Area (LGA).

The main objective of the proposal is to improve safety on the bridge. The proposal includes widening of the bridge by approximately 1.5 metres on each side to provide one wide through lane in each direction with a shoulder. The proposal will also involve widening of the northern and southern bridge approaches for about 250 metres either side to improve alignment and provide safer lane widths on approach to the bridge. Additional repair and maintenance works to the bridge are also included within the scope of works. The proposed works and construction footprint area (hereafter referred to as the 'study area') is shown on Figure 1 and 2.

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by TfNSW to prepare an Aboriginal archaeological survey report to inform the strategic design development and environmental assessment for the proposed works. This assessment was prepared in accordance with the Stage 2 requirements of the TfNSW *Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI)* (Roads and Maritime 2011) and the Heritage NSW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010).

1.2 Summary of findings

Background research and archaeological survey identified one Aboriginal archaeological site comprising Aboriginal objects within the study area: Scouters Mountain Engadine (AHIMS 52-2-0742). In addition, the Cubbitch Barta National Estate Area heritage place (Place ID. 105405) has also been identified within the study area. The heritage place was listed in part for its Indigenous values.

Outside of the identified Aboriginal site, the remainder of the study area displays low archaeological potential, primarily as a result of disturbance from historic and contemporary land use practices.

Based on a study area wide impact assessment,

- the Cubbitch Barta National Estate Area will be at least partially impacted by the proposed works. The portion of the Cubbitch Barta National Estate Area impacted by the proposal does not contain Aboriginal objects and some disturbance exists within the general landscape. For these reasons the impact to the Cubbitch Barta National Estate Area was assessed as minor.
- Impact to Scouters Mountain Engadine can be avoided as the proposal area was revised to exclude all works within five metres of the rock overhang associated with the AHIMS record. This exclusion area has been overlaid onto the design and provided in Figure 9. As a result of this exclusion area, the proposal would not trigger the need to obtain an AHIP.

Any change to the proposed exclusion area would trigger the need for further assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and TfNSW PACHCI would be required.

No further heritage assessment of the Cubbitch Barta National Estate Area is warranted, however if the estate area cannot be avoided consultation with the Tharawal Local Aboriginal Land Council should be undertaken.

1.3 Investigator / contributors

A full list of investigator / contributors to the current study is included in Table 1 below.

Table 1. Investigator / contributor

Investigator/ Contributor	Affiliation	Role
Dr Matthew Kelleher	Kelleher Nightingale Consulting	Reporting, Survey, Advisor and Review
Mark Rawson	Kelleher Nightingale Consulting	Report, Survey
Ben Anderson	Kelleher Nightingale Consulting	GIS
Madeline Harding	Kelleher Nightingale Consulting	Reporting
Darren Duncan	Gandangarra Local Aboriginal Land Council	Cultural Heritage Advisor, Survey

Project description

The existing Heathcote Road bridge over Woronora River (also referred to as bridge 152) is a single lane undivided bridge. It is about 126m length with four sets of piers. Existing lane widths are narrow at 3.05m with no usable shoulders (0.3m shoulders) and no physical separation of opposing traffic lanes. Both the eastern and western side approaches are on a curve and sloping gradient which do not conform to current road design guidelines. Crash history statistics for the bridge (July 2011 to June 2016, Strategic design gateway report) include record of a fatality and two serious injuries. Road safety concerns are a key issue for motorists and the local community and the Bridge and road corridor often receive media attention. In 2018, the Minister for Roads Maritime and Freight announced a commitment to improve the safety of the Heathcote Road narrow bridge.

In addition to the crash history, predicted population and traffic growth is anticipated to place increased pressure on the road corridor potentially increasing the risk of the number and severity of incidents. Increased incidents would potentially lead to an increase in unplanned road closures, and a reduction in travel time reliability, for vehicles including for key freight routes.

Proposal objectives include:

- improve road safety by increasing the road and shoulder lane widths on the bridge and approaches
- improve network reliability
- deliver a design solution that has the ability to be implemented in the short-term

Key features of the proposal

The proposal involves widening the bridge by a cantilever bridge structure attached to the existing structure. The approaches to the bridge are proposed to be widened by minor removal of material from the rock face on both the north and south approaches to the bridge. The full proposal length is about 630m including upgrade to the bridge approaches. The proposal includes associated enabling works such as utility relocation and vegetation removal. Ancillary facilities required include a site compound, tracks to access the bridge abutments and laydown areas.

The preferred method of widening is to install headstock extensions to each of the piers. The headstock extensions are post tensioned in place and held by the friction force against the pier. The headstock extensions support new steel box girders. Composite formwork on top of the steel girders allows the bridge deck slab extension to be poured which is followed by the construction of bridge barriers. Resurfacing the bridge deck will be required to improve the cross gradient and maintain the crown at the centre of the bridge carriageway. The main work tasks are listed below.

Site establishment and pre-construction works

- Implement full road closure traffic arrangements.
- Potential small on-site office and amenities block within existing road corridor.
- Establish nominated temporary laydown and storage areas within the closed road corridor.
- Install personnel protection screens on bridge.
- Demarcate approved limits of work.
- Possible Property boundary works (i.e. fencing).
- Establish erosion and sediment controls.
- Establish access track for vehicles and plant beneath the bridge. This would be accessed via the northern abutment. This would require vegetation removal along the identified access track and also to establish area/s for crane platforms.
- Construct a temporary waterway crossing across Woronora River for vehicle access to the southern side.
- Establish crane platform area/s.
- Construct scaffolding. This may require both ground and suspended scaffolding.
- Install bridge walkways on both sides (either by crane or scaffolding).
- Establish a small storage area on the northern access track for storage of plant and equipment above the flood level when not in use.
- Utilities adjustment (optical fibre).

Construction

Bridge strengthening and repair

- Repair and maintenance work to existing bridge includes:
 - Repairs to cracking and concrete spalling

- Replacement of expansion joints and bearings
- Anti-carbonation coating
- Pier protection, earthworks and installation of rip-rap material.
- Install working platforms at abutments and modifications to bridge abutments and associated earthworks, possible retaining wall, installation of bridge aprons.
- Bridge widening including installation of permanent formwork (performed from scaffold walkways).
- Deck pouring.
- Parapet installation using mobile cranes.
- Installation of drainage.
- Remove existing rail on bridge.
- Install new bridge deck including pavement and temporary line markings.

Upgrade to northern and southern approaches

- Slope stabilisation works to the rock cutting on the eastern side of the road at the southern abutment. This includes removal of vegetation on the face of the cutting and crest of the slope, scaling of the rock face, shotcreting, possible rock bolting, maintenance access points, and reconstruction of the drainage gutter at the base of the slope.
- Slope stabilisation works to the rock cutting on the western side of the road at the northern abutment. This includes removal of vegetation on the face of the cutting and crest of the slope, and possible benching of the slope (subject to further investigation including geological assessment).
- Construction of widened pavement and line-marking.
- Drainage adjustments.
- Installation of road furniture features including barriers and signage.

Demobilisation

- Remove scaffolding, site office, and crane.
- Long term stabilisation of disturbed areas prior to removal of erosion and sediment controls.
- Reinstate barrier on bridge.
- Undertake permanent line-marking.

Compound sites

Two site compounds have been nominated for construction. The locations are described below and as shown in figures below. Both locations are owned by TfNSW and have previously been used as construction compound locations.

- Location 1 is approximately 2.6km east of the main works area on the corner of Princes Highway and Wilson Parade intersection, Heathcote. The land is owned by TfNSW, and currently not in use. It has an approximate area of 2100m², all of which is hardstand area. No vegetation removal would be required. The closest

residential receivers are located on the far side of Princes Highway (about 60 metres west) and on the other side of the adjacent railway corridor (about 80 metres east).

- Location 2 is approximately 5km west of the main works area and is a fenced compound site on the north-west corner of Heathcote Road and New Illawarra Road intersection, Lucas Heights. It is approximately 700m². No vegetation removal is required. There are no nearby residential receivers.

In addition to the above nominated compound areas, it is also proposed to utilise hardstand areas within the existing road corridor during the full road closure for an amenities block and optional site office, temporary stockpiling and, temporary laydown areas for delivery and possible fabrication of bridge components.

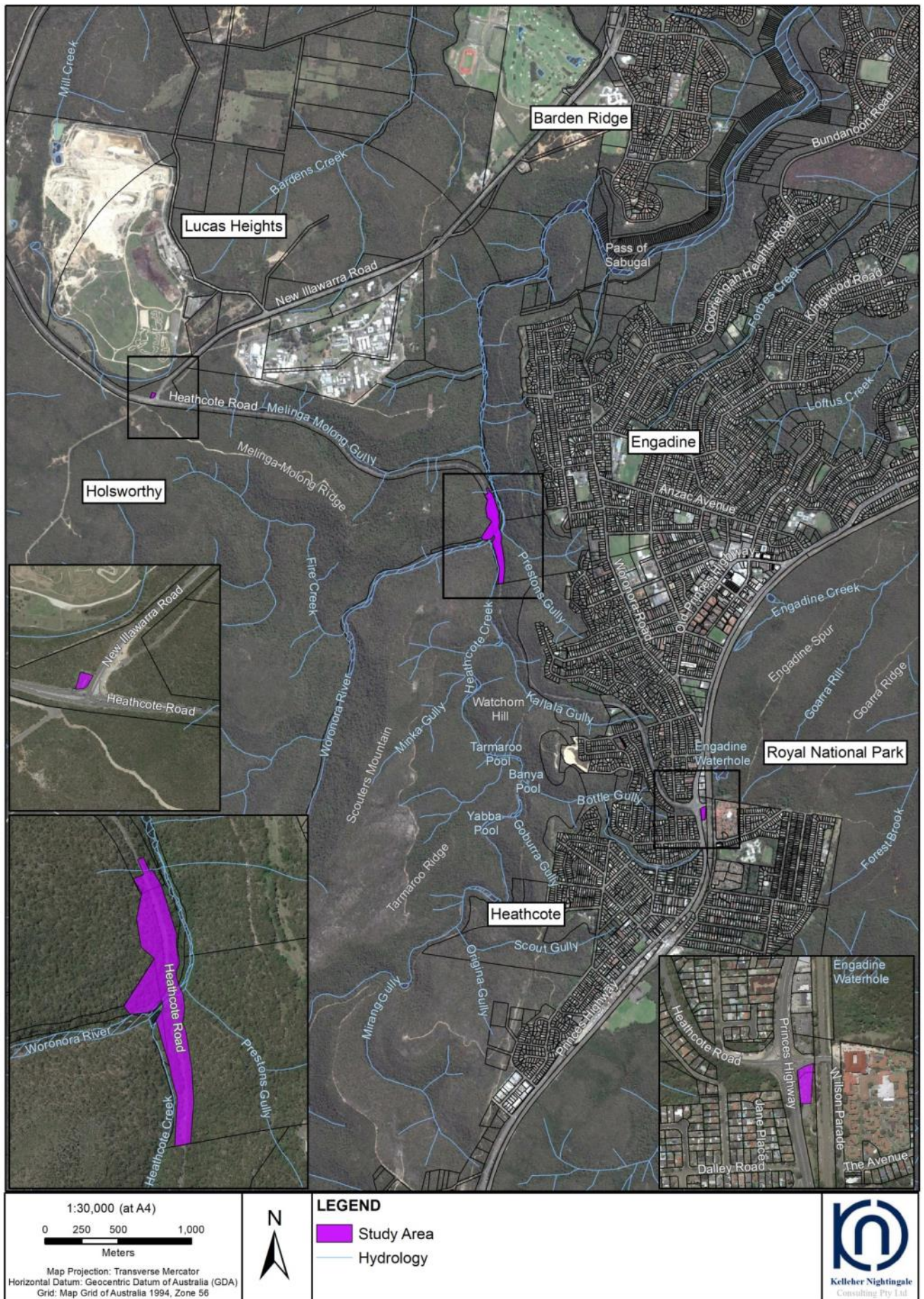


Figure 1. Overview of study area

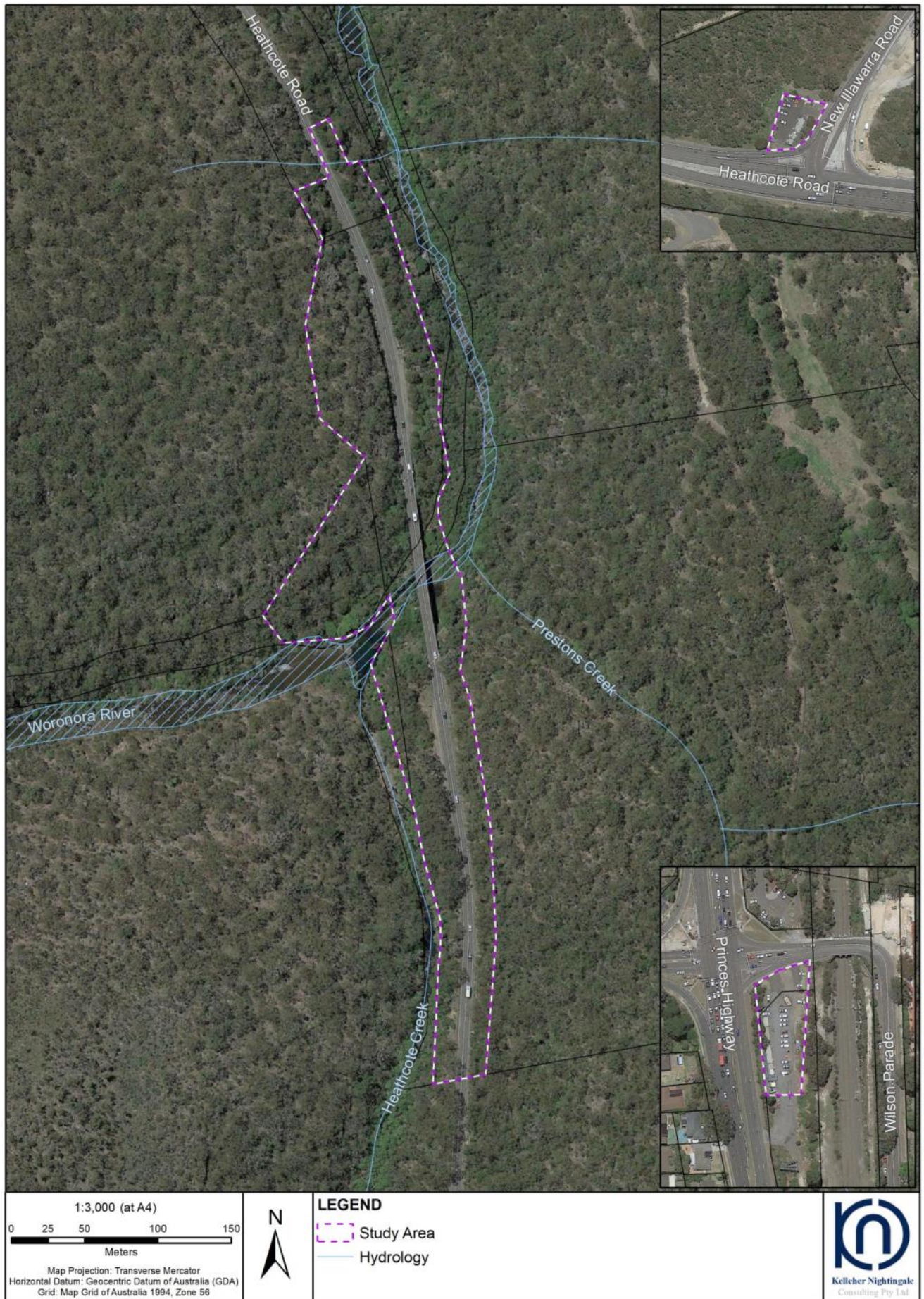


Figure 2. Detail of study area

2 Aboriginal stakeholder consultation

TfNSW has developed the PACHCI to provide a consistent means of effective consultation with Aboriginal communities regarding activities which may impact on Aboriginal cultural heritage and a consistent assessment process for TfNSW activities across NSW. In accordance with the PACHCI, the early stages of TfNSW projects involve consultation with Local Aboriginal Land Councils and registered Native Title holders/claimants.

The project has been conducted in consultation with the Gandangarra Local Aboriginal Land Council (GLALC), Tharawal Local Aboriginal Land Council (TLALC) and the registered Native Title claimant for the area, the South Coast People.

GLALC, TLALC and the Native Title Claimant were contacted by TfNSW at the commencement of the project to discuss the proposed works and invited to participate in the archaeological surveys. The Native Title Claimant and TLALC were invited to participate in archaeological survey, however were not available to attend on the proposed dates.

The archaeological survey of the study area was arranged with GLALC for 25 May 2020 and 17 August 2020. Darren Duncan from GLALC participated in both surveys.

One Aboriginal archaeological site, Scouters Mountain Engadine (AHIMS 52-5-0742) was identified within the study area as a result of archaeological survey. GLALC representative Darren Duncan provided an Aboriginal stakeholder cultural heritage survey report. The Aboriginal stakeholder cultural heritage survey report is attached as Appendix A.

3 Review of previous archaeological investigations

3.1 AHIMS web services

The Aboriginal Heritage Information Management System (AHIMS) is a database operated by Heritage NSW and regulated under section 90(Q) of the (NSW) National Parks and Wildlife Act 1974 (NPW Act). AHIMS contains information and records related to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the NPW Act) and declared Aboriginal places (as defined under the NPW Act) in NSW.

A series of AHIMS searches were conducted on 25 & 26 August 2020 to identify registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (Client service ID 530303, 530307 & 530728). The search results are attached as Appendix B.

The AHIMS Web Service database searches were conducted within the following coordinates (GDA, Zone 56):

Eastings: 314821 – 315355
 Northings: 6228452 – 6229615
 Buffer: 0 metres (the search coordinates included a buffer around the study area).

Eastings: 316384 – 316626
 Northings: 6227017 – 6227341
 Buffer: 0 metres (the search coordinates included a buffer around the study area).

Eastings: 312667 – 312802
 Northings: 6229985 – 6230115
 Buffer: 0 metres (the search coordinates included a buffer around the study area).

The AHIMS search results showed:

6	Aboriginal sites are recorded in or near the above locations*
0	Aboriginal places have been declared in or near the above locations

The distribution of registered Aboriginal sites within these coordinates are shown in Figure 3. The frequencies of site types within the search areas are shown in Table 2.

Table 2. Frequency of site types and context from AHIMS database search

Site Context	Site Feature	Number	Frequency
Closed	Art (Pigment or Engraved)	2	33
	Art (Pigment or Engraved); Artefact; Grinding Groove	1	17
	Potential Archaeological Deposit (PAD)	1	17
	Shell	2	33
Total		6	100

The AHIMS results, the nature of previously recorded sites and previous archaeological investigations in the area are discussed further in section 3.3.

3.2 Other heritage registers and databases

Other sources of information including heritage registers and lists were also searched for known Aboriginal heritage in the vicinity of the study area. These included:

- Sutherland Local Environmental Plan (LEP) 2015
- Roads and Maritime Heritage Register
- Sydney Water Heritage Register
- State Heritage Register and State Heritage Inventory
- Commonwealth Heritage List
- National Heritage List
- Australian Heritage Places Inventory
- Register of the National Estate (Non-statutory archive)

Cubbitch Barta National Estate Area Commonwealth Heritage List (Place ID 105405)

The study area contains a portion of the Cubbitch Barta National Estate Area (also referred to as the Holsworthy Military Training Area) which is a listed place on the Commonwealth Heritage List (Place ID 105405). As a listed place on the Commonwealth Heritage List, the area is protected under the Environment Protection and Biodiversity Conservation Act 1999.

The Cubbitch Barta National Estate Area was originally listed on the Register of the National Estate for its Indigenous, natural and historic values on 27 October 1998 (Place ID 100633). The nomination for the original listing was undertaken by the Tharawal Local Aboriginal Land Council who nominated the Cubbitch Barta National Estate Area in all categories of significance related to Aboriginal, Historic, Aesthetic, Military and Natural values. The place was primarily listed as a result of the ongoing archaeological investigations undertaken for the proposed alternative option for a Second Sydney Airport at Holsworthy. The Cubbitch Barta National Estate Area was subsequently registered on the Commonwealth Heritage List on 22 June 2004 (in its first year of

operation) along with 333 additional eligible places from the Register of the National Estate.

Disturbance within the Holsworthy Military Training area is considered relatively low due to the historic land use of the site as a military training area and the rugged nature of the landscape. Much of the surrounding urban development has not encroached on the military training area at Holsworthy, leading to the protection of over 500 Aboriginal archaeological sites. The following statement is a summary taken from the listing's Statement of Significance in reference to the Indigenous values of the site, as maintained on the Australian Heritage Database:

The Cubbitch Barta National Estate Area is highly valued by members of the Tharawal Local Aboriginal Land Council and the Dharawal people for its symbolic, cultural, educational and social associations (Criterion G.1). The Aboriginal cultural landscape of the area reflects the past lifestyle of Aboriginal people in this region and its preservation enables Aboriginal people to maintain cultural links to the area. These connections with the past are particularly important, because Aboriginal people in this part of Australia were among the earliest impacted by European settlement of this continent and their culture has since been disrupted by war, disease and urban development. Throughout the environments of the area, the Dharawal see evidence of the relationship between their people and the land. The Tharawal Local Aboriginal Land Council is also concerned about maintaining the area's natural environment.

The area contains a large and diverse collection of Aboriginal sites, which represent a complex Aboriginal cultural landscape (Criterion A.3). Over 530 sites are known from the area and a further 509 potential archaeological sites have been documented. It is highly likely that the area contains many hundreds more sites. Sites include rock paintings and drawings, engravings, open scatters of artefacts, grinding grooves and scarred trees. The survival of a significant number of scarred trees within the area is important as this is a rare type of site within the Sydney Basin (Criterion B.2). While rock art sites are well represented in the Sydney Basin, other types of sites are less so. The preservation within the area of scarred trees, open artefact scatters and archaeological sites in particular, offer considerable potential for further developing a picture of day to day activities of Aboriginal people in the Sydney Basin prior to 1788 (Criterion C.2). This large number of sites and the stories they may tell form a landscape in which Aboriginal life prior to 1788 is recorded without the large scale impact of European settlement. There is also a high density of sites in the area. This is particularly important because sites are found in groups or clusters with their relationship to one another largely intact. By examining where they are located in the landscape and their relationship to other types of sites, a more complete picture of the lifestyle of Aboriginal people could be established (Criterion C.2).

The Georges River, which bounds the National Estate area on the west and is close to the north, has been identified as an important north-south Aboriginal cultural boundary within the Sydney Basin. The cultural landscape of the National Estate area is representative of the southern social unit of the Sydney Basin (Criterion D.2). This unit has been characterised by the presence of a number of distinctive traits within the art and by complex analyses which show that the art sites of this region are significantly different from those north of the Georges

River. The large number of sites, the relatively high site density, the condition of sites and the preservation of the landscape as a whole makes the area important in terms of the further definition of this southern unit. The area also offers considerable research potential in terms of the analysis and interpretation of small scale groups (Criterion C.2). There is evidence to suggest that this area formed the cultural landscape of a single residence group whose territory extended over the Georges River and Williams/Mill Creek drainage basins. In this region, it is uncommon to have such a landscape preserved in this way and particularly important, as knowledge of local groups from ethno history is often incomplete and problematic.

The rich collection of more than 300 rock art sites within the area is regionally significant as a group in the Sydney Basin and representative of rock art south of the Georges River (Criterion D.2). The rock art sites are diverse in terms of technique (paintings, drawings and engravings) and motifs depicted (Criterion A.3).

The art in the area contains a number of motifs which are rare within the Sydney region, such as the engraving of a pregnant woman. The site where this occurs is considered important, as female motifs and gender specific evidence of this kind are relatively rare (Criterion B.2). The long history of recording the rock art sites by voluntary groups and individuals indicates that they are aesthetically important to groups within the broader community (Criteria E.1). The aesthetic value of these sites is enhanced by their excellent condition and lack of graffiti.

The Cubbitch Barta National Estate Area is important as an illustration of a landscape in which changes in the relationship between Aboriginal people and early settlers took place (Criterion A.4). This is a phase in the cultural history of Australia for which traditional documentation is often poor. The area is associated with Governor Macquarie's war against the Aboriginal people of the Liverpool, Campbelltown and Appin areas from April to November 1816. Despite efforts to move Indigenous people away from this country, documentation indicates Aboriginal people were still visiting sites within the area in the 1830s. Within the area, it is the evidence of the strong Aboriginal presence combined with the nineteenth century history and land use without much twentieth century development, which makes this area unusual for the way it can illustrate this period of history. Potential exists for further research to shed light on this era through research relating to exploration, settlements within the area and information about the adjacent Aboriginal reserve (Criterion C.2).

The Cubbitch Barta National Estate Area is located 30 kilometres south-west of Sydney and contains 18,000 hectares of the Woronora Plateau. The boundaries of the Cubbitch Barta National Estate area comprise the Georges River to the west, the Holsworthy Barracks to the north, Heathcote Road and Heathcote National Park to the east and the Dharawal State Recreation Area to the south.

The current study area covers a portion of the listed Cubbitch Barta National Estate heritage place. No previously recorded or registered AHIMS sites or PAD areas associated with the heritage place listing have been recorded within the study area. The portion of the Cubbitch Barta National Estate Area located within the current study area is shown on Figure 3.

[This figure has been deliberately omitted from the public version report]

Figure 3. AHIMS search results and heritage register & database search results

3.3 Previous archaeological investigations

The study area and the surrounding lands have been subject to archaeological assessment. Previous archaeological investigations within and in the vicinity of the study area have included large scale development proposals, local management plans (walking track) and academic studies of the Woronora Plateau (Illawarra Prehistory Group). A summary of the relevant investigations is presented in this section.

Heathcote Road Upgrade – Preliminary Aboriginal Survey Report, Stage 2 PACHCI

Previous preliminary archaeological assessment was undertaken of the Heathcote Road between the New Illawarra Road and Princes Highway to inform preliminary environmental investigations for potential Heathcote Road upgrade works between the New Illawarra Road and Princes Highway (KNC 2017). The project included a two kilometre wide assessment corridor surrounding the existing alignment of Heathcote Road (one kilometre on either side) and encompassed the entirety of the current study area.

Preliminary investigations identified a total of 45 Aboriginal archaeological sites (including three duplicate recordings) within the assessment area. The sites were predominantly rockshelters with art, archaeological deposit and/or potential archaeological deposit (PAD). In addition, two culturally modified trees, one grinding groove site and one stone arrangement were also identified. The sites were predominantly located on steep slopes in elevated locations within proximity to the major water source of the Woronora River and its tributaries. Preliminary constraints mapping also identified areas of varying Aboriginal archaeological sensitivity within the assessment corridor: these included areas of high, moderate and low sensitivity. Areas of low archaeological sensitivity were determined due to impact from modern land use and distance from water sources. In these areas, the potential for archaeological sites to occur was low. Areas of moderate archaeological sensitivity were determined based on limited visible impact from modern land use, proximity to water sources and previously identified Aboriginal archaeological sites. It was considered likely that further Aboriginal archaeological sites would be present in these areas. Areas of high archaeological significance were locations where Aboriginal archaeological sites had previously been identified.

Two sites were identified within the current study area by the assessment as a result of previous background research; these included sites Scouters Mountain Engadine (AHIMS 52-2-0742) and Woronora Pipeline PAD3 WPLP (AHIMS 52-2-1787). Scouters Mountain Engadine was recorded as a shelter with Art and Woronora Pipeline PAD3 WPLP was recorded as a shelter with Art and PAD. Scouters Mountain Engadine is located within the current study area. Further assessment of site Woronora Pipeline PAD3 WPLP determined that the site had been registered on AHIMS at the incorrect location. The site is not located within the study area and its corrected location is approximately 100 metres further to the east.

The majority of the current study area was generally assessed as displaying moderate archaeological sensitivity. A small portion of the study area adjacent to the Princes Highway and Wilson Parade was assessed as having low archaeological sensitivity. It was determined that in future, if a preferred design option for the Heathcote Road upgrade is identified, further archaeological investigations would be required in order to assess

specific impacts to known sites and the potential for unknown sites within the proposed road upgrade corridor.

Sutherland Shire Walking Track Network

Archaeological studies were undertaken for the Sutherland Shire Walking Track Network by KNC (2008). The project included Aboriginal Site Impact Assessment and the preparation of a Conservation Management Plan Strategy. The assessment sought to assess existing and potential impacts to Aboriginal sites within the framework of the Walking Track Network across the Shire, and to develop a management strategy for their protection and conservation. The assessment targeted three walking tracks within the network: the Great Kai'ma Way, Bonnet Bay Walking Track and the Woronora Valley Track. The Woronora Valley Track is located between 200-250 metres east of the current study area.

A total of 78 Aboriginal sites were recorded and assessed in the vicinity of the three walking trails; 36 of these sites had been previously recorded. Sites identified comprised shelters with art, occupation shelters with artefacts and/or shell midden, axe grinding groove sites and open scatters of midden and artefacts. The assessment demonstrated that there were a broad range of Aboriginal site types across the Shire, not only in the number of sites recorded, but also in terms of what was identified at individual sites. For example, previously recorded shelters with art were also shown to have archaeological deposit such as shell midden and/or stone artefacts. Sites recorded as potential archaeological deposits were also found to contain deposits and/or art which had not previously been observed.

Eight previously recorded sites were located during the survey of the Woronora Valley Track. Fourteen sites not previously recorded were identified during the survey. Shelters with midden material or occupation deposit were the most frequently recorded site (46%), followed by shelters with art (18%), middens, shelter with art and PAD, and shelters with PAD (all on 9%) and shelters with midden and art and axe grinding grooves (both at 5%). Two of the sites had previously been recorded as PADs. The survey did not locate any cultural features at these two sites.

Two Aboriginal archaeological sites within proximity to the current study area were assessed: WT05 (Woronora Pipeline PAD 3) Campbelltown (*also registered as Woronora Pipeline PAD3- WPLP3*) and WT 21- Two Shells Shelter, Woronora River (*also registered as WT21 (Two Shells Shelter) Campbelltown*). Both sites contain duplicate site card recordings at the same location, as shown from the AHIMS search results on Figure 3.

Several management strategies were recommended for effective management of the identified Aboriginal sites. Recommendations included scientific recording of art sites which were under threat of continued weathering of sandstone surfaces, removal of rubbish and/or graffiti from sites which would be able to tolerate such works, controlled visitation to sites through establishment of a protective screen and the planned design of walking tracks to not impact on sites. It was generally recommended that those sites identified as a result of the fieldwork should be added to Council's Aboriginal sites database to ensure they were considered in relation to the broader planning and management activities of Council.

Management specific to the rockshelter with art and rockshelter with art and PAD sites located within proximity to the included no immediate action required. It was recommended that the location of the sites should be identified in an environmental

management plan for any construction activities for the Woronora Valley Track to ensure they were not inadvertently damaged.

Holsworthy Military Area

Archaeological investigations have been undertaken within the Holsworthy Military area located north and west of the current study area. Significant archaeological assessment was undertaken at Holsworthy for a proposed second Sydney airport, as an alternative to the preferred Badgerys Creek option. Navin Officer (1997) produced a Draft Impact Statement detailing the potential impacts of a Secondary airport on the Holsworthy area resulting from comprehensive archaeological survey of the Holsworthy study area. The Holsworthy field survey coverage area boundary encompassed a stretch of Heathcote Road from Sandy Point to the Woronora River, approximately 13 kilometres in length. This included a small portion of the north eastern corner of the current study area. Landforms surveyed included plateau surfaces, crests, steep sided valleys, both moderate and low gradient undulating terrain, alluvial flats, ridgelines and fluvial corridors.

There were 821 Aboriginal archaeological sites recorded during survey within the wider Holsworthy field survey area. In addition to this, 14 site recordings were added to the database from previous surveys which had taken place within the assessment area during environmental audit of the Military area. Sites when grouped into mutually exclusive categories consisted of 19 artefact scatters, 37 isolated finds in open contexts, 48 scarred trees, 54 open sites with grinding grooves, 15 open engraving sites (some with grinding grooves), 113 rock shelters with art (pigment) and 20 rockshelters with deposit. One shelter with engraved art, 506 shelters with PAD and three open context PAD were also recorded within the surveyed area (Navin Officer 1997:5-14). Quartz was the predominant raw material, with silcrete, chert, quartzite and volcanics also identified. Less common instances of petrified wood, tuff/mudstone and rhyolite were also recorded at a small number of sites. The most frequent art motif types identified within shelter contexts included tracks and non-figurative designs, followed by macropods and profile quadruped animals, birds and indeterminate motif types. Motif types including fish, anthropomorphic figures and other splayed quadrupeds were also recorded in small numbers. The most common shelter site attribute was pigment art, followed by PAD or archaeological deposit. Few recordings of engraved art, grinding grooves or evidence of quarrying were made, accounting for only 1-2% of sites.

Lucas Heights

Multiple archaeological investigations have been undertaken for the waste disposal depot at Lucas Heights. In 1980, archaeological survey was undertaken at Bardens Creek for an extension of the existing waste disposal depot. The Bardens Creek assessment area was located to the north of the existing depot, approximately 2.3 kilometres to the north of the current study area at the Heathcote/ New Illawarra Road intersection. This survey identified thirteen sites within the Bardens Creek catchment, seven of which were determined to be within the boundaries of the proposed extension area. Sites identified included three shelters with deposit and art, three shelters with art, two shelters with deposit, art and axe grinding grooves, four axe grinding groove sites and one engraving site with axe grinding grooves. Test excavations were undertaken by Val Attenbrow and Tia Negerevich (1981) at four of the sites rockshelter with deposit sites identified during the survey. The recommendations from this report concluded that a formal consent to destroy be applied for all sites. Further detailed recording was also

recommended for sites identified as a result of the assessment, which had not been test excavated.

Additional archaeological assessment was undertaken by Koettig and McDonald (1984) in the Upper Mills Creek area as an alternative area for the proposed extension of the Lucas Heights waste disposal depot. The boundaries of the proposed alternative site project area were located to the north of the Heathcote Road/ New Illawarra Road intersection. One shelter site with hand stencils and PAD and two shelters with PAD were identified as a result of archaeological survey. One open context artefact scatter was also identified. The shelter site with hand stencils (M11) contained seven white hand stencils on the ceiling, with most having faded as a result of natural processes. The PAD area at this site was described as more than 15 cm deep. Test excavation was carried out at the two shelters with PAD (M12 and M13). The test pit at M13 identified a total of 31 artefacts. The dominant raw material identified at this site consisted of quartz (83%) and silcrete (14%). The only diagnostic pieces identified at this site were bipolar flakes and cores. The test pit at M12 identified a total of 100 artefacts. Raw material identified consisted predominantly of silcrete (49%) and quartz (45%) materials, with some instances of fine grain siliceous material. Artefact types included quartz bipolar pieces, a bipolar core and a flake. Five artefacts of silcrete showed evidence of retouch or usewear, including one asymmetric backed piece. Excavations from the two sites (M12 and M13) identified that these shelters were representative of other shelters which had previously been test excavated in the area, however the artefact density of these sites was relatively low compared to other sites in the region. Recommendations of the overall assessment included further excavations at site M12, and further recordings of the art at site M11.

Further archaeological investigations were undertaken by Koettig (1985) within the Upper Mill Creek area. Further excavation was undertaken at site M12 in accordance with the previous assessment. An excavation program was also undertaken at site M11 to determine if archaeological deposit was present. An artefact scatter identified during the original survey (designated M14) was also subject to archaeological test excavation. Excavation undertaken at site M11 identified five charcoal samples which revealed that occupation of the site had commenced prior to 2200 years ago. Faunal evidence was identified and consisted of 470 fragments of bone. The stone assemblage consisted of 14, 145 artefacts with dominant raw materials being quartz and silcrete, with other fine grain siliceous material also present. Multiplatform and single platform cores, flakes, broken flakes and flaked pieces were identified within the deposit. Backed blades were also identified within the assemblage. A total of 234 artefacts were identified from further excavation at M12. The raw materials identified included quartz, silcrete and fine grained siliceous material. Percentages of these materials were almost equal. Artefact types included bipolar cores, bipolar flakes, cores, debitage, retouch/ usewear flakes and two backed blades. Site M14 identified a total of 197 artefacts with similar results to those recorded at site M11 and M12. Further excavations were subsequently undertaken at sites M11, M12 and M14 (Koettig 1990).

Woronora Eastern Catchment

The Illawarra Prehistory group (Sefton 1989) undertook field survey of the Cordeaux River and Woronora River between 1988 and 1990. The Woronora Eastern Catchment survey area included parts of Heathcote National Park and neighbouring Crown land which was surveyed in two phases. A portion of this surveyed area is located south and

west of Heathcote Road, within the current study area. The first survey of the Woronora Eastern Catchment was undertaken by the Illawarra Prehistory Group in 1988 and 1989. This survey identified a total of 18 open context sites. Grinding grooves were present at 17 of these sites. Four sites featured rock engravings and engraved groove channels. Of the 33 closed context rockshelter sites identified, art was recorded in 32 shelters and 12 shelters contained surface artefacts. Subsequent field survey identified a total of 62 sites, made up of 20 open context sites and 42 closed context sites. Site types included art, stone artefacts, and grinding grooves. Lesser instances of rock engravings and engraved groove channels were also identified. Sandstone overhangs were inspected for art, shells, stone artefacts and grinding grooves. Sandstone outcrops were also examined for grinding grooves, rock engravings and engraved groove channels. A total of 113 Aboriginal archaeological sites were identified throughout the field survey investigations undertaken in the Woronora Eastern Catchment; none of these sites were identified within the current study area. Within the Cordeaux Catchment Area to the south of the study area, 38 sites were identified consisted of grinding grooves, rock engravings, engraved groove channels and shelters. A comparison of the two surveyed areas concluded that the occurrence and density of sites in the Cordeaux Catchment was far less, likely as a result of the catchment areas differing in geography and environment.

3.4 Previously identified sites within the study area

Previous archaeological investigations and background research has identified one previously registered Aboriginal archaeological site situated within the current study area. The site is discussed below.

Scouters Mountain; Engadine; (AHIMS 52-2-0742)

Scouters Mountain Engadine comprised a closed context rockshelter site with art. The original site card recording offers limited information regarding the identification and recording of the site. The art comprised a hand stencil in very even red stain, likely done with brush and a stick figure, also in red stain, depicting a person in a running motion throwing a spear from the left hand. The site card notes that both figures are unusual and do not appear to be of Aboriginal origin. A "line" motif has also been drawn on the site plan and included in the site card recording. The three motifs (two of which are thought not to be of Aboriginal origin) were recorded in a rockshelter measuring approximately five metres in length, with a maximum depth of two metres.

3.5 Previously identified sites within proximity to the study area

Previous archaeological investigations have identified a multitude of Aboriginal archaeological sites within the local area and wider region, with varying site types recorded across the Woronora Plateau. Background research has identified three Aboriginal archaeological sites (comprising five AHIMS registrations) situated in the vicinity of the current study area. These sites are discussed below.

Site name: WT21 (Two Shells Shelter) Campbelltown

AHIMS number: 52-2-3658 (includes duplicate recording 52-2-4343)

Site WT21 (Two Shells Shelter) Campbelltown consisted of a closed context rockshelter site with art and deposit. The site was recorded as a result of Aboriginal heritage assessment undertaken for the Sutherland Shire Walking Track Network (KNC 2008). The site was located approximately 60 metres east of the Woronora River and approximately

200 metres west of Crescent Place, Engadine. The site card noted that the shelter was close to the same level as Heathcote Road on the opposite bank of the Woronora River.

The sandstone shelter was south-west facing and recorded as approximately 4.5 metres in length, 2.5 metres in depth and 4.2 metres in height. Loosely compacted pale sand was observed across the shelter floor; a small amount of slope wash from an intermittent stream dripping at the southern end of the shelter also noted. The shelter roof consisted of disjointed blocks of sandstone that allowed for a large amount of water seepage through the site, particularly through the back wall. Two shell fragments were recorded in the centre of the shelter floor.

The rockshelter site was determined to be in generally poor condition, despite no visible human impacts to the shelter, apart from possible tree weed species growing on the shelter floor. The research potential for the site was determined to be low.

This site includes duplicate recording WT 21 – Two Shells Shelter, Woronora River (AHIMS 52-2-4343).

Site name: Woronora Pipeline PAD3 – WPLP3;

AHIMS number: 52-2-1787 (includes duplicate recording 52-2-3657)

Site Woronora Pipeline PAD3- WPLP3 was originally recorded by Bobbie Oakley in 1995 as a result of archaeological survey undertaken for the Woronora – Peshurst Pipeline from Woronora Dam to Allaway Reservoir project. The AHIMS site was registered as a shelter with art and deposit, a rock engraving site and axe grinding groove site. Limited information was provided on the AHIMS site card at the time of recording. Further assessment undertaken by Mary Dallas Consulting Archaeological in December 2007 for an Aboriginal Heritage Planning study for Sutherland Shire Council determined that the original report referenced on the AHIMS site card was missing and further information regarding the shelter site was unavailable.

The site was subsequently relocated as a result of Aboriginal heritage assessment undertaken by KNC for the Sutherland Shire Walking Track Network in 2008. The site was confirmed to be a rockshelter with art and PAD. The sandstone shelter was located approximately 10 metres south of a tributary of the Woronora River that drains west from the northern end of Peppermint Grove, Engadine and approximately 70-80 metres below the Woronora pipeline.

The sandstone shelter measured approximately 11.3 metres in length, 4.3 metres in depth and 2.8 in height. Deposit within the shelter consisted of fine grey sand with charcoal fragments towards to the centre of the shelter floor. Four motifs were present in the shelter site. Motifs 1-2 were identified on a low part of back wall. Motif 1 was determined to likely be of Aboriginal origin and probably a partial charcoal in-filled macropod. The back, hind quarters and tail were clear but the front of the motif was faded due to white mineral salt staining. Motif 2 consisted of two animal legs or arms, possibly the front of Motif 1.

Two other motifs were located on an upper panel of the back wall and consisted of one red pigment, adult right hand stencil, and one orange pigment, adult left hand stencil. These appeared to be fresh and possibly of non-Indigenous origin.

A rocky platform located on the creek bed in front of the shelter was searched for axe grinding grooves; however no grinding grooves could be relocated. The rockshelter site was recorded as being in moderate condition, with human impacts noted, including the

presence of an old newspaper dated to 1979. The paper appeared to have survived 28 years in a relatively damp location and could still be read although it was fragmented and weathered. Water seepage was recorded as occurring in the east section of the shelter and occasionally towards the centre. Orange staining from iron oxide leaching and extensive white mineral salt staining was present throughout the shelter. Despite some disturbance from natural processes and human impacts, the site was assessed as having moderate research potential for subsurface deposit within the shelter floor.

This site includes duplicate recording WT05 (Woronora Pipeline PAD 3) Campbelltown (AHIMS 52-5-3657).

Site name: Woronora River;

AHIMS number: 52-2-0612

Site Woronora River consisted of a rockshelter site with art. The site was originally recorded by I. Sim, J.K and P. Price in November 1962 as 'Rock Shelter Site 8'. The site was recorded on the south bank of the Woronora River, approximately 15 metres above the river, at the eastern end of several large boulders. The shelter floor was relatively flat and even and measure nine squared metres, with no boulders present.

Fragments of charcoal figures were present at three locations along the rear wall, however these were mostly too faint to decipher. Two wallaby figures were recorded as very faint. Additional black and red line figures lower on the rear wall had been almost obliterated as a result of weathering and camp fire lit against the wall.

The shelter had been disturbed by human impacts, having been affected by graffiti and with rubbish across the shelter floor. Water seepage was present in places along the rear wall of the shelter.

4 Landscape context

The study area is located on the Woronora Plateau, a physiogeographic region of the Sydney Basin. The Sydney Basin is a large geological feature stretching from Batemans Bay in the south to Newcastle in the north and Lithgow in the west. The formation of the basin began between 250 to 300 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow (Clark and Jones 1991). By the Triassic period the basin consisted of a large coastal plain, with geological deposits from this period divided into three main groups: the Narrabeen Group, Hawkesbury Sandstone and the Wianamatta Group (Clark and Jones 1991, Pickett and Alder 1997).

The topography of the study area is characterised predominantly by the steep gradient of the Woronora River valley (Figure 4). Woronora River is a significance watercourse which crosses the study area from west to north to join the Georges River approximately nine kilometres north east of the study area. The smaller Prestons Creek tributary drains from the southeast to where it meets the Woronora River downstream of the current bridge crossing. The Heathcote Creek is present throughout Heathcote National Park and drains north, where it meets the Woronora River within the central portion of the study area. Within the study area, the creek runs parallel to the western slope of Heathcote Road. The majority of the study area is defined by the steep slopes of the gully. Two prominent ridgelines are present on the western side of the study area and culminate in high points at Melinda Molong Mountain to the northwest and Scouters Mountain to the southwest (Figure 4). The portions of the study area comprising the proposed compound areas are located across broad elevated ridgeline crest landforms.

The underlying geology of the study area comprises Hawkesbury Sandstone with shale lenses (Hawkesbury Sandstone Variant) capping the ridgetop beneath the Heathcote township (Figure 5). Hawkesbury Sandstone geology is characterised by fine to coarse grained quartzose sandstone with minor interbeds of siltstone/sandstone laminate, siltstone and claystone (Bowman, Stroud, Sherwin and Ray 1986: 36). The basal geology is overlain by the Hawkesbury, Falconbridge and Lucas soil landscapes (Figure 6). The Hawkesbury colluvial soil landscape covers the majority of the current study area and dominates the rolling to very steep hills with slope gradients between 20-70% that surround the Woronora River. The soil landscape is characterised by shallow discontinuous soils associated with rock outcropping and locally deep soils on the inside of benches, joints and fractures (Hazelton and Tille 1990:45). The Falconbridge residual soil landscape is located on the level to gently undulating broad crests and ridges of the plateau surfaces to the east and covers the south eastern portion of the study area. The soil landscape is characterised by shallow Earthy Sands and Yellow Earths and very shallow localised Siliceous Sands/Lithosols in association with rock outcrops (Hazelton and Tille 1990). The Lucas Heights residual soil landscape is located on gently undulating plateau surfaces and ridges with level to gently inclined slope gradients in the north western portion of the study area. The soil landscape is characterised by moderately deep Podzolic and Soloths on the ridges and plateau surfaces, Lateritic Podzolic Soils on crests and Yellow Earths on shoulders of plateaux and ridges (Hazelton and Tille 1990).

European settlement of the region occurred later than that on the Cumberland Plain due to a prevailing belief in the unsuitability of the area (Nugent 2005: 39). European interest in the local area began with construction of the South Road in the 1840's which was devised by the Surveyor-General Thomas Mitchell to provide a more direct route

between Sydney and the Illawarra (Jervis 1942: 361-2). The road followed the ridgetop at Barden Ridge before crossing the Woronora River at the Pass of Sabugal, which was named by Mitchell, and proceeding along Woronora Road and south along the Princes Highway (Jervis 1942: 361-2; Neve 2000: 4). The establishment of Bottle Forest (the modern suburb of Heathcote) also occurred at this time (Jervis 1942: 365).

The section of Heathcote Road between Holsworthy Military Reserve and Heathcote was constructed between 1940 and 1943 in order link Liverpool and the Sutherland Shire. The road was constructed to improve the ease of movement of troops and defence supplies to and from the Holsworthy Military Reserve. The new road was approximately 21 kilometres long and incorporated four new concrete bridges over Harris Creek, Williams Creek and Deadmans Creeks, as well as the Woronora River. Road construction required extensive clearing, cutting and filling, particularly on the ascent and descent from the Woronora River crossing located in the study area. The Heathcote Road Bridge over Woronora River was subsequently completed in 1941. Construction involved the utilisation of primarily steel and concrete materials to create the five span two lane reinforced concrete bridge.

The impacts and disturbance related to historic construction of the existing road and bridge are highly visible in the landscape. More recent land use disturbance immediately adjacent to the main portion of the study area is less visible and is generally restricted to the installation of utility corridors. The proposed compound areas comprise highly disturbed areas which have been stripped of vegetation and likely levelled. These areas have also been previously utilised as site compound areas. Areas of remnant native vegetation comprising Sydney Sandstone Gully Forest and Sydney Sandstone Ridgetop Woodland border the slopes of the study area. Sandstone Gully Forest native vegetation generally occurs in the lower steep slopes of sandstone gullies on the western side of the Woronora Plateau and is characterised by Sydney Red Gum, Red Bloodwood and Blackbutt tree species (National Parks and Wildlife Services 2002: 76). Sandstone Ridgetop woodland transitions from midslope to the ridgetop and plateaux and comprises Red Bloodwood, Scribbly Gum and Banksia species (National Parks and Wildlife Services 2002: 69).

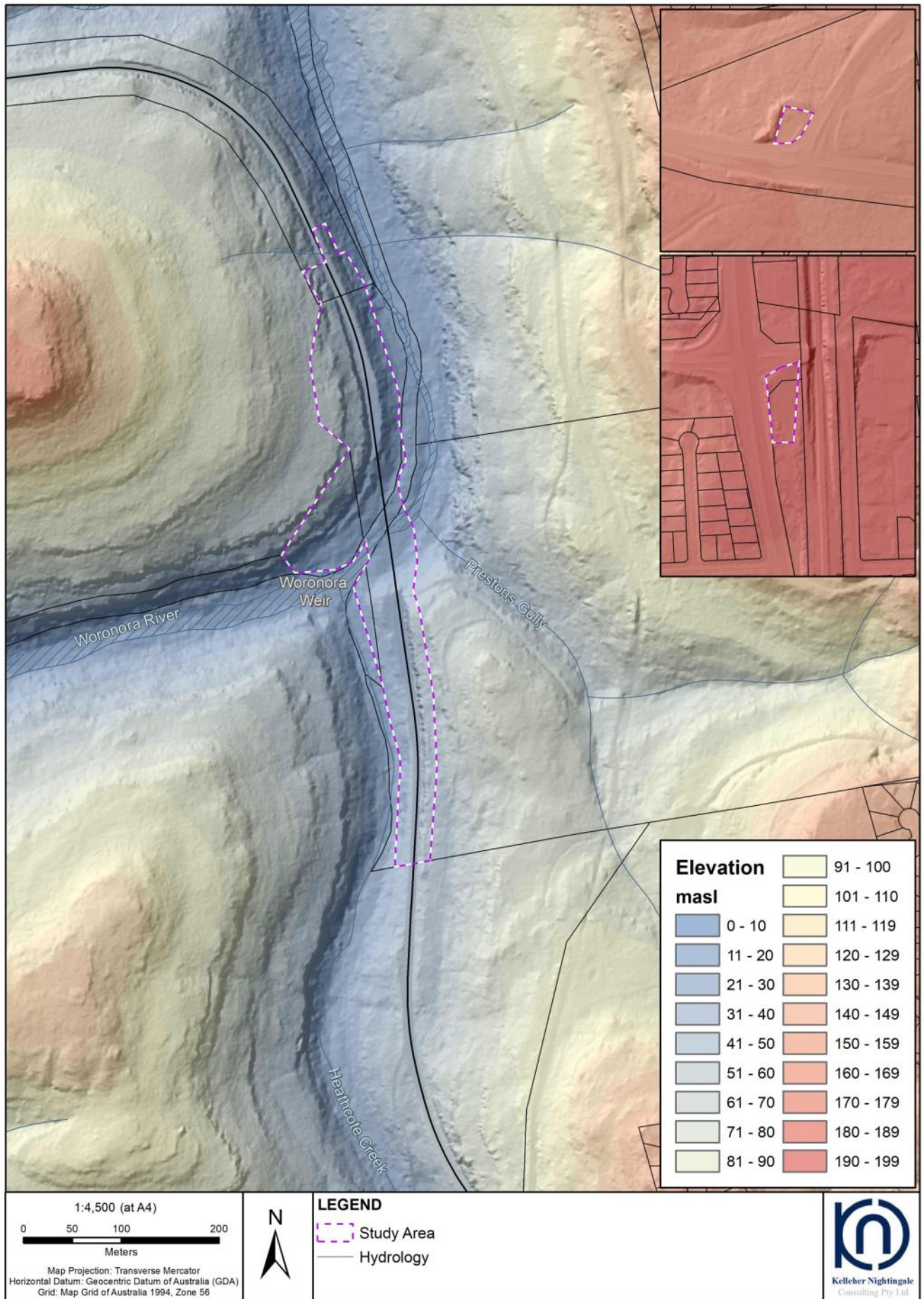


Figure 4. Topography of the study area



Figure 5. Geology landscapes of the study area

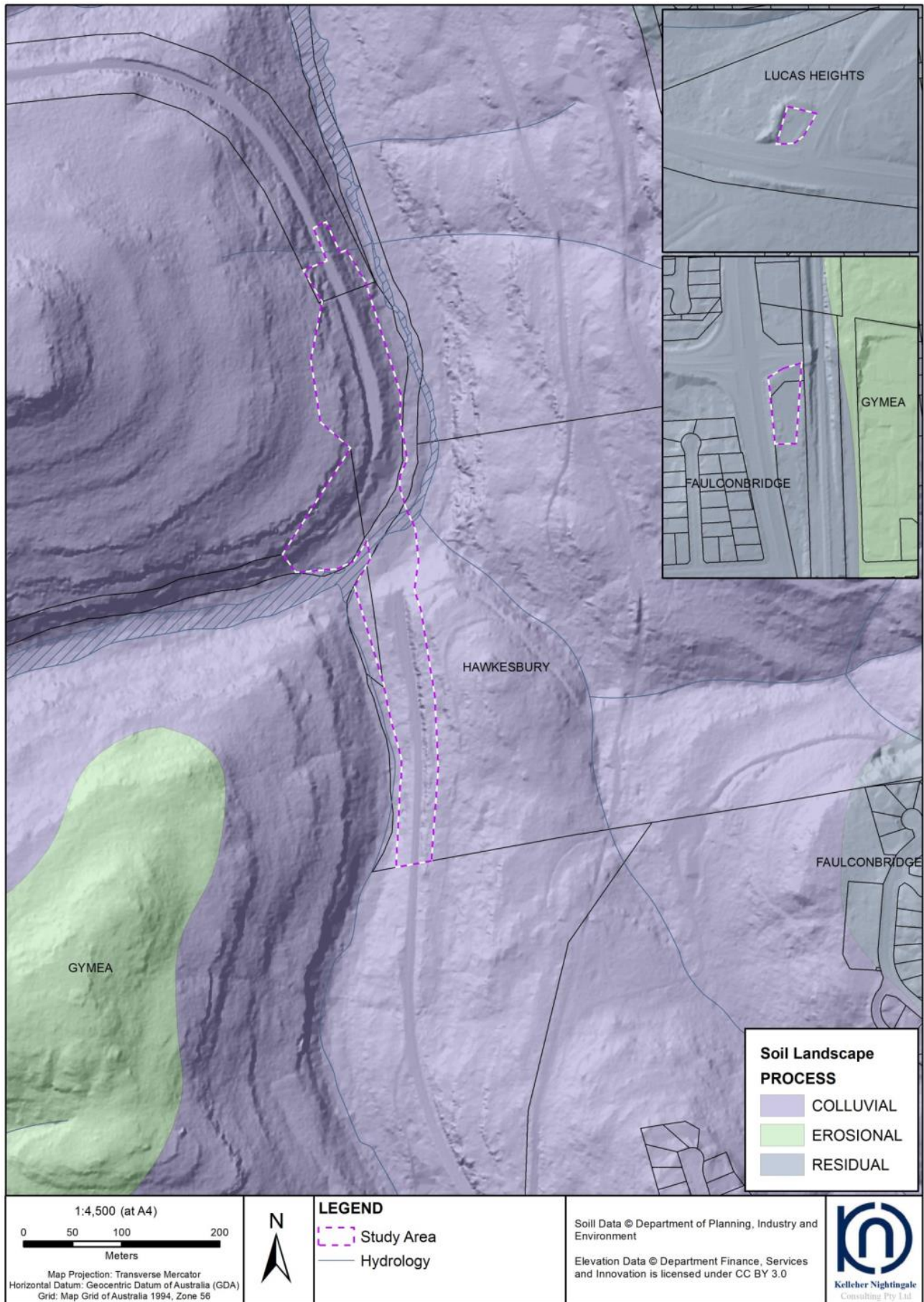


Figure 6. Soil landscapes of the study area

5 Regional character and site predictions

Previous archaeological investigations have provided data on site distribution, site typology and lithic raw material use that aids in assessing the archaeological character of the region. Site frequency and density can be related to key landscape factors including distance to water, landform, slope gradient, soil landscape and proximity to environmental resources. Additionally, historical land use practices and disturbance provide data that assists in formulating predictions of expected site types and distribution within the study area. Previous investigations undertaken throughout the region have typified that the distribution of archaeological material in the region around Heathcote Road focusses on a combination of suitable geology and low disturbance.

The underlying Hawkesbury sandstone geology of the area is conducive to the formation of rock shelters and this site type is the most commonly identified site type in the wider region. Shelters containing art, archaeological deposit or potential archaeological deposit are distributed across the slopes on both sides of Heathcote Road. Artefacts identified in archaeological deposits in the wider region are predominantly quartz and silcrete, however quartzite, chert and FGS artefacts have also been identified.

Preservation of archaeological deposit in open contexts (i.e. artefact scatters and isolated finds) is relatively rare in the region. This is partially due to environmental conditions unfavourable to their survival such as steep slopes and erosional soils, but may also relate to the general availability of rock shelters. Environmental contexts that would have been more favourable to preservation of open context sites include flat ridge tops and plateaux with more stable residual soil landscapes, however these areas were also the focus for initial European land use within the region and have a longer history of European disturbance. The Hawkesbury sandstone outcrops as benches and slabs which can provide flat or gently sloping surfaces suitable for engraving sites and grinding grooves. Grinding grooves are well represented among previously recorded sites in the wider region. Grinding grooves occur on suitable sandstone outcrops that also offer a source of water, whether within or adjacent to creeklines or due to seepage and collection on the rock surface after periods of rain.

Various resources that would have been valued by Aboriginal people are present within region, including various native plant and animal species, sources of fresh water, good views over the surrounding landscape from the ridgelines and spurs, exposed sandstone for grinding grooves and engravings, rock shelters suitable for use as campsites and elevated ridge corridors allowing for easier transit. Significant heritage values have also been identified within the Cubbitch Barta National Estate Area, with the listed heritage item present within the study area and further northwest.

Based on information from previous archaeological investigations, landscape context and regional character, site predictions for the study area include the following:

- Rock shelter sites are likely to occur where suitable overhangs have formed in the local sandstone bedrock. Overhangs are more likely to occur on the steeper slopes of a ridgeline, but may also form beneath outcrops in flat to gently sloping crest contexts.

- Shelters may contain engraved or painted art executed in charcoal or ochre, and may contain archaeological deposit where disturbance to the shelter floor has been limited and some depth of sediment exists.
- Open artefact scatters and/or isolated finds are less likely. Archaeological deposit is more likely to have been preserved in closed context rock shelter sites.
- Grinding grooves may exist on suitable sandstone outcroppings that occur in proximity to creeklines or collect water after rain.
- Clearance of original vegetation and increasing urbanisation along the ridgelines lessens the likelihood of identifying culturally modified trees, but old growth trees may be present in the more heavily vegetated parts of the study area and have the potential to display scars of Aboriginal origin.
- Archaeological sites are more likely to be identified in areas that have been subject to less intensive disturbance. Conversely, identification of open context sites may be aided by some measure of ground disturbance where this has increased the visibility and exposure of archaeological material.
- It can be expected that locally derived quartz and regionally available silcrete will be the most commonly encountered artefact raw materials.

6 Sampling strategy and field methods

The aim of the archaeological survey was to conduct a full coverage, pedestrian survey of the study area and to record any Aboriginal archaeological objects, sites or areas with potential to contain Aboriginal objects. The study area was arbitrarily divided into two survey units based on landform and features of the physical environment (Figure 7). Each survey unit was photographed and an assessment made of archaeological potential based on the location of previously identified sites, landform and disturbance.

Survey Unit 1 comprised the western and eastern sides of Heathcote Road on the southern approach to the Heathcote Road Bridge over Woronora River. The survey unit comprised the steep slopes descending generally north towards the riverbank landform and weed covered sandbar. Disturbance was present in the form of former sandstone rubble embankments, culverts and an overgrown former access road. Landforms within Survey Unit 1 consisted of slope, riverbank and open depression.

Survey Unit 2 comprised the western and eastern sides of Heathcote Road on the northern approach to Heathcote River Bridge over Woronora River. The survey unit included a steep slope embankment dropping to the Woronora River below. Disturbance within the survey unit comprised former road and bridge construction, guard rails and evidence of utilities installation. The survey unit was entirely comprised of slope landform.

Based on the archaeological background and landform context of the study area, the survey team closely inspected areas of outcropping sandstone for rock engravings and grinding grooves, while overhangs and shelters were inspected for the presence of art and/or archaeological deposit.

Archaeological surveys were conducted on 25 May 2020 & 17 August 2020. The survey team comprised Mark Rawson (KNC), Darren Duncan (GLALC), Joseph Fanous (TfNSW) and Cameron Jordan (TfNSW).

The survey team were equipped with high resolution aerial photography and topographic maps showing the study area, proposed work locations, and the location of previously recorded Aboriginal archaeological sites. A non-differential GPS receiver was used for spatial recordings. All GPS recordings were made using the Geocentric Datum of Australia (GDA) coordinate system. Detailed notes on the condition of the survey unit were compiled by the survey team including an assessment of surface visibility, vegetation coverage, and disturbance.

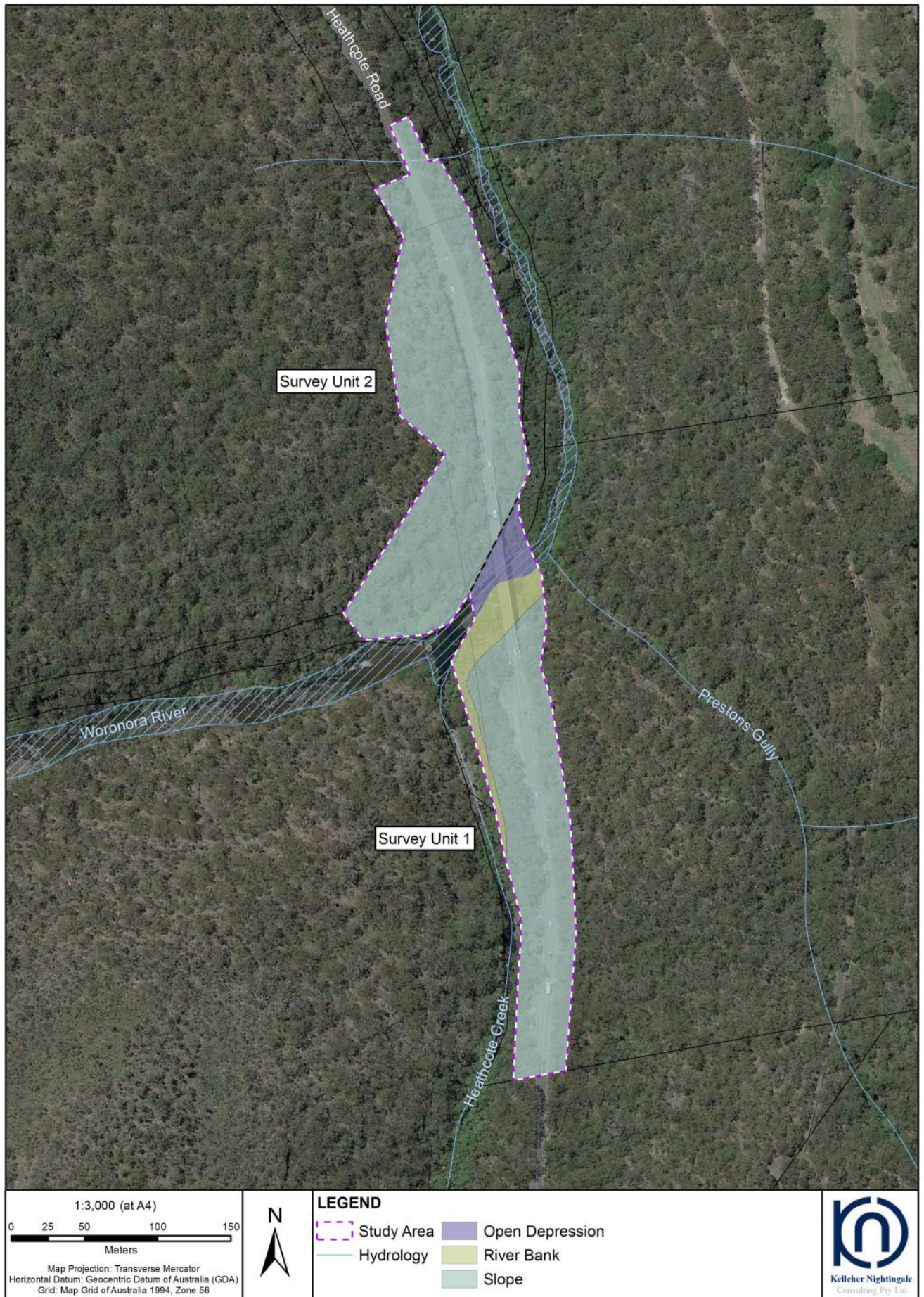


Figure 7. Survey units and landform

7 Survey results

One previously recorded Aboriginal archaeological site Scouters Mountain Engadine (AHIMS 52-2-0742) was identified in the study area as a result of archaeological survey. The results of the survey are shown in Figure 8 and described below.

7.1 Previously recorded site within the study area

Site Name: Scouters Mountain Engadine

AHIMS ID: 52-2-0742

Coordinates (GDA94): [REDACTED]

Landform Context: Slope

Scouters Mountain Engadine comprised a closed context rockshelter site with art. The original site card recording offers limited information regarding the original identification and recording of the site. The art comprises a hand stencil in very even red stain, likely done with brush and a stick figure, also in red stain, depicting a person in a running motion throwing a spear from the left hand. The site card noted that both figures are unusual and do not appear to be of Aboriginal origin. A “line” motif has also been drawn on the site plan and included in the site card recording. The three motifs (two of which are thought not to be of Aboriginal origin) were recorded in a rockshelter measuring approximately five metres in length, with a maximum depth of two metres.

The site was revisited and assessed as part of archaeological assessment undertaken for geotechnical borehole works related to the current project.

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Figure 8. Survey results – identified Aboriginal archaeological site

7.2 Survey coverage

Archaeological field survey was undertaken over two days (25 May 2020 & 17 August 2020). Two proposed compound areas located on the corner of the Princes Highway and Wilson Parade intersection, Heathcote and on the north-west corner of the Heathcote Road and New Illawarra Road intersection, Lucas Height have been assessed. These areas exhibit high levels of landscape disturbance associated with recent and former use as compound site locations. No Aboriginal archaeological sites or archaeological potential exists at these locations.

Survey Unit 1 comprised both sides of Heathcote Road on the southern approach to the Heathcote Road Bridge over Woronora River. The majority of the survey unit was covered in overgrown weeds and dense native bushland, particularly across the steep sloping embankment descending towards the river. An access track present on the western side of the bridge, leading down to the river had become heavily overgrown. Limited surface exposures present along the overgrown track were inspected for any evidence of Aboriginal objects; however none were identified. At the bridge crossing the river valley was steeply sided and featured vertical sandstone escarpments, benches, overhangs, and large boulders. A large sandbar over sandstone bedrock was present along the edges of the Woronora River which had become obscured by weeds and flood debris. Large amounts of debris, bent over vegetation, and weed covered sandbars indicated periodic large scale flash flooding in this area.



Plate 5. View to north, south of Heathcote Road Bridge over Woronora River. Note limited surface visibility due to dense vegetation and weed covered sandbars.



Plate 6. Facing south on the south western side of bridge. Note disturbed embankment between Heathcote Road and Heathcote Creek.

The exposed portions of the riverbed contained large flat sandstone platforms, boulders, rock pools and vegetated sandbars. Survey coverage of obtrusive sandstone exposures was good and generally only limited by leaf litter and encroaching vegetation at platform margins. Suitable rock platforms were inspected for any evidence of grinding grooves or rock engraving sites. None were identified within Survey Unit 1.

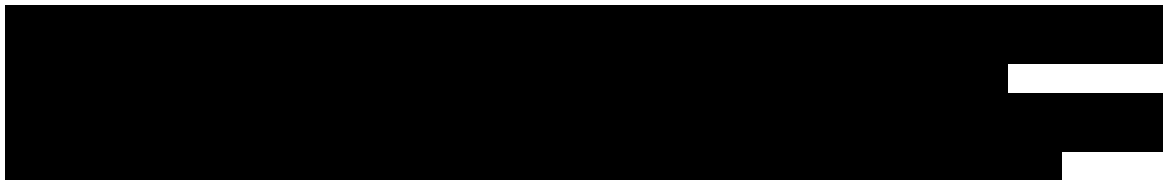


Plate 7. View south on western side of Heathcote Road. Photo demonstrates overgrown former access road.



Plate 8. View south of bridge. Photo displays the top of embankment and access track. Note poor visibility and existing disturbance from previous road construction.

Ground surface visibility was low on the limited amount of exposures present as a result of the increased vegetation. Rockshelters were present in areas where the underlying sandstone had weathered to form overhangs. Overhangs were generally small with walls not suited to the creation or preservation of art and floors without sediment depth.



Historic and contemporary land use disturbance was observed across Survey Unit 1 and contributed to the overall low archaeological potential of the study area in Survey Unit 1. Disturbance present was primarily related to the construction of the former and existing road bridges over Woronora River. A disturbed sandstone embankment and old culverts were also observed during the inspection. The southern bridge abutments were steep with disturbed slopes of sandstone boulder scree from construction of Heathcote Road, and no potential for overhangs. The majority of the study area within Survey Unit 1 was found to exhibit low archaeological potential.



Plate 9. Facing south, beneath bridge. Note rocky slopes on northern side of river, these have been disturbed by previous road and bridge construction.



Plate 10. Example of good exposure on sandstone outcropping bordering the Woronora River, with dense vegetation also present.

Survey Unit 2 comprised the northern approach to Heathcote Road Bridge over Woronora River and adjacent land on both sides of Heathcote Road. The northern side of the river contained a steep escarpment and fall to the river below. Northern bridge abutments were disturbed, with rocky steep slopes present. No potential for rockshelter sites within the proposed upgrade corridor within Survey Unit 2 were identified. Any flat outcropping sandstone exposures or riverbed sandstone exposures were closely inspected for any evidence of Aboriginal sites; however none were identified.



Plate 11. Photo of bridge abutment flat sandstone exposures present in riverbed.



Plate 12. View to south, north of bridge on eastern side. Note existing disturbance related to road construction and fibre optic cabling.

Survey immediately adjacent to the road corridor was also undertaken. Existing disturbance was observed within proximity to the road and was related to former road construction, guard rail construction and the installation of a fibre optic easement. No Aboriginal archaeological sites or areas of archaeological potential were identified within Survey Unit 2.

In summary, one previously registered Aboriginal site, Scouters Mountain Engadine was identified in the south western portion of the study area. The majority of the study area either did not contain suitable landscape features for sites to occur, or had been disturbed by natural erosional processes, previous flood events and previous construction and upgrade works related to the construction of Heathcote Road and the existing Heathcote Road Bridge over Woronora River.

7.3 Survey coverage analysis

Surface exposure varied considerably within the survey area and was dependant on vegetation density, natural processes such as erosion and modern land use disturbance. Surface exposure across the study area also varied between landforms. Visibility and exposure on the slopes was generally very low and visibility within surface exposures was low. Increased exposure and visibility was present across the riverbank and open depression landforms bordering the Woronora River; with sandstone outcrops offering moderate levels of exposure and good visibility. Details of survey and landform coverage are outlined in Tables 5 and 6 below.

Table 3. Survey coverage

Survey Unit	Landform	Area (m ²)	Visibility (%)	Exposure (%)	Effective Coverage (m ²)	Effective Coverage (%)
1	Slope	13285	30	30	1196	9
1	Riverbank	2475	40	60	594	24
1	Open Depression	1370	40	60	329	24
2	Slope	22645	20	30	1359	6

Table 4. Landform coverage

Landform	Area (m ²)	Area Effectively Surveyed (m ²)	% of Landform Effectively Surveyed	# of Sites
Slope	35930	2555	7	1
Riverbank	2475	594	24	0
Open Depression	1370	329	24	0

8 Analysis and discussion

Background research, AHIMS records and archaeological field survey identified one previously registered Aboriginal site, Scouters Mountain Engadine (AHIMS 52-2-0742) within the study area [REDACTED]

[REDACTED] The underlying Hawkesbury sandstone geology is conducive to the formation of rock shelters and this site type is the most commonly identified site type in the wider region.

The archaeological field survey found that overall ground surface visibility and exposure was low due to extensive dense vegetation and current land use; however, the low visibility did not significantly impede the moderate visibility of sandstone platforms, overhangs or shelters and the archaeological sensitivity of the study area could be assessed based on topographic location, geology and visible subsurface disturbance.

The survey found that the majority of the study area contained low potential for subsurface archaeology due to natural erosional processes, impacts from previous flood events and ground surface disturbance from modern land use practices including the construction of the existing Heathcote Road Bridge and road and the installation of utilities.

8.1 Aboriginal settlement history of the study area

The physical evidence of Aboriginal landscape use in the area predominantly consists of shelter sites containing art, deposit and PAD, rock engraving sites and grinding groove sites. Environmental resources that would have been valued by Aboriginal people are present in the region, including various native plant and animal species, sources of fresh water, good views over the surrounding countryside from the ridgelines and spurs, exposed sandstone for grinding grooves and engravings, rock shelters suitable for use as campsites and elevated ridge corridors allowing for easier transit. Within the study area, one Aboriginal archaeological site has been identified.

The site Scouters Mountain Engadine consists of a rockshelter with art. The site has been subject to disturbance from erosion, as well as human impacts such as graffiti and recent use. Despite this, the site is of moderate-high archaeological significance. Rockshelter sites containing art are of significance to the contemporary Aboriginal community and are considered to be of high cultural value as they represent a tangible expression of Aboriginal culture.

The archaeological evidence indicates that the Woronora River, its steep valley and ridgeline plateaux were focal points for intensive Aboriginal occupation due to the resources available. Elevated and enclosed rockshelters adjacent to Woronora River and its tributaries are likely to have functioned as camp sites from which past Aboriginal people could have exploited these resources

Significance assessment

One of the primary steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984; Pearson and Sullivan 1995:7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan

and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long term outcomes for future generations as the nature of what is conserved and why, also changes over time.

The assessment of significance is a key step in the process of impact assessment for a proposed activity as the significance or value of an object, site or place will be reflected in resultant recommendations for conservation, management or mitigation.

The Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (OEH 2010a) requires significance assessment according to criteria established in the Australia ICOMOS Burra Charter, 1999 (Australia ICOMOS 1999). The Burra Charter and its accompanying guidelines are considered best practice standard for cultural heritage management, specifically conservation, in Australia. Guidelines to the Burra Charter set out four criteria for the assessment of cultural significance:

- Aesthetic value - relates to the sense of the beauty of a place, object, site or item
- Historic value - relates to the association of a place, object, site or item with historical events, people, activities or periods
- Scientific value - scientific (or research) value relates to the importance of the data available for a place, object, site or item, based on its rarity, quality or representativeness, as well as on the degree to which the place (object, site or item) may contribute further substantial information
- Social value - relates to the qualities for which a place, object, site or item has become a focus of spiritual, political, national or other cultural sentiment to a group of people. In accordance with the OEH Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW, the social or cultural value of a place (object, site or item) may be related to spiritual, traditional, historical or contemporary associations. According to OEH, “social or cultural value can only be identified through consultation with Aboriginal people” (OEH 2011:8).

One Aboriginal archaeological site was identified within the study area. The significance assessment (archaeological survey) for the identified archaeological site has focussed on the scientific significance of Aboriginal heritage values as identified in the Burra Charter.

Scientific Values

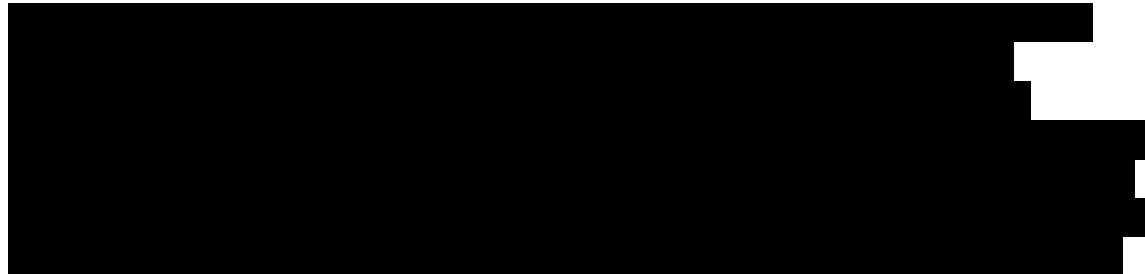
Scientific value has been assessed for the identified Aboriginal archaeological site within the study area. This value has been developed based on significance criteria of research potential (including integrity/condition, complexity and archaeological potential), representativeness and rarity. The identified archaeological site in the study area displayed moderate to high scientific significance.

High significance is usually attributed to sites which are so rare or unique that the loss of the site would affect our ability to understand an aspect of past Aboriginal use/occupation of an area. In some cases a site may be considered highly significant because it is now rare due to destruction of the archaeological record through development. Sites with moderate significance are those that offer the potential to yield information that will contribute to the growing holistic understanding of the Aboriginal cultural landscape of the region. Archaeological investigation of moderately significant sites will contribute knowledge regarding site type interrelationships, cultural use of landscape features and occupation patterns, especially in relation to the identified environmental factors influencing site formation and preservation in the region. Sites of

low significance are those that do not offer this potential and are unlikely to provide any further scientifically valuable information.

8.2 Statements of significance

Background research and survey identified one previously recorded Aboriginal archaeological site (Scouters Mountain Engadine) within the study area. A statement of significance has been developed based on background research and the current archaeological assessment (field survey). The statement of significance is presented below.



Sites of this type are also significant to contemporary Aboriginal people and are considered to be of high cultural value as they represent a tangible expression of Aboriginal culture. Based on the intactness of information, representativeness, and research potential of the site, Scouter Mountain Engadine was determined to have *moderate-high archaeological significance*.

Table 5. Identified Aboriginal archaeological site and significance assessment

Site	AHIMS ID	Assessed Significance
Scouters Mountain Engadine	52-2-0742	Moderate-High

9 Impact assessment

Transport for NSW (TfNSW) propose to widen Heathcote Road Bridge over Woronora River (also referred to as Narrow Bridge No. 152) on Heathcote Road. The proposal is located along the A6 section of Heathcote Road corridor which is a section between New Illawarra Road, Lucas Heights and Princes Highway, Heathcote. The proposal includes widening of the bridge by 1.2 metres on each side to provide one wide through lane in each direction with a shoulder. The proposal will also involve widening of the northern and southern bridge approaches for about 250 metres either side to improve alignment and provide safer lane widths on approach to the bridge. Additional repair and maintenance works to the bridge are also included within the scope of works. Two compound sites located on the corner of Princes Highway and Wilson Parade intersection, Heathcote and on the north-west corner of Heathcote Road and New Illawarra Road intersection, Lucas Height have also been nominated.

One Aboriginal archaeological site Scouters Mountain Engadine (AHIMS 52-2-0742) has been identified within the study area (Table 6). The site consisted of a previously registered closed context rockshelter with art.

Best practice is to avoid all impact to Aboriginal archaeological sites. Coordinates of the rock shelter boundary were plotted onto the design and a five metre buffer area added to form an exclusion zone, as shown in Figure 9 (also Appendix C). By adopting this exclusion zone, the proposal avoids impact to Scouters Mountain Engadine, and avoids the trigger to obtain an AHIP.

Any change during detailed design which would cause encroachment into this exclusion zone would trigger the need for further assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and TfNSW PACHCI would be required, and if impact cannot be avoided, an AHIP must be obtained prior to any impact.

The potential for indirect vibration risk is considered low. Any potential risk for indirect vibration impacts can be adequately managed through vibration management plan prepared by an appropriately qualified specialist including established vibration criteria and appropriate stop-work warning systems.

Table 6. Impact assessment for identified Aboriginal archaeological site

Site Name	AHIMS ID	Impact Assessment
Scouters Mountain Engadine	52-2-0742	Impact can be avoided with the exclusion zone

[This figure has been deliberately omitted from the public version report]

Figure 9 – Adopted exclusion zone around Scouters Mountain Engadine

Cubbitch Barta National Estate Area Commonwealth Heritage List (Place ID 105405)

The Cubbitch Barta National Estate Area heritage place (Place ID. 105405) has been identified within the study area. The heritage place was listed in part for its Indigenous values. These values relate to archaeological, symbolic, cultural, educational and social associations. Primarily, the Cubbitch Barta National Estate Area heritage place is of cultural significance due to the presence of over 500 Aboriginal archaeological sites

within the Holsworthy Military Training Area. This large collection of sites represents a complex Aboriginal cultural landscape of significance to the nominee, the Tharawal Local Aboriginal Land Council and the Dharawal People. The Aboriginal sites located within the Cubbitch Barta National Estate Area are of particular significance as they have largely been preserved in good condition due to the historic land use of the site as a military training area.

The current study area covers a portion of the listed Cubbitch Barta National Estate heritage place (see Figure 8). This portion of the Cubbitch Barta National Estate heritage place will be at least partially impacted by the proposed works discussed in Chapter 2.

No previously recorded or registered AHIMS sites or PAD areas associated with the listing have been recorded within the study area; nor will they be impacted by the proposal. Aboriginal archaeological assessment undertaken for the current project has confirmed that no previously unrecorded Aboriginal archaeological sites or areas of archaeological potential are located within the Cubbitch Barta National Estate Area.

The portion of the heritage place located within the current study area has been subject to some level of historic land use disturbance, primarily related to existing road and bridge construction. In addition to this, Aboriginal archaeological sites located within or within close proximity to the current study area which comprise some of the same site types as those within the heritage listed place, have all demonstrated land use disturbance related to human impacts.

Natural landscapes which are tied to cultural values will be at least partially impacted by the proposal.

As no Aboriginal archaeological sites or areas of archaeological potential have been identified within this portion of the heritage place and the area has been subject to previous land use disturbance, the current assessment has identified that the proposed works will have a minor impact on the Indigenous values identified in the heritage listing's Statement of Significance.

Best practice is to avoid impact to the Cubbitch Barta National Estate Area. Future design for the project should take the location of the identified heritage place into consideration and avoid impact where possible. If impacts to the Cubbitch Barta National Estate Area cannot be avoided, further consultation with Tharawal Local Aboriginal Land Council and the contemporary Aboriginal community should be undertaken.

10 Legislative considerations

The National Parks and Wildlife Act 1974 (NPW Act) is the primary statutory control dealing with Aboriginal heritage in New South Wales. Items of Aboriginal heritage (Aboriginal objects) or Aboriginal places (declared under section 84) are protected and regulated under the Act.

Under the Act, an “Aboriginal object” is defined as “any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains”. As such, Aboriginal objects are confined to physical evidence and are commonly referred to as Aboriginal sites.

Aboriginal objects are protected under section 86 of the Act. It is an offence to harm or desecrate an Aboriginal object, either knowingly [section 86 (1)] or unknowingly [section 86 (2)].

There are offences and penalties relating to harm to, or desecration of, an Aboriginal object or declared Aboriginal place. Harm includes to destroy, deface, damage or move. Penalties are tiered according to offences, which include:

- a person must not harm or desecrate an Aboriginal object that the person knows is an Aboriginal object;
- a person must not harm or desecrate an Aboriginal object (strict liability offence);
- a person must not harm or desecrate an Aboriginal place (strict liability offence);
- failure to notify Office of Environment and Heritage of the location of an Aboriginal object (existing offence and penalty); and
- contravention of any condition of an Aboriginal Heritage Impact Permit.

Under section 87 (1) it is a defence if “(a) the harm or desecration concerned was authorised by an Aboriginal heritage impact permit, and (b) the conditions to which that Aboriginal heritage impact permit was subject were not contravened”

Section 87 (2) of the Act provides a defence against prosecution under section 86 (2) if “the defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed”.

Under section 90 (1) of the Act “the Director-General may issue an Aboriginal heritage impact permit”. The regulation of Aboriginal heritage impact permits is provided in Part 6 Division 2 of the Act, including regulations relating to consultation (section 90N).

An Aboriginal Heritage Impact Permit (AHIP) is required for an activity which will harm an Aboriginal object.

11 Management and recommendations

Background research and archaeological survey identified one previously registered Aboriginal archaeological site comprising Aboriginal objects, Scouters Mountain Engadine (AHIMS 52-2-0742), within the study area. No newly recorded Aboriginal archaeological sites were identified as a result of archaeological survey. Outside of the identified Aboriginal site, the remainder of the study area displays low archaeological potential, primarily as a result of disturbance from historic and contemporary land use practices and natural processes related to fluvial activity.

The portion of the Cubbitch Barta National Estate Area impacted by the proposal does not contain Aboriginal objects and some disturbance exists within the general landscape. For these reason the impact to the Cubbitch Barta National Estate Area has been assessed as minor and does not affect the values of the heritage listing. No further heritage assessment is warranted, however if the estate area cannot be avoided, consultation with the Tharawal Local Aboriginal Land Council should be undertaken.

Based on a study area wide impact assessment, impact to Scouters Mountain Engadine (AHIMS 52-2-0742) can be avoided with the adopted exclusion zone (Figure 9) thereby avoiding the need to obtain an AHIP. Any change during detailed design which would cause encroachment into this exclusion zone would trigger the need for further assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and TfNSW PACHCI would be required. In that instance, an AHIP would be required prior to any impact to Aboriginal heritage.

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Appendix A Aboriginal Stakeholder cultural heritage survey report

[This appendix has been deliberately omitted from the public version report]

Appendix B AHIMS Basic and Extensive Search Results

[This appendix has been deliberately omitted from the public version report]

Appendix C Map of the adopted Exclusion Zone around Scouters Mountain Engadine

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