27 April 2018

April Hudson
Environmental Scientist
Cardno
Ground Floor, 16 Burelli Street
Wollongong NSW 2500

Dear April,

## Re: Aboriginal due diligence advice: Backsaddle Planning Proposal, Kiama NSW

**Our Ref: Matter 26813**

Biosis Pty Ltd has been commissioned by April Hudson (Cardno) to provide Aboriginal due diligence advice for the proposed Backsaddle Planning Proposal, Kiama NSW at Lots 156, 183, 185, 186, 188 and 189 DP 751279, Lot 99 DP 1042908, Lot 1320 DP 1060995, Lot 199 DP 1042913, Lot 300 DP 1059841, Lot 1 DP 1178500, Lot 1 DP 1003719 and Lot 1 DP 995058 (Figure 1 and Figure 2). The project involves the following intentions as part of the preliminary structure plan of the study area:

- Retain the existing land in Zones E2 Environmental Conservation and E3 Environmental Management (see Figure 4-2) and existing Biodiversity Layer (see Figure 4-3).
- Create large lot residential land to the north to provide a buffer to the interface between rural and low density residential lots.
- Enhance the existing public park and create a Neighbourhood Hub adjacent to the park suitable for small shops, child care centre and a small community meeting space.
- Identify land suitable for a senior's housing development within land to be zoned for low density residential purposes.
- Create an asset protection zone to the western perimeter of the site that includes a perimeter public road and also creates a buffer to adjoining rural lands.
- Create new pathways linking to the existing pathway network to the east including a pathway along Greyleigh Drive and possible pathway along an area of riparian vegetation.

The purpose of this advice is to assist the client in exercising due diligence in determining whether the project will involve activities that may harm Aboriginal objects and to determine whether consent in the form of an Aboriginal Heritage Impact Permit (AHIP) is required.

The *National Parks and Wildlife Act 1974* (NPW Act) provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. Harm is defined to mean destroying, defacing, damaging or moving an object from the land. There are a number of defences and exemptions to the offence of harming an Aboriginal object or place. The NPW Act states that a person or organisation who

exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution for the strict liability offence of unknowingly harming an object without an AHIP.

The NPW Act allowed for a generic code of practice to explain what due diligence means. As a result, the National Parks and Wildlife Regulation 2009 (NPW Regulation) adopted the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) ('the code'). The code sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

- Identify whether or not Aboriginal objects are, or are likely to be, present in an area.
- Determine whether or not their activities are likely to harm Aboriginal objects (if present).
- Determine whether an AHIP application is required.

This advice follows the code and includes a background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) ('the Code') was conducted, in order adequately map areas of high, moderate and low archaeological sensitivity. It is useful to determine whether the Code is applicable to the proposed project. The Code outlines a series of questions to clarify this, responses to these questions are outlined in Table 1.

**Table 1 Questions required to detemine the applicabiltiy of the code**

| Question | Response |
|---|---|
| **Is the activity a declared project under Part 3A of the EP&A Act?** | No |
| **Is the activity an exempt activity listed in the National Parks and Wildlife Act or other legislation?** | No |
| **Will the activity involve harm that is trivial or negligible?** | No |
| **Is the activity in an Aboriginal Place or are you already aware of Aboriginal objects on the land?** | No |
| **Is the activity a low impact activity for which there is a defence in the Regulation?** | No |
| **Do you want to use an industry specific code of practice?** | No |
| **Do you wish to follow your own procedure?** | No |

As none of the above questions apply to the project, due diligence must be established through using the code. The code consist of a series of five steps outlined below.

## Step 1: Will the activity disturb the ground surface or any culturally modified trees?

The proposed works include residential development, creation of a residential hub with shops, a retirement home and construction of pathways, roads and associated amenities.

These activities will disturb the ground surface and/or any culturally modified trees and therefore consideration of Steps 2a and 2b of the code is required.

## Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware

An extensive search of the AHIMS database was conducted on 17 April 2018 (Client service ID: 339645). The search identified 11 Aboriginal archaeological sites within a 5 kilometre search area, centred on the proposed study area (Appendix 3). None of these registered sites are located *within* the study area (Figure 3). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

**Table 2 AHIMS Sites within the vicinity of the study area**

| Site type | Occurrences | Frequency (%) |
|---|---|---|
| **Artefact** | 3 | 27.3 |
| **Burial** | 1 | 9.1 |
| **Modified tree (carved or scarred)** | 1 | 9.1 |
| **Potential Archaeological Deposit (PAD)** | 5 | 45.5 |
| **Shell, artefact** | 1 | 9.1 |
| **Total** | 11 | 100 |

A simple analysis of the Aboriginal cultural heritage sites registered within 5 kilometres of the study area indicates that the dominant site type is PAD sites representing 45.5 % (n=5) followed by artefact sites at 27.3% (n=3) (Table 2). Burials, modified trees and a shell and artefact combined site were also each recorded in the region once, accounting for 9.1% of sites (Table 2).

A review of the reports held by AHIMS identified several archaeological studies have been undertaken within the locality of the study area. These include:

**Archaeological assessment of Aboriginal and historical sites on the proposed north Kiama by-pass between Dunmore and Bombo, Kiama NSW (Silcox, 1990)**

Connell Wagner Pty Ltd commissioned Silcox to undertake an archaeological survey to identify and assess the significance of any Aboriginal or European sites that would be affected by the corridor of the north Kiama by-pass. The survey identified four Aboriginal sites, three of which had been previously identified (52-5-0253, 52-5-0251 and 52-5-0072) and one new site. 52-5-0253 consisted of 15 artefacts located in a spoil heap from an animal burial, 52-5-0251 contained 5 artefacts and 2 shell fragments, while 52-5-0072 was recorded but not described in the report. The new site (KB1) consisted of a sparse scatter of shell fragments and two stone artefacts that covered an area of 10 metres by 10 metres. The site was located on the eastern side of a sand mine directly opposite 52-5-0072.

The survey also resulted in the identification of two potential campsite locations (KBx and KBy). KBx consisted of a terrace surface in the vicinity of 52-5-0253, while KBy involved a low ridge further south. Due to poor surface visibility no artefacts were evident and the existence of the campsites could only be established through test excavation. Silcox recommended that no further archaeological investigations

were needed for 52-5-0251, an AHIP for a consent to destroy be obtained for KB1, and limited test excavations be carried out at the campsite locations.

**An archaeological assessment of optical fibre route from Kiama to Jamberoo, South Coast New South Wales (Hamm 1993)**

In 1993 Giles Hamm was commissioned by Telecom Australia to undergo a heritage assessment for their proposed installation of an optical fibre cable between Kiama and Jamberoo. Hamm identified that the most likely site type to occur in the study area was small stone artefact scatters located in undisturbed land or scarret trees. A survey was carried out on the 17 September 1993 with Mr Jim Davis of the Illawarra Local Aboriginal Land Council. No Aboriginal sites were located along the proposed route. The lack of sites was attributed to previous disturbances from farming and road construction which would have removed any sites. It was recommended that Telecom Australia proceed with their project, with no further archaeological investigation. Two creek crossings at Spring Creek and Jerrara Creek, however, were recommended to be monitored by the Jima Davis.

**Cedar Grove Estate, Kiama: Archaeological survey (Saunders 2004)**

As part of a Statement of Environmental Effects, Saunders was commissioned to undertake an archaeological assessment for a residential development at Cedar Grove Estate, Jamberoo Road, located less than a kilometre north of the current study area. Saunders study area was located on low to medium gradient slopes of a broad spur crest between Spring Creek and Willow Gully Creek. The assessment included background research and a field survey; however no Aboriginal archaeological sites, European historical sites or areas of Aboriginal archaeological potential were located within the study area. Saunders concluded that the study area contained low archaeological potential on basal slopes with occupation likely focused around the Jamberoo lagoon to the north or the coast to the east. The low gradient basal slope/crest was noted as possibly having moderate archaeological potential however construction, landscaping and domestic use would have destroyed or severely disturbed any sites. Saunders recommended that no further archaeological investigation was required in the study area.

**Kiama to Jerrara 33kV Feeder 7007 (NOHC 2007)**

Navin Officer Heritage Consultants undertook a cultural heritage assessment of a four kilometre long 33kV Feeder 7007 which runs from the Kiama Zone Substation to the Jerrara Switching Station to the north of the current study area. There were relatively high levels of disturbance along the route and no Aboriginal sites or areas of archaeological potential were identified during the course of the survey of the line. The route of Feeder 7007 was considered to have low Aboriginal archaeological potential.

**Archaeological survey for Aboriginal sites at the proposed Broughton landfill extension, South Coast, NSW (Navin 1998)**

Navin conducted an archaeological survey of approximately 15 hectares of land located one and a half kilometres inland from the coastline at Kiama, at the foothills of the Illawarra Range. The study area consisted of a descending ridgeline from Saddleback Mountain on a southwest-northeast orientation, which formed the watershed between Spring Creek and the coastal catchment of the immediate Kiama hinterland. The gradients within the study area were relatively low and were situated on spur and ridgeline crests, and upper slopes. The survey resulted in the location of one isolated find, a single stone artefact, and one area of archaeological potential.

**Gerroa Sand Mine Extension, Aboriginal Cultural Heritage Review (NOHC 2005)**

Navin Officer Heritage Consultants conducted an archaeological assessment of the proposed Gerroa Sand Mine Extension area. The surface survey of the area identified one new Aboriginal archaeological site (52-2-0452) and a number of surface expressions of shell midden material. Those areas that remain undisturbed were considered to be of moderate to high archaeological significance, including previously identified conservation areas A and B. Further archaeological investigations were recommended.

**Gerringong Gerroa Sewerage Scheme Archaeological Salvage Program (NOHC 2006)**

Navin Officer Heritage Consultants completed an Aboriginal archaeological subsurface testing program of areas of identified Aboriginal archaeological potential between foxground and Gerroa, to determine the presence and extent of cultural material. The excavations resulted in the identification of five areas that contained cultural material, comprising pieces of shell and stone tools. It was recommended that these areas are salvaged prior to the commencement of sand extraction.

## Step 2b. Activities in areas where landscape features indicate the presence of Aboriginal objects

In order to determine whether the activity is within landscape features likely to contain Aboriginal objects a review of information pertaining to ethnohistories, soils, geology, landform, disturbance and potential resources has been undertaken.

### Ethnohistory

It is generally accepted that Aboriginal peoples have inhabited Australia for the last 50,000 years (Allen and O'Connell 2003). Despite a proliferation of known Indigenous sites there is considerable ongoing debate about the nature, territory and range of pre-contact Indigenous language groups in the Illawarra region. These debates have arisen largely due to the lack of ethnographic and linguistic information recorded at the time of European contact. By the time colonial diarists, missionaries and proto-anthropologists began making detailed records of Indigenous people in the late 19th Century, pre-European Indigenous groups had been broken up and reconfigured by European settlement activity. The following information relating to Indigenous people on the Illawarra is based on such early detailed records.

The Illawarra region is the traditional land of the Wodi Wodi, a group of people who spoke a variant of the Dharawal language (Wesson 2009). The area of this group extended from Botany Bay down the coast to around Nowra. To the north of the Wodi Wodi, the Darug are identified, to the west are the Gundanguura, and in the south the Thoorga are identified (Tindale 1974).

The areas inhabited by each of the groups are considered to be indicative only and would have changed through time and possibly also depending on circumstances (i.e. availability and distribution of resources).

Traditional stories tell of the arrival of the Wodi Wodi to Lake Illawarra, bringing with them the Dharawal or cabbage tree palm from which their language is named (Wesson, 2009, p. 5). Analysis of middens in the region has provided dates of occupation dating back 6000 to 7000 years on the coast and at Lake Illawarra, and it is accepted that Aboriginal occupation of the south coast dates to around 20,000 years ago (AMBS 2008, p. 33).

Interactions between the first recorded contact between Aboriginal and European peoples occurred in 1770, when Captain Cook sailed down the east coast of Australia in the Endeavour and observed cook fires and Aboriginal people carrying canoes along the coast (Organ 1990, p. 2). The next recorded contact

occurred in 1796, when Flinders and Bass travelled along the coast in the Tom Thumb (Organ 1990, p. 8). Organ (1993, p. 49) also notes an expedition from Jervis bay by George William Evans, in which the expedition met several groups of Aboriginal people on the way through the Wollongong area in 1812.

### Geology, soils and hydrology

The study area lies within the Coastal Plain physiographic region that is located between the Illawarra Escarpment and the ocean (Hazelton 1992, p. 2). It consists of the gentle rises of the Illawarra Coal Measures, rolling to steep low hills of volcanic materials, moderate to steep slopes of Berry Siltstone and undulating Budgong Sandstone and Quaternary alluvium. The Coastal Plain is characterised as a mosaic of foothills, ridges, spurs, hillocks and floodplains with slopes varying from very gently inclined to steep with the occasional low cliff. It is dissected by easterly flowing streams at intervals that become more frequent towards the north (Fuller 1982, p.18) (Figure 4).

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. Because they are defined by a combination of soils, topography, vegetation and weathering conditions, soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The Bombo Soil Landscape is present within the study area and is characterised as an erosional landscape that consists of rolling low hills with benched slopes and sea cliffs with extensive rock platforms on latite and basalt (see Table 1). The soils are relatively shallow (less than 50 centimetres) structured loams on the crests and moderately deep (50 – 100 centimetres) Krasnozems on the upper slopes and benches. Brown and red Podzolic soils occur on the mid and lower slopes (Hazelton 1992, p. 43). This soil landscape is an erosional landscape with an extreme erosion hazard. This high erosion hazard combined with a history of tree clearance and ploughing and very shallow A1 horizons will have resulted in the movement and disturbance of any potential sub-surface deposits that were present in the study area (Figure 4).

**Table 3 Bombo soil landscape characteristics (Hazelton 1992).**

| Soil material | Description |
|---|---|
| **Bombo 1 (bo1)** | Friable brown sandy loam topsoil; high organic content; reddish brown in colour; inclusions consist of abundant roots. |
| **Bombo 2 (bo2)** | Hard setting sandy loam topsoil; colour ranges from brownish black to dark reddish brown; inclusions consist of 2-6mm stones (2-10%) and abundant roots. |
| **Bombo 3 (bo3)** | Light medium clay subsoil; colour is reddish brown; inclusions can be localised rounded basalt or latite stones of 20-60mm (2-10%). |
| **Bombo 4 (bo4)** | Sandy clay subsoil; reddish brown in colour; inclusions consist of many ex-ped roots. |
| **Bombo 5 (bo5)** | Strongly pedal medium clay subsoil; brown in colour; no inclusions. |

Hydrological features within the study area consist of five first order drainage lines sloping to the west and feeding into Spring Creek. These drainage lines constitute non-perennial water sources which would only contain water during periods of rainfall and for a limited time due to the sloping nature of these lines. This indicates that these drainage lines would not provide a reliable source of water. Additionally, these water sources are located in steep valleys with large hill slopes either side making these sources difficult to access from the study area. The nearest perennial water source is Spring Creek, flowing along the western

boundary of the study area. This creek would have provided a reliable source of water, but it is also situated at the base of steep hillslopes and is not easily accessible from the study area. Further from the study area, the Pacific Ocean, located 1.5 kilometres east and swamp at Jamberoo, 3 kilometres north would have provided access to a range of resources.

### Resources

The coastal plain of the Illawarra region generally provides a number of resources that could have been used by Aboriginal inhabitants. Lithic resources would have been accessible in the outcrops of siltstone, shale, chert, and tuffaceous sandstones that are located further inland. These resources would be used by Aboriginal people for a variety of purposes dependent on the particular task involved, and they would often need to be modified into tools for the desired objective.

A number useful plant and animal species would have been available in the region. Bark from the lillypilly and cabbage tree palm was used as rope and string to make nets, fishing lines, shelters and carrying bags (Wesson 2009). The fruit from the lillypilly and plum pine was also used as a medicine and as an indicator for the presence of insects, reptiles and sea animals in addition to a food source (Wesson 2009).

Terrestrial, sea, and avian species were used for a number of purposes, including as a food resource. Mammals such as kangaroos and arboreal mammals such as possums were used as a food source and also for tool making. Bones and teeth were used as points or barbs for hunting spears and fishing spears, while tail sinews are known to have been used as a fastening cord (Attenbrow 2010, p. 99). Some animal species, such as dolphins, were not used as a source of food. Instead they provided a significant contribution to the social and ceremonial aspects of Aboriginal life through their use as ritual implements, personal adornments, totems or art motifs (Attenbrow 2010, p.107-10; Wesson 2009).

The local environment of the study area provided access to water, flora and fauna resources, and useful stone material. These factors would have made the area a potentially useful place of occupation.

### Disturbances

The study area, made up of various land grants, was predominantly used for agricultural farming and Dairying practices. In the early 1840s and 50s the brush lands of the Illawarra were cleared to be converted into small farms (Cousins 1948). In many cases and as observed fig trees and cabbage palms were allowed to remain. The survival of these trees indicated where the brush land once was (Cousins 1948). An analysis of aerial imagery associated with the study area is outlined in Appendix 1.

## Step 3. Can you avoid harm to the object or disturbance of the landscape feature?

The proposed works include residential development, creation of a residential hub with shops, a retirement home and construction of pathways, roads and associated amenities which will result in disturbance to landscape features in the study area.

## Step 4: Desktop assessment and visual inspection

### Desktop assessment

Based upon the results from Stages 2a and 2b of the code a model has been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

This model is based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a predictive model has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 3). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

**Table 4 Aboriginal site prediction statements**

| Site Type | Site Description | Potential |
|---|---|---|
| Flaked Stone Artefact Scatters and Isolated Artefacts | Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds. | Moderate: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Due to the presence of a perennial water source there is moderate potential for artefact sites. |
| Shell Middens | Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time. | Low: Shell midden sites have been recorded in the region along coastal foredunes. There is a very low potential for shell middens to be located in the study area due to the shallow soil profiles. |
| Quarries | Raw stone material procurement sites. | Low: There is no record of any quarries being within or surrounding the study area and the geology of the study area does not contain suitable resources. |
| Potential Archaeological Deposits | Potential sub surface deposits of cultural material. | Moderate: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present |

| Site Type | Site Description | Potential |
|---|---|---|
| (PADs) | | within areas adjacent to water courses or on high points in undisturbed landforms, however the shallow soil profiles suggest a moderate potential for PADs |
| Scarred Trees | Trees with cultural modifications | Low: Scarred trees are the most common site type within the vicinity of the study area. Due to extensive vegetation clearance only a small number of mature native trees have survived in the study area |
| Grinding Grooves | Grooves created in stone platforms through ground stone tool manufacture. | Low: Suitable horizontal sandstone rock outcrops are unlikely to occur along drainage lines as the geology of the study area does not features sandstone. |
| Burials | Aboriginal burial sites. | Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not associated with burials. |
| Rock shelters with art and / or deposit | Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves. | Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist. The geology and topography of the study area does not allow for these sandstone overhangs or exposures |
| Aboriginal Ceremony and Dreaming Sites | Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants. | Low: There are currently no recorded mythological stories for the study area. |
| Post-Contact Sites | These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use. | Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one. |
| Aboriginal Places | Aboriginal places may not contain any “archaeological” indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as | Low: There are currently no recorded Aboriginal historical associations for the study area. |

| Site Type | Site Description | Potential |
|---|---|---|
| | swimming and fishing holes), places where Aboriginal political events commenced or particular buildings. | |

## Visual inspection

A visual inspection of the study area was undertaken on 20 April 2018 by archaeologists Mathew Smith and Amy Butcher. The visual inspection consisted of a systematic survey of the study area targeting all landforms within the study area to identify and record any Aboriginal archaeological sites visible on the surface or areas of Aboriginal archaeological potential and cultural sensitivity. The archaeological survey was conducted on foot. The methods used during the visual inspection conformed to Requirements 5 to 8 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b). For terminology and definitions used within this section, please refer to the aforementioned guideline.

One meandering transect was walked across all landforms in the study area, which predominately consisted of large steep hillslopes, with infrequent drainage lines, and ridge crests also present (Plate 1). Ground surface visibility of the study area was low at approximately 10% due to extensive grass coverage present across the study area (Plate 2). Exposure was also low across the study area at approximately 5% with infrequent exposures occurring as a result of slumping on the slopes, disturbances around gates and around wide flat outcroppings of basalt where soil was non-existent (Plate 3). Disturbances in the study area were minimal with several small, shallow dams observed. Mounds of basalt cobbles were also observed frequently within the study area as well (Plate 4). These mounds indicate that ploughing has occurred in the study area, as it was common practice to collect large rocks from a field before ploughing. No new Aboriginal objects or sites were located during the site inspection. The results of the site inspection indicated that the study area contained low archaeological potential. The results of the visual inspection are outlined in Figure 6 and Figure 7.

**Plate 1** **North east facing photo showing steep gradient hillslopes that slope down to a drainage line**

**Plate 2** **Representative photo showing high percentage of grass coverage across study area**

**Plate 3** **Example of extensive outcropping of basalt along flat crest of rideline, with exposures surrounding.**

**Plate 4** **Mound of granite cobbles located in the middle of a paddock (1 metre scale)**

## Step 5: Further investigations and impact assessment

Further assessment is not warranted based upon the completion of Steps 1 to 4 of the code. The study area has been determined to contain low archaeological potential with no sites identified during the survey. The low potential of the study area is attributed to the topography and soils of the study area. Topography of the study area mostly consists of large steeply inclined hillslopes, with two ridgelines present that terminate overlooking Spring Creek. These ridgelines contain shallow to non-existent topsoils and have been cleared of trees, ploughed and grazed in the past. The shallow soils and disturbances combined suggest that any potential surface or sub-surface sites have been disturbed or destroyed, similar to the findings of Saunders (2004). A number of drainage lines were present in the study area but were not easily accessible from these ridgelines or from the study area in general, with the western side of Spring Creek, outside the study area providing better access. It is more likely that occupation in the vicinity of the study area was concentrated further east and closer to the coast, or north towards the Jamberoo Lagoon, where resources and landforms were more easily accessible.

**Recommendation 1: No further archaeological assessment is required**

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential. There are no constraints; therefore, the proposed works can proceed with caution, subject to recommendations 2 and 3.

**Recommendation 2: Discovery of unanticipated Aboriginal objects**

All Aboriginal objects and Places are protected under the NSW National Parks and Wildlife Act 1974. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a

qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

**Recommendation3: Discovery of Aboriginal ancestral remains**

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location

Not recommence work at that location unless authorised in writing by OEH.

Please contact me if you have any enquiries.

Yours sincerely

Mathew Smith
Field Archaeologist

## References


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## Appendix 1: Figures

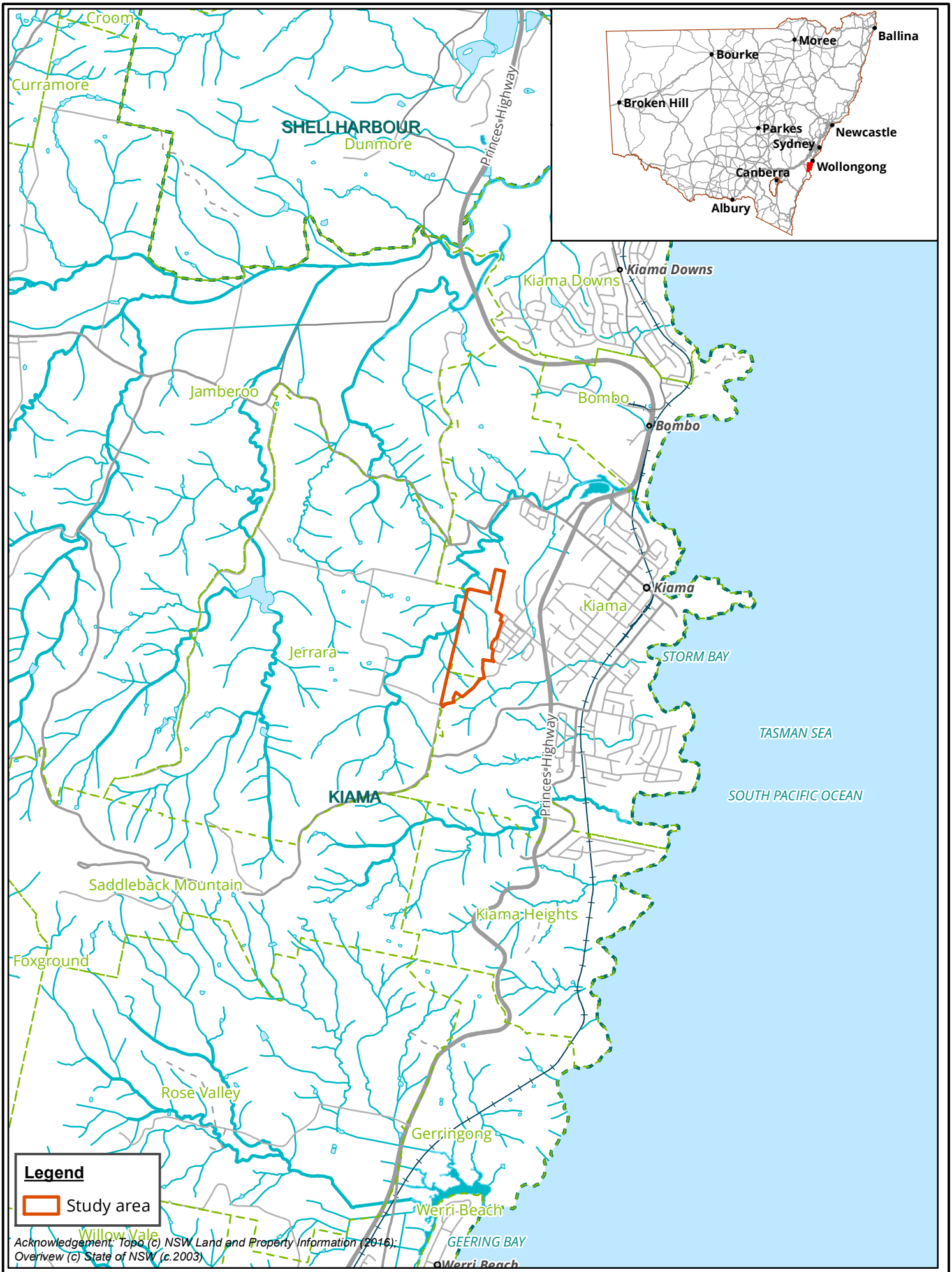


Figure 1: Study area in a regional context

Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 26813
Date: 26 April 2018,
Checked by: MJS, Drawn by: LW, Last edited by: lwilson
Location:\\bio-data-01\matters$\26800s\26813\Mapping\



**Legend**

Study area

Acknowledgements: Basemap © Land and Property Information 2016

## Figure 2: Study area detail

0 60 120 180 240 300

Metres

Scale: 1:6,000 @ A3

*Coordinate System: GDA 1994 NSW Lambert*

N


Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong


*Matter: 26813*
*Date: 26 April 2018,*
*Checked by: MJS, Drawn by: LW, Last edited by: lwilson*
*Location:\\bio-data-01\matters$\26800s\26813\Mapping\26813_F2_StudyArea*



**Legend**

- AHIMS Records
- Project Area

**Figure 3: AHIMS records near the Project Area**

**NOT TO BE MADE PUBLIC**

0 190 380 570 760 950

Metres
Scale: 1:19,000 @ A3
*Coordinate System: GCS GDA 1994*

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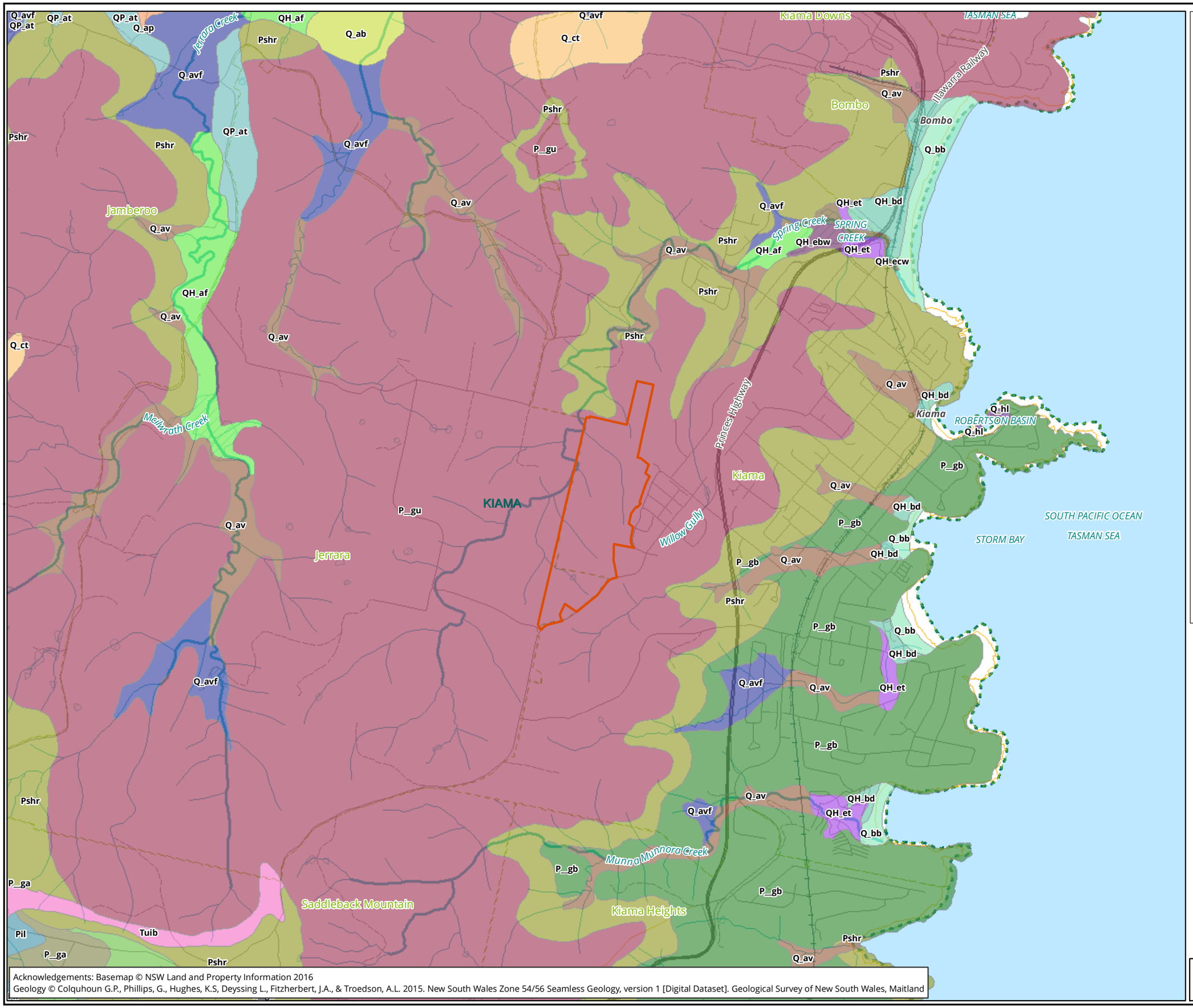
*Matter: 26813*
*Date: 26 April 2018,*
*Checked by: Iwilson, Generated by: Iwilson*
*Location:\\bio-data-01\matters$\26800s\26813\Mapping\26813_ACH_F3_AHIMS.mxd*






**Legend**

Study area

**Geological Units**

- P__ga - Cambewarra Latite Member
- P__gb - Blow Hole Latite Member
- P__gs - Saddleback Latite Member
- P__gu - Bumbo Latite Member
- Pil - Illawarra Coal Measures
- Pshr - Broughton Formation
- Q_ab - Alluvial backswamp deposits
- Q_ap - Alluvial palaeochannel deposits
- Q_av - Alluvial valley deposits
- Q_avf - Alluvial fan deposits
- Q_bb - Coastal deposits- beach facies
- Q_ct - Colluvial talus deposits
- Q_hl - Anthropogenic breakwaters, embankments and artificial levees
- QH_af - Alluvial floodplain deposits
- QH_bd - Coastal deposits- dune facies
- QH_ebw - Estuarine basin and bay (subaqueous)
- QH_ecw - Estuarine channel deposits (subaqueous)
- QH_et - Estuarine tidal-delta flat
- QP_at - Alluvial terrace deposits
- Tuib - Bong Bong Basalt

**Figure 4: Geology associated with the study area**

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

*Coordinate System: GDA 1994 NSW Lambert*

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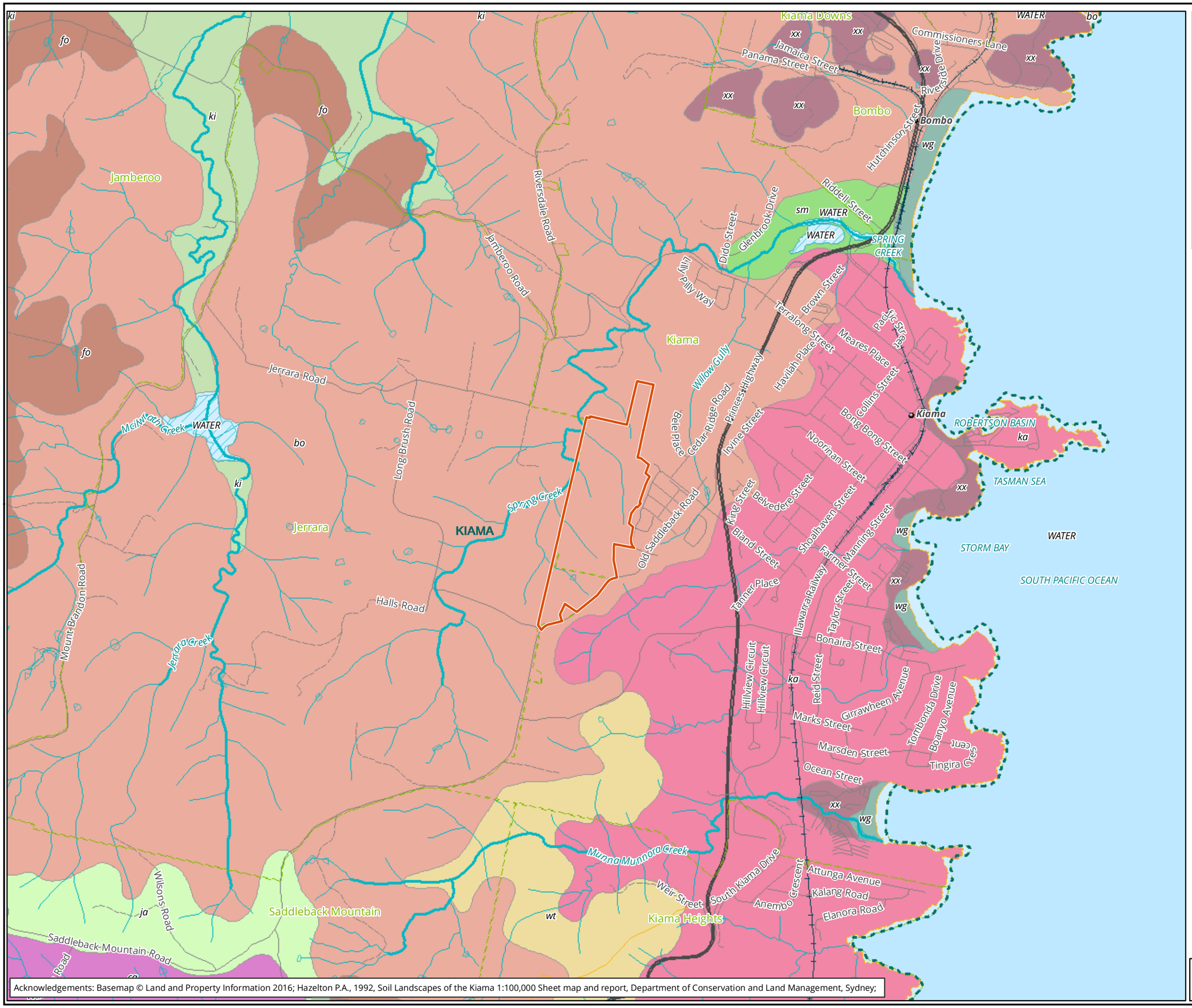


**Legend**

Study area

**Soil Landscape units**

- bo - BOMBO
- ca - CAMBEWARRA
- fo - FOUNTAINDALE
- ja - JAMBEROO
- ka - KIAMA
- ki - KILLALEA
- sm - SEVEN MILE
- WATER - WATER
- wg - WOLLONGONG
- wt - WATTAMOLLA ROAD
- xx - DISTURBED TERRAIN

**Figure 5: Soil landscapes associated with the study**

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

*Coordinate System: GDA 1994 NSW Lambert*

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*26813 ACH_F5_Soils*


Acknowledgements: Basemap © Land and Property Information 2016; Hazelton P.A., 1992, Soil Landscapes of the Kiama 1:100,000 Sheet map and report, Department of Conservation and Land Management, Sydney;


Acknowledgements: Basemap © Land and Property Information 2016


**Legend**

- Study area
- Low archeological potential

**Figure 7: Survey results**

0 60 120 180 240 300

Metres
Scale: 1:6,000 @ A3
*Coordinate System: GDA 1994 NSW Lambert*

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*26813_ACH_F7_SurveyResults*


Acknowledgements: Basemap © Land and Property Information 2016


**Legend**

- Study area
- Survey tracks

## Figure 6: Survey effort

0 60 120 180 240 300

Metres

Scale: 1:6,000 @ A3

*Coordinate System: GDA 1994 NSW Lambert*

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## Appendix 2: Aerial photos

**Plate 5** **1949 aerial of study area showing areas of ploughing (purple star) (NSW LPI)**

**Plate 6** **1970 aerial of study area showing areas of ploughing (purple star) (NSW LPI)**

## Appendix 3: AHIMS