

## **Sydney Polo Club**

### **Aboriginal Heritage Due Diligence Report**

Report prepared for BMD Constructions

April 2016



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## Report Register

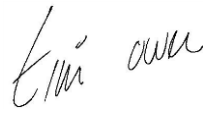
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The report has been reviewed and approved for issue in accordance with the GML quality assurance policy and procedures.

|                  |                                                                                     |                              |                                                                                       |
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## 1.0 Introduction

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GML Heritage (GML) Pty Ltd has been engaged by BMD Constructions to prepare a Due Diligence Aboriginal Heritage Report for the Sydney Polo Club at Richmond (the study area). This report forms part of the Environmental Assessment for the study area prepared under Part 5 of the *Environmental Planning and Assessment Act 1979*.

The purpose of this report is to identify whether the study area possesses or has the potential to possess Aboriginal heritage sites, places, objects and/or values, in accordance with the Office of Environment and Heritage (OEH) guidelines for due diligence.

This report does not provide a significance assessment of any Aboriginal sites, places and/or values. This project does not follow the OEH guidelines for Aboriginal community consultation. Recommendations are provided as to whether further Aboriginal heritage assessment and management will be necessary.

This report was prepared by Jodi Cameron, GML Graduate Consultant, with input and review by Dr Tim Owen, GML Senior Associate.

### 1.1 NSW Legislation Relevant to Aboriginal Heritage

In NSW Aboriginal heritage is principally protected under two Acts:

- the *National Parks and Wildlife Act 1974* (NPW Act 1974); and
- the *Environmental Planning and Assessment Act 1979* (EPA Act 1979).

#### 1.1.1 National Parks and Wildlife Act 1974

All Aboriginal cultural material receives statutory protection under the *National Parks and Wildlife Act 1974* (NSW) (NPW Act). If Aboriginal cultural material is found, the Office of Environment and Heritage (OEH) must be informed under Section 89A of the NPW Act.

New offences relating to the harm to, or desecration of, an Aboriginal object or declared Aboriginal Place were introduced with the *NPW Amendment (Aboriginal Objects and Places) Regulation 2010* on 1 October 2010. The definition of 'harm' now includes to destroy, deface, damage or move an Aboriginal object or declared Aboriginal Place. The OEH has stated:

*The most significant change is the introduction of tiered offences and penalties. Offences committed with knowledge, in aggravating circumstances or in relation to an Aboriginal Place will attract higher penalties than previously. There is a new strict liability offence of harming Aboriginal objects and of harming or desecrating Aboriginal Places.<sup>1</sup>*

The strict liability offence of harming Aboriginal objects has a number of defences. The two defences relevant to this project include the statutory defence of due diligence through complying with an adopted industry code of practice (see due diligence below) or compliance with the conditions of an Aboriginal Heritage Impact Permit (AHIP).

#### 1.1.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EPA Act) provides a statutory framework for the determination of development proposals. It provides for the identification, protection and management of heritage items through inclusion in schedules to planning instruments such as Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). Heritage items in planning

instruments are usually historic sites but can include Aboriginal objects and places. The EPA Act requires that appropriate measures be taken for the management of the potential archaeological resource by means consistent with practices and standards adopted in meeting the requirements of the NPW Act.

The study area is located within the Hawkesbury Local Government Area (LGA), and is therefore subject to the Hawkesbury Local Environmental Plan 2012 (Hawkesbury LEP 2012). Clause 5.1 (Heritage Conservation) provides the requirements for heritage. The heritage conservation objectives of the Hawkesbury LEP 2012 are:

- a) To conserve the environmental heritage of Hawkesbury.*
- b) To conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views.*
- c) To conserve archaeological sites.*
- d) To conserve Aboriginal objects and Aboriginal places of heritage significance.*

Clause 5.1 (2) of the Hawkesbury LEP 2012 details the requirements for consent:

*(2) Requirement for consent*

*Development consent is required for any of the following:*

*(a) Demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):*

- (i) a heritage item,*
- (ii) an Aboriginal object,*
- (iii) a building, work, relic or tree within a heritage conservation area,*

*(b) Altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item.*

*(c) Disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed.*

*(d) Disturbing or excavating an Aboriginal place of heritage significance.*

*(e) Erecting a building on land:*

- (i) on which a heritage item is located or that is within a heritage conservation area, or*
- (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,*

*(f) Subdividing land:*

- (i) on which a heritage item is located or that is within a heritage conservation area, or*
- (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.*

Clause 5.10 (7) addresses the requirements for archaeological sites:

*(7) Archaeological sites*

*The consent authority must, before granting consent under this clause to the carrying out of development on an archaeological site (other than land listed on the State Heritage Register or to which an interim heritage order under the Heritage Act 1977 applies):*

- (a) notify the Heritage Council of its intention to grant consent, and
- (b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.

Clause 5.10 (8) establishes guidelines in relation to places of Aboriginal significance:

*(8) Aboriginal places of heritage significance*

*The consent authority must, before granting consent under this clause to the carrying out of development in an Aboriginal place of heritage significance:*

- (a) consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place by means of an adequate investigation and assessment (which may involve consideration of a heritage impact statement), and*
- (b) notify the local Aboriginal communities, in writing or in such other manner as may be appropriate, about the application and take into consideration any response received within 28 days after the notice is sent.*

## 1.2 Approach to Aboriginal Heritage Management

In order to administer the NPWS Act 1974 and EP&A Act 1979, the OEH has issued a series of best practice guidelines and policies. The applicability of these depends upon the approval mechanism for a project. The current project will be assessed and granted approval under Part 5 of the EP&A Act 1979. Therefore the approach to the preparation of this document was based on the following current best practice guidelines:

- NPWS Aboriginal Cultural Heritage. Standards and Guidelines Kit (draft 1997);
- DECC *Guide to Determining and Issuing Aboriginal Heritage Impact Permits* (2009);
- DECC *Operational Policy: Protecting Aboriginal Cultural Heritage* (February 2009);
- DECCW *Aboriginal cultural heritage consultation requirements for proponents 2010. Part 6 National Parks and Wildlife Act 1974* (April 2010);
- DECCW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (13 September 2010);
- DECCW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (24 September 2010); and
- the *Australia ICOMOS Burra Charter, 2013* (the Burra Charter).

## 1.3 Due Diligence Approach

The OEH has issued a code of practice guideline that defines a 'due diligence' approach to Aboriginal heritage: *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (13 September 2010). This guideline is designed to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects, and/or Aboriginal Places, and to determine whether they should apply for consent in the form of an AHIP.

BMD has adopted the *Due Diligence Code of Practice* as a best practice management tool for potential Aboriginal heritage objects, place and values which could be associated with the project.

The *Due Diligence Code of Practice* 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); and
- determine whether an AHIP application is required.

The OEH has defined due diligence thus:

*Due diligence is a legal concept describing a standard of care. Exercising due diligence means turning your mind to the likely risks of your proposed course of action. It is not enough to perform activities carefully. Due diligence requires consideration of your obligations under, in this case, the NPW Act, and the consideration and adoption of a course of action that is directed towards preventing a breach of the Act.*

*In the context of protecting Aboriginal cultural heritage, due diligence involves taking reasonable and practicable measures to determine whether your actions will harm an Aboriginal object and if so avoiding that harm.<sup>2</sup>*

The steps that are required to follow the due diligence process are:

- searching the Aboriginal Heritage Information Management System (AHIMS);
- checking for landscape features which may indicate the presence of Aboriginal objects;
- strategies to avoid harming Aboriginal objects; and
- desktop assessment and visual inspection to confirm the presence of Aboriginal objects.<sup>3</sup>

In preparing this report, GML complied with the guidelines set out in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (13 September 2010)*. The extent of land covered by the due diligence process is described as the study area, see below.

## 1.4 Description of the Study Area and Context

The study area is comprised of 23 allotments within the Hawkesbury Local Government Area (LGA) in the suburb of Richmond (Table 1.1). The Allotments are along Old Kurrajong Road, Powells Lane, Ridges Lane and Triangle Lane, approximately 62km North West of Sydney, NSW (Figure 1.1 and 1.2). The study area is bounded to the Northwest by a 2.4km stretch of the Hawkesbury River and is approximately 209 ha in size (Figure 1.2). The land within the study area currently has a variety of uses including polo fields, turf farms, dwellings, farm buildings, grazing pastures, animal yards, animal training yards and wetlands.

## 1.5 Due Diligence Process

In accordance with Step 1 of the OEH *Due Diligence Code of Practice* it is identified that the proposed activity will disturb the ground surface of the study area. Therefore the following due diligence steps are presented in this report:

Step 2a—Aboriginal Heritage Information Management System (AHIMS) database search;

Step 2b—the identification of landscape features that indicate the presence of Aboriginal objects;

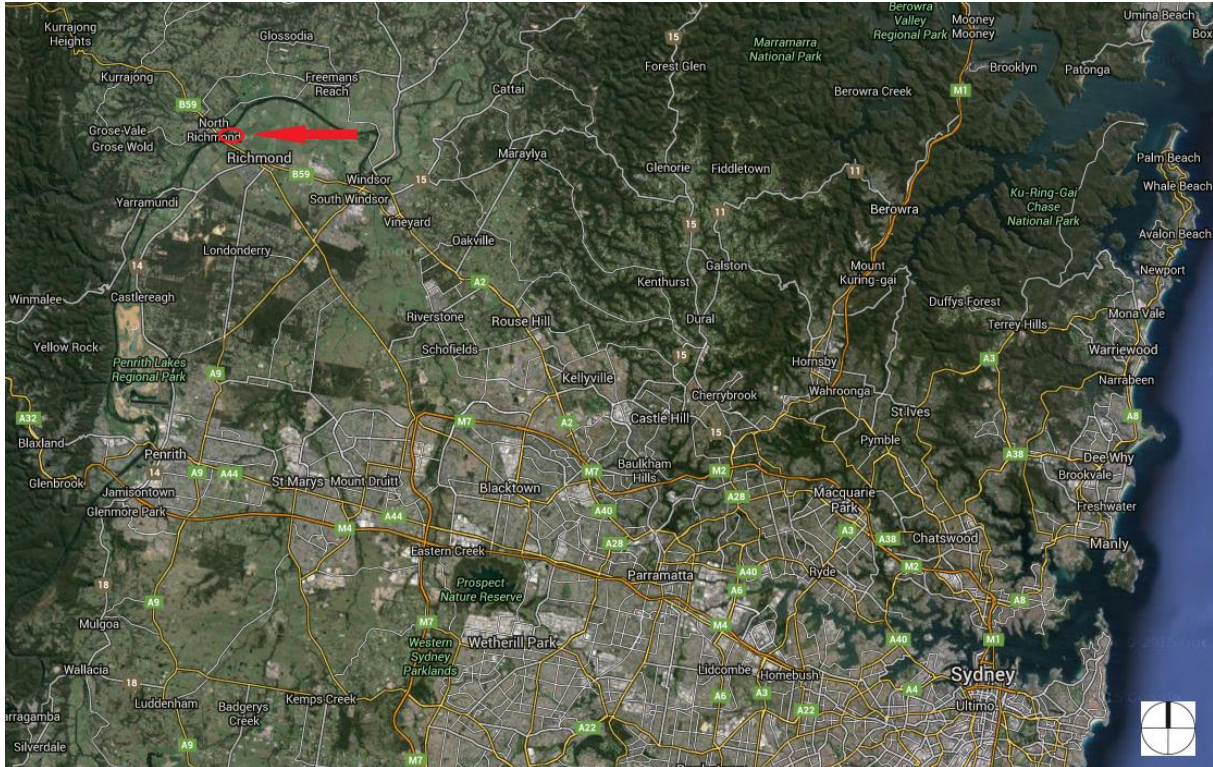
Step 3—discussion with respect to the extent of the development footprint;

Step 4—desktop assessment and visual inspection; and

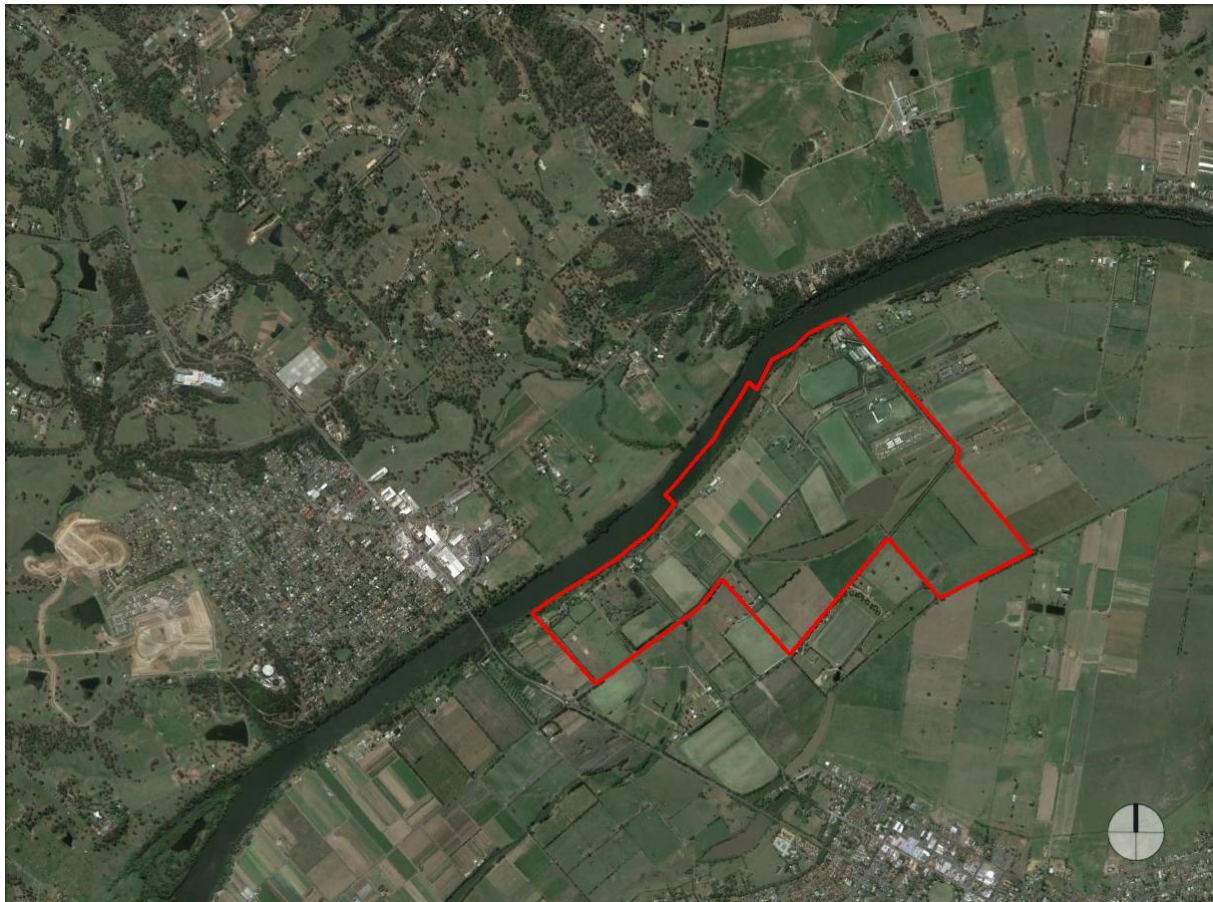
Step 5—further investigation and impact assessment.

**Table 1.1** DP and Lot Numbers Contained within the Study Area.

| Access             | DP      | Lot |
|--------------------|---------|-----|
| Old Kurrajong Road | 206104  | 1   |
|                    |         | 2   |
|                    | 89087   | A   |
|                    |         | B   |
| Powells Lane       | 70128   | 1   |
|                    | 663770  | 25  |
| Ridges Lane        | 77207   | 1   |
|                    | 556434  | 27  |
|                    | 997087  | 1   |
|                    |         | 2   |
|                    | 1151145 | 128 |
|                    |         | 129 |
| Triangle Lane      | 997087  | 3   |
|                    | 1168610 | 1   |
|                    |         | 2   |
|                    | 997086  | 1   |
|                    | 1100252 | 25  |
|                    | 1120860 | 4   |
|                    |         | 5   |
| NA                 | 120794  | 1   |
|                    | 365391  | A   |
|                    | 659412  | 1   |
|                    | 972649  | 1   |



**Figure 1.1** Location of study area, as indicated by red circle and arrow. (Source: Google Maps with GML overlay, 2016)



**Figure 1.2** Study area location, adjacent to the Hawkesbury River. (Source: Google Earth 2016, with GML additions, 2016)

## 2.0 AHIMS and Environment Context

### 2.1 AHIMS Search

A search of the OEH AHIMS database for an area between latitudes -33.6005, 150.7083 to -33.5588, 150.7744 with a buffer of 1km surrounding the study area was undertaken on 16 March 2016. There are currently no registered sites or Aboriginal places identified within the study area.

Outside of the study area, the search identified 18 recorded Aboriginal sites, which comprised eleven stone artefact based sites (open camp sites), four axe grinding grooves, one shelter with art and one open camp site/quarry/scarred tree (Table 2.1). Information on one site was restricted and listed as 'destroyed'. The results of the search are shown in Table 2. and Figure 2.1.

**Table 2.1** Results of AHIMS Search.

| Site Feature                                                       | Frequency |
|--------------------------------------------------------------------|-----------|
| Stone Artefacts (Open Camp Site)                                   | 11        |
| Grinding Groove                                                    | 4         |
| Shelter with Art (Pigment or Engraved)                             | 1         |
| Open Camp Site, Quarry, Scarred Tree (Modified Tree, Stone Quarry) | 1         |
| Unknown                                                            | 1         |
| Total                                                              | 18        |

This AHIMS search indicated that open camp sites with stone artefacts constitute the predominant remnants recorded in this area. This is followed by axe grinding groove sites. Given the extent of the search area, the frequency of sites is generally low, which does not suggest that Aboriginal people were not using the area, rather during the course of historical development no extensive Aboriginal archaeological assessments or excavations have been undertaken in this area.

The general patterning of Aboriginal sites in the local area shows a strong association with the Hawkesbury River and in general with areas associated with waterways. Open camp sites with stone artefacts are found surrounding the study area, without obviously associated landform patterning. As such, stone artefacts could be identified anywhere in the region, including within the subject area.

One site of note is site 45-5-0814 (recorded by Jo McDonald in 1991). This site is approximately 3.5km northwest of the study area (on the north side of the Hawkesbury River) and contains a stone quarry, modified tree and open camp site (Figure 2.1). The site is estimated to be 400m by 300m and is situated on a knoll and ridge, within 400m of a tributary of Currency Creek. It is described as having both areas of disturbance from ploughing and undisturbed areas in situ. The site provides evidence of raw stone extraction, knapping and artefact utilisation. In the southern area of the site a scarred tree was recorded. The scar was found on an Ironbark approximately 25m tall, measuring 1.82m by 0.4m, it was situated 0.5m off the ground surface with an orientation of 60°. This quarry site is significant as a local source of stone material for artefact manufacture, evidenced by the cluster of 'open camp sites' surrounding it (Figure 2.1). Materials from the quarry site could have easily been transported to the current study area.

To the southwest of the subject area are two notable sites—grinding groove site (#45-5-0259) and a shelter with art (#52-2-0851) (Figure 2.1). The landscape context and proximity to the Hawkesbury River for both of these sites is very similar to current study area. However, there are some issues with the recording of these two sites.

The site card for site 52-5-0851 contains coordinates that locate this site near the current study area, however, the detail on the AHIMS card describes a site in Wilton, near Wollongong. It is suggested that site 52-5-0851 is not located near the study area.

Site 45-5-0259, a grinding groove site, also presents a location error. The grid reference places the site on the east bank of the Hawkesbury River, however the site card describes a site on the west bank of the river. The site is located on a small rocky outcrop, next to the river. It is described as containing a large number of sharpening grooves, all within close proximity to each other.

Given the local geological context, and that Freemans Reach soil landscape is located on both sides of the Hawkesbury River, there is some potential for sites such as 45-5-0259 to be associated with the study area, if suitable outcrops of sandstone bedrock are present.

## **2.2 The Local Landscape Context**

The purpose of this section is to provide environmental contextual information for use in developing a predictive model of Aboriginal site locations associated with the study area. Interactions between people and their surroundings are of integral importance in both the initial formation and the subsequent preservation of the archaeological record. The nature and availability of resources including water, flora and fauna and suitable raw materials for the manufacture of stone tools and other items had (and continues to have) a significant influence over the way in which people utilise the landscape.

Alterations to the natural environment also impact upon the preservation and integrity of any cultural materials that may have been deposited whilst current vegetation and erosional regimes affect the visibility and detectability of Aboriginal sites and objects. For these reasons, it is essential to consider the environmental context as a component of any heritage assessment.

### **2.2.1 Geology**

The study area is underlain by Hawkesbury Sandstone and Wianamatta Group materials. The soil landscapes associated with the study area are quaternary alluviums derived from the Narrabeen Group (Figure 2.2).<sup>4</sup> Out crops of sandstone bed rock may have been suitable for use by Aboriginal people for art and/or grinding stone and wooden implements (resulted in grinding grooves).

### **2.2.2 Landforms and Landscape Features**

The study area has extremely low relief (less than 9m elevation across its extent) and is level to very gently inclined. The erosional landform pattern of the study area is a level plain to a gently undulating plain.<sup>5</sup> The current study area is situated on the Hawkesbury River, which may have influenced the patterns of Aboriginal occupation. Landscape features surrounding the study area includes local hills to the northwest and panoramic views of the Blue Mountains to the west of the study area, extending 180° from north to south (refer to Section 3.3 for a discussion of aesthetics associated with the study area). The Blue Mountains are known to be of cultural significance to the Aboriginal community.

### 2.2.3 Soils

The study area is located in the Freemans Reach soil landscape which is characterised by friable, deep brown alluvial sands and loams (Figure 2.2).<sup>6</sup> The Freemans Reach soil landscape is a part of the active floodplain of the Nepean/Hawkesbury River, where streambank erosion and deposition constantly occur.

Topsoil (A1 Horizon) associated with the Freemans Reach soil landscape is generally brownish black apedal sandy loam. This typically overlies reddish to yellowish brown apedal sand (A2 Horizon). These overlay brown apedal sandy clay loam, brown massive sandy clay (B Horizons) and Wianamatta Group bedrock.<sup>7</sup>

Surviving evidence of Aboriginal occupation could be found in the A horizon soils. These soils hold the potential for stratified archaeological sites, subject to the process of historical land use and natural process of site formation and erosion impacts arising from flooding.

### 2.2.4 Hydrology

The study area lies on the banks of the Hawkesbury River. There are a number of low order creeks and lagoons within and surrounding the study area, although the majority of these appear to have been modified by historical activities and damming.

The study area contains an unnamed lagoon approximately 1.1km traversing east to west between Ridges Lane and Triangle Lane/Powells Lane. This appears to have been dammed, with channelized water courses flowing into and out of its margins. The margins of this lagoon appear as a flood plain, spilling across the adjacent fields. The action of damming this lagoon is likely to have increased its size and extent, resulting in erosion of soils from the surrounding landforms. This lagoon has been dammed since 1955 (Figure 2.3).

Two dams are located within the study area; one in the southwest sector, the second in the northeast sector. These would be fed by ephemeral water courses or water sheds, not immediately apparent from aerial photography (Figures 2.3, 2.4 and 2.5). The zone to the south of the immediate study area presents four further lagoons, which could be dammed lower order creeks. There are no apparent water channels flowing north into the study area from these lagoons. The north and western boundary of the study area is the Hawkesbury River; a very high order, permanent source of fresh water.

In summary, prior to historical landform modifications (Section 2.2.6 the study area was likely to contain three or four small ephemeral transient water channels. The course of these channels was probably not permanent, and may have been influenced by flood events and accumulations of alluvium (Section 2.2.3 ). The proximity of the study area to the Hawkesbury River meant that fresh water acquisition would not have been a limiting factor for Aboriginal occupation. However, there are no specific water sources within the study area that would have provided an obvious focus for Aboriginal occupation.

### 2.2.5 Fauna and Flora

Prior to clearing in the nineteenth century, the vegetation of the subject area would have been a dry sclerophyll forest which included broad-leaved apple (*Angophora subvelutina*), cabbage gum (*Eucalyptus amplifolia*) and forest red gum (*E. tereticornis*). Other species include paperbarks (*Melaleuca*), river oak (*Casuarina cunninghamiana*) and wattles (*Acacia*).

The range of flora would have provided Aboriginal people with a source of food, although the ecology of the study area is limited to one type of ecological community, rather than containing multiple communities with a wider range of plants for use.

### **2.2.6 History of Land Use**

A history of land use over the past 60 years have been gained from analysis of the 1955 aerial (Figure 2.3), the 1978 aerial (Figure 2.4) and the recent photography 2002 held in Google Earth (Figure 2.5).

The 1955 aerial photograph show the study area as a series of ploughed and planted fields, surrounded by a developed series of roads, houses and other out buildings, intercut by wetlands (Figure 2.3). These primary features and layout remain today, most notably the road layout, wetlands and primary field system. Use of the land in the 1950s appears to be associated with orchards, cropping and turf farming. Ploughing and cropping results in a significant impact to soil integrity through the turning over of soil. Turf farming results in a significant impact to the soil, through the regular removal of soils, culminating in a loss of integrity and condition. The agricultural activities undertaken in the 1950s appear intensive and would likely have disturbed Aboriginal sites if present.

In 1978 a number of smaller roads have been constructed extending to the Hawkesbury River (Figure 2.4). Of particular note is the extensive stripping and development within the central portion of the study area, adjacent to the Hawkesbury River. This development would have significantly impacted all soil profiles resulting in a complete loss of soil integrity and condition.

Recent aerial photography shows the development of the study area with polo pitches, coupled with landscaping (Figure 2.5). Continuity in cropping has continued in areas not subject to the polo club development.

In all aerial photographs the landforms adjacent to the River have been landscaped up to the margin of the river, presumably up to the point of the open depression which falls down to the river. The dams and internal water courses have been subject to cropping and agriculture up to the immediate margin of the water bodies—there is no obvious buffer area which has not been ploughed.

In summary, the entire study area has been subject to significant and repeated ploughing and cropping, turf farming has occurred across a proportion of the study area, development of the polo club and its landscaping has also occurred over the last 60 years. These activities would have significantly impacted the whole study area's soil's condition and integrity. There are no obvious locations that have not been associated with these activities. As such, on the basis of land use impacts, the entire study area holds a low level of archaeological potential on the basis of soil removal and modification that resulted in a loss of soil condition and integrity.

## **2.3 Synopsis of the AHIMS Search and Landscape Context**

The AHIMS results indicate that the region surrounding the study area contains a homogenous Aboriginal archaeological signature, comprising mainly stone artefact sites, with one identified source of material, north of the study area. Regionally there are grinding groove sites associated with sandstone outcropping. As such, in terms of comparability, the study area could contain stone artefact based sites and grinding grooves, subject to the presence of residual soils and/or suitable sandstone bedrock features. The flat landforms of the study area and alluvial soils do not lend themselves to rock outcropping.

An analysis of the study area's more recent history shows that it has been subject to a substantial quantity of impact, associated with farming and more recently the polo activities. These activities appear to be intensive and would have significantly disturbed any Aboriginal archaeological deposits present. Some activities, such as turf farming, would also have removed soils from the study area. The study area contains a large lagoon, which appears in the 1955 aerial photographs. This appears to have been dammed and created an artificially large wetland area, subject to regular flooding. Whilst this feature does not appear to have been modified recently, the land immediately surrounding this lagoon has been used intensively and subject to the same high levels of agricultural disturbance, flooding and impact. As such, this lagoon does not represent an obvious focus for Aboriginal use pre-European arrival.

In summary, the study area does not contain any registered Aboriginal sites, and on the basis of land use history is unlikely to retain Aboriginal archaeological deposits in soils with any condition or integrity. The study area does not present a specific landform which would be distinct on a regional level, being a flat plain, without features. The lagoon system appears to have been artificially enlarged by damming, and consequentially does not provide a focus for Aboriginal habitation activities.

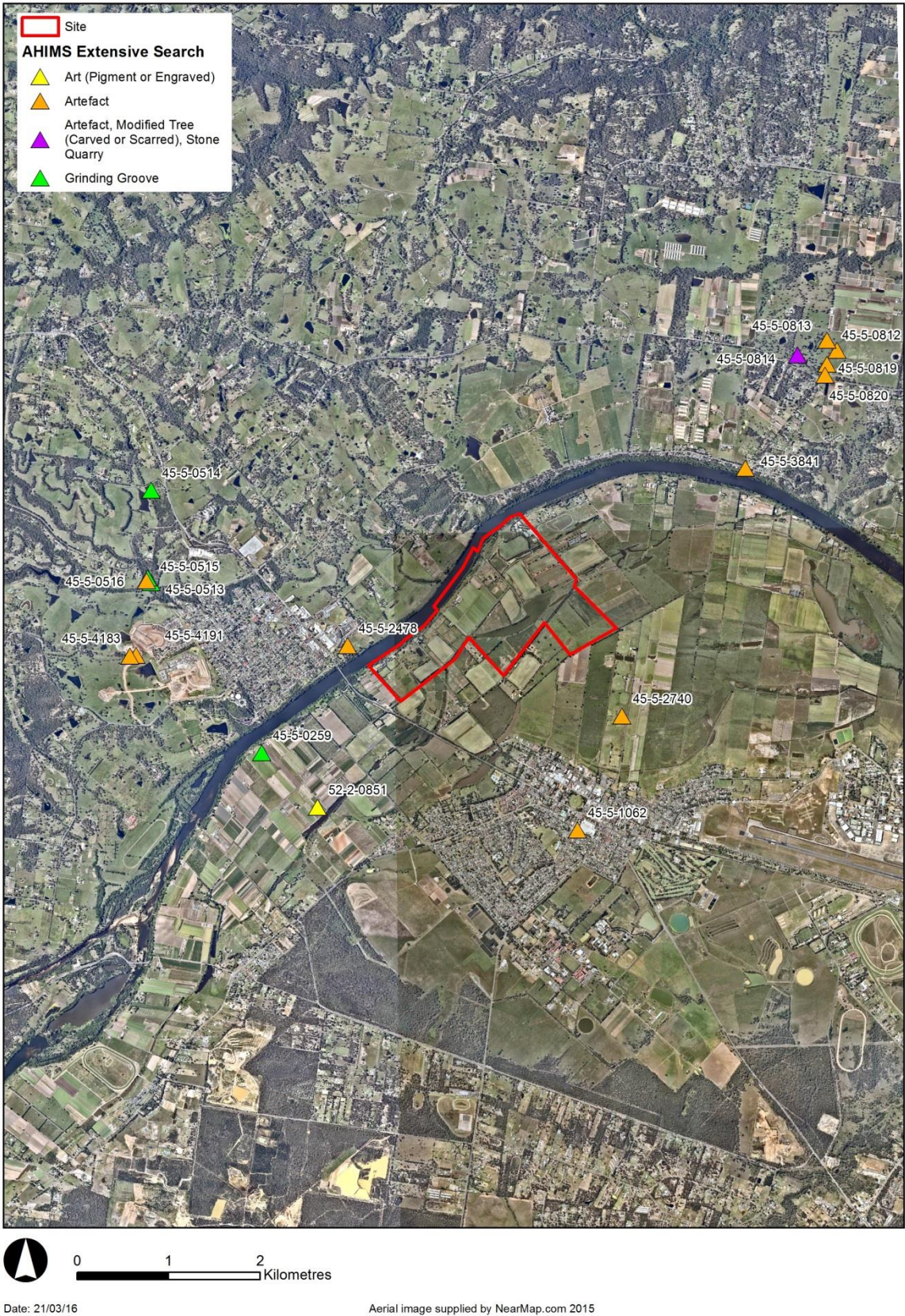
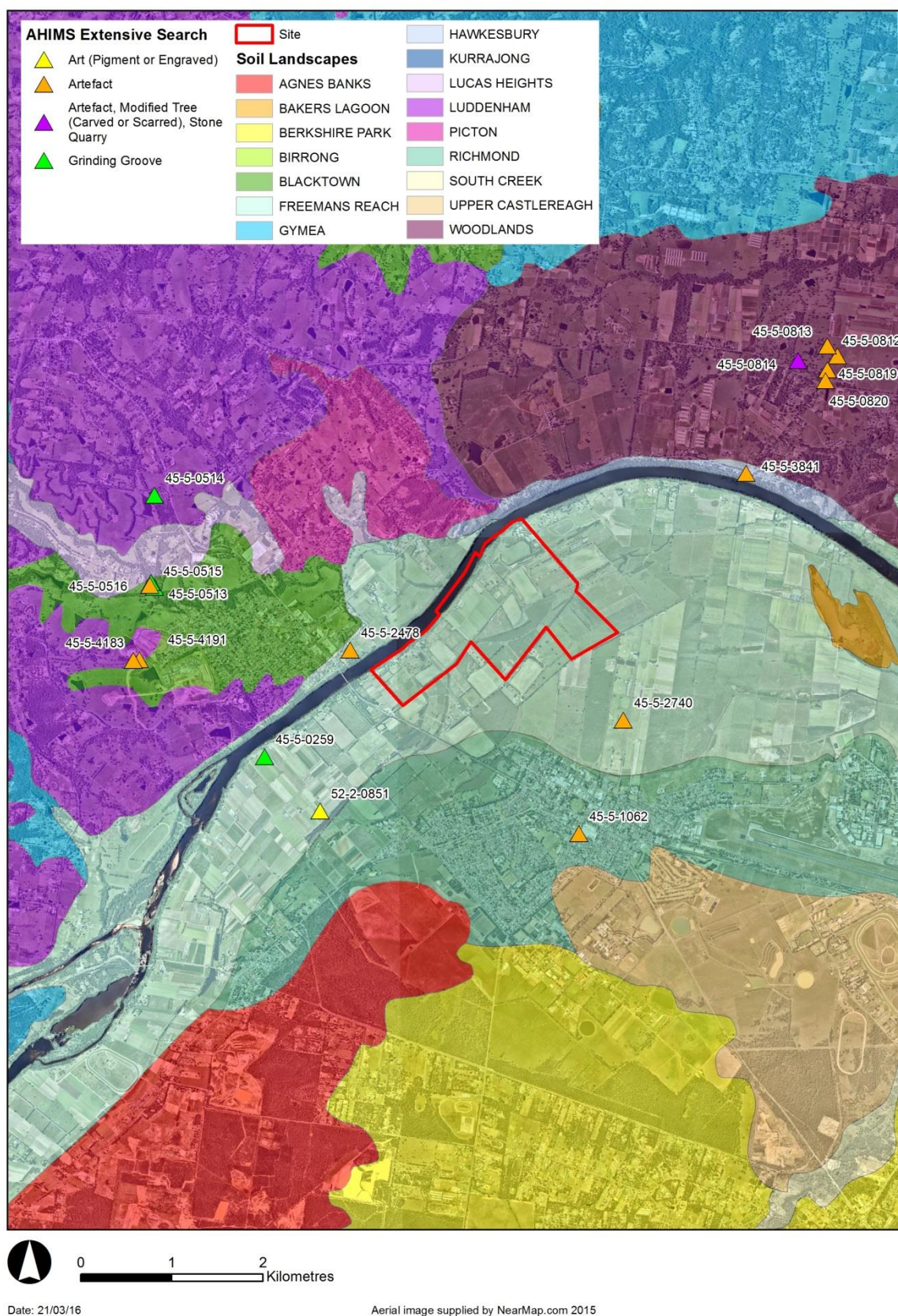


Figure 2.1 AHIMS Extensive Search Results. Study area is outlined in red. (Source: Nearmap and OEH AHIMS, with GML overlays)



**Figure 2.2** AHIMS results against the mapped soil landscapes. Study area is outlined in red. (Source: Nearmap and OEH AHIMS with GML additions)



**Figure 2.3** 1955 aerial photograph showing the study area. (Source: LPI with GML additions, 2016)



Figure 2.4 1978 aerial photograph showing the study area. (Source: LPI with GML additions, 2016)



**Figure 2.5** 2002 aerial photograph showing the study area. (Source: Google Earth with GML additions, 2016)

## 3.0 Aboriginal Heritage Desktop Assessment and Visual Inspection

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### 3.1 Aboriginal Ethno-history

This area of the Cumberland Plain was occupied and managed by the Bu-ru-be-ron-gal (or Boorooberongal) clan of the Darug (various spellings including Dharug, Dharrook, Dharruk, Dharrook, etc) people for thousands of years prior to European occupation which inscribed the land with a different pattern and form.<sup>8</sup> The Darug was a language group that represented a number of different groups of people who occupied the Sydney basin from the coast between South Head and the north shore of Botany Bay, out to the edge of the Blue Mountains. Within this area there were approximately 20 different bands, each having a different territory, boundaries and sacred spaces.<sup>9</sup>

We know from historical, oral and ethnographic evidence that Sydney's Aboriginal people lived in small groups consisting of multiple extended families. Each group belonged to a wider group or 'clan', such as the Darug, linked through common language, kinship ties, marriage and trade. Other neighbouring clans such as the Wiradjuri, Gundungurra and Dharawal would also have been regularly visited and traded with.<sup>10</sup> Aboriginal lives were organised around complex social, spiritual and economic relationships and it is likely that specific resources zones such as for food, materials, water or ceremonial grounds were controlled by local groups who shared these resources with their neighbours as tradition and needs dictated.

The Darug people would have used the landscape seasonally, building open campsites on the higher ground with ready access to numerous natural water sources present across the land in association with the Hawkesbury River. Campsites would have been selected and moved to allow people to take advantage of seasonally abundant foods. The surrounding plains provided native animals and vegetable foods, as well as other resources including timber and leaves, and natural gums and resins that were used for a range of implements and tasks. The Darug would have fired areas within their Country to maintain a clear and open understorey. This encouraged the fruiting of plants and the growth of fresh herbage for animals to graze. Kangaroos, emus, snakes, bandicoots, possums and other game foods would have been eaten. Roots and tubers including yams would have been dug along the creeks and roasted in open campfires.

Stone was a vital material, and its distribution in the landscape played a role in determining people's movements and patterns of trade and exchange with other language groups.<sup>11</sup> Silcrete was the dominant stone material used in the manufacture of the stone tools in the region. However, the Darug people also utilised other locally available stone such as silicified tuff, chert and quartz.

It is likely that the Darug clans of the Cumberland Plain had the rights to the natural resources that occurred in their respective habitation area.<sup>12</sup> The Bu-ru-be-ron-gal people had traditional rights over the trade of basalt, which was collected from the river bed and made into ground edge hatchets. These were traded over large distances.<sup>13</sup>

Aboriginal people used traditional land management practices to assist in hunting various native animals for meat and skins. Firing was used to create grassland open spaces where animals were encouraged to graze and could be easily hunted. This accounts for the 'park like' environment noted by several European settlers in the late eighteenth and early nineteenth century.<sup>14</sup>

## 3.2 Relevant Local Literature

A number of archaeological studies and academic works have been prepared that include the study area. Those works and reports of direct relevance to this due diligence assessment are detailed below. This literature review focuses on reports relevant to the study and is based on information obtained from the OEH AHIMS and GML's library.

### Aboriginal Occupation Chronology in the Sydney Region

Thousands of Aboriginal occupation sites have been documented for the wider Sydney region, and the few available radiocarbon determinations mostly date to the last 1000–2000 years. This is likely only indicative of the preferential preservation of organic material (charcoal) from more recent sites.

The Eastern Regional Sequence (ERS) is a framework for chronologically understanding changes in lithic technologies in south eastern Australia, particularly in the Sydney region. A summary of temporal change and characteristics of lithic technologies within the Bondaian phases of the ERS for the Sydney region is presented in Table 3.1.

**Table 3.1** Eastern Regional Sequence.

| Period          | Age                      | Description                                                                                                                                                                                                 |
|-----------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pre-Bondaian    | c30,000–8000BP           | Preferential use of silicified tuff in assemblages. Cores and tools vary widely in size. No backed artefacts, elouera or ground stone. Predominant technique is unifacial flaking. Bipolar flakes are rare. |
| Early Bondaian  | c8000–3000BP             | Decline in use of silicified tuff. Shift in raw material usage to silcrete. Appearance of backed artefacts. Wide use of bipolar flaking.                                                                    |
| Middle Bondaian | c3000–1000BP             | Main phase of backed artefacts. Introduction of asymmetric alternating flaking. Smaller tools and cores. Increase in bipolar flaking.                                                                       |
| Late Bondaian   | c1000BP–European Contact | Backed artefacts become rare or absent from most sites. In coastal areas there is a change to the use of quartz.                                                                                            |

#### *Aboriginal Occupation of the Cumberland Plain during the Pleistocene*

Evidence of multiple phases of Aboriginal occupation, from the late Pleistocene (c25–30ka) to Middle Bondaian (c3–5ka) have been retrieved and radiocarbon dated from the Parramatta Sand Sheet, a sandy river terrace deposit.<sup>15</sup>

The radiocarbon determinations from site RTA-G1 in Parramatta demonstrate multiple occupation events over a considerable time period. The date of 30,735 ± 407 BP is the earliest date for human occupation along the eastern coast of Australia. The RTA-G1 determinations further confirm that a transition from preferential use of silicified tuff to substantial use of silcrete was made between c6000 and 8000 years ago. Prior to dating of RTA-G1, we lacked a firm indication of age for silicified tuff assemblages across the Cumberland Plain (and the broader Sydney region) which generally underlie silcrete dominant assemblages.

A date of 9376 ± 61 BP (Wk-16167), calibrated to 10,700 BP (95.4 per cent probability) was recovered for a small, weathered silicified tuff assemblage within the former grounds of Tempe House, the earliest date for an occupation site in the coastal strip of the Sydney Basin.<sup>16</sup>

The preferential use of silicified tuff as a Pre-Bondaian signature was also encountered in two rock shelters at the base of the Darling Mills State Forest—with dates of  $6740 \pm 120$  BP (Wk-2963) and  $10,150 \pm 130$  BP (Wk-2511).<sup>17</sup> These radiocarbon determinations also indicate that use of glossy silcrete (ie potentially heat-treated silcrete)—which dominates most silcrete assemblages on the Cumberland Plain—may have been adopted as early as c6700 and 5050 Cal BP. This is significantly earlier than had been suggested by previous studies of heat treatment in the region.<sup>18</sup>

The ERS and comparable dating from Aboriginal sites on the Cumberland Plain could be used to assist in defining the chronological context of the study area, should large assemblages of stone artefacts be identified.

### **Cumberland Plain Predictive Model**

The Cumberland Plain is one of Australia's most archaeologically excavated landscapes, where the past 20 years has seen hundreds of excavations across many locations and landforms. A number of key Aboriginal heritage archaeological excavations have been undertaken that provided the basis for predictive modelling on the Cumberland Plain, in particular sites excavated by JMcDCHM in the Rouse Hill Development Area.<sup>19</sup>

The Cumberland Plain Predictive Model hypothesises how the nature of Aboriginal sites across the Cumberland Plain can vary according to landform and landscape. Stream order forms the basis of this model and assumes that people would have preferentially selected places where the water supply was more permanent and predictable for semi-permanent camping locations.<sup>20</sup> The Cumberland Plain Predictive Model predicts that the size (density and complexity) and nature of archaeological features will vary according to the permanence of water (ie ascending stream order), landscape unit and proximity to lithic resources in the following ways:

- In any landscape location across the Cumberland Plain, there is a chance that a 'background scatter' of Aboriginal objects exists—that is, objects deposited as a consequence of one-off manufacture and/or use, where no correlation would be associated with a landform or a more permanent activity area. Such areas are unlikely to contain a subsurface archaeological deposit.
- Assessment of archaeological subsurface potential solely through surface manifestation of artefacts during surface survey is inadequate to accurately identify and assess the presence of subsurface deposits as soils are largely aggrading across the Cumberland Plain, and therefore most artefacts are buried.
- In the headwaters of upper tributaries (ie first-order creeks), archaeological evidence will be sparse and represent little more than a background scatter; and, where distant from stone sources, would demonstrate the use of stone rationing strategies. Based on previous excavations on the Cumberland Plain, artefact densities of approximately 1 artefact/m<sup>2</sup> would be expected in these areas.<sup>21</sup>
- In the middle reaches of minor tributaries (second-order creeks) there will be archaeological evidence for sparse but focused activity (eg one-off camp locations, single episode knapping floors). Artefact densities of approximately 6.5 artefacts/m<sup>2</sup> would be expected in these areas.<sup>22</sup>
- In the lower reaches of tributary creeks (third-order creeks) there will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors (perhaps used and reused), and evidence of more concentrated

activities. A regional analysis of artefact densities for third-order creeks has not been undertaken as too few test squares had been excavated in these landscapes. However, based on the model, it can be expected that artefact densities of between 8–13 artefacts/m<sup>2</sup> would be found in these areas.

- On major creek lines (fourth-order) there will be archaeological evidence for more permanent or repeated occupation. Sites will be complex and may even be stratified. Artefacts will show less use of rationing strategies as people may have been less mobile and remained in the same location for several days, or even weeks. Evidence for the caching of raw materials may also be present. Artefact densities of approximately 14 artefacts/m<sup>2</sup> would be expected in these areas.
- Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site.
- Ridgetop locations between drainage lines will usually contain limited archaeological evidence, although isolated knapping floors or other forms of one-off occupation may be in evidence in such a location.
- Elevated terraces and flats overlooking higher order watercourses may contain archaeological evidence for more permanent or repeated occupation.
- Naturally outcropping silcrete will have been exploited and evidence for extraction activities (decortication, testing and limited knapping) would be found in such locations.

It has also been hypothesized that stone artefact based sites in close proximity to an identified stone source would cover a range of size and cortex characteristics. With distance away from the resource, the general size of artefacts in the assemblage should decrease, as should the percentage of cortex and rate of artefact discard (distance–decay model). The availability of raw materials such as silcrete and silicified tuff in gravel beds, and the increasing number of known silcrete sources, has made the testing of the distance decay model very difficult, and this model may be a risky mechanism for explaining raw material preferences around the Cumberland Plain.<sup>23</sup>

The application of this predictive model suggests that the study area does not contain water sources which provided a focus for intensive Aboriginal activities, which could have resulted in an archaeological signature. However, this is tempered by the western boundary being the Hawkesbury River. Whilst presenting a large permanent water source, with known use of its gravel beds, there are not any associated specific landforms or features within the study area which demonstrate an obvious connection to Aboriginal use.

As such, the study area is most likely to contain isolated stone artefacts, in disturbed soil context, with an obvious focus or connection to a larger intact sub-surface archaeological deposit.

### **Paleochannels and Patches: A Geoarchaeological Assessment of Silcrete Sources in the Cumberland Plain, Eastern Australia—Doelman et al. 2015<sup>24</sup>**

Doelman et al conducted a geoarchaeological survey across five locations within the Cumberland Plain, where silcrete baring gravels of the St. Mary's Formation are exposed. Those sites were Dean Park, Chesham Street, Ropes Crossing, Park Street and Wellington Street. Four characteristics were assessed at each location, physical context and appearance, material quality (based on grain size and sorting), abundance of raw material and accessibility (ease of extraction).

The results of the survey found that quality, abundance and accessibility of silcrete varied greatly within each source and across the Cumberland Plain. As suitable raw material for artefact manufacture was difficult to find, it was concluded that when a reliable source was found, it was heavily targeted. Little to no evidence exists of sites being used as quarries as the nature of procurement involves removing a cobble to be worked in a different location.

The paper defines locations across the Cumberland Plain used as quarries—these are located around 30km southwest of the study area.

### **Richmond Water Reuse Project—Archaeological Survey and Test Excavations—Jo McDonald Cultural Heritage Management 1997-1998<sup>25</sup>**

JMcDCHM was commissioned by Sydney Water to undertake archaeological survey and testing as a part of the Richmond Water Reuse Project in 1997 and 1998. At the time of the excavation, the land was owned by the Department of Education and used by the University of Western Sydney. The area was known as Clarendon Paddocks and was formally a swamp. It is approximately 4.5km southeast of the current study area.

JMcDCHM excavated 40 test squares through five transects and retrieved a total of 69 artefacts. The results of the excavation suggest occasional Aboriginal occupation within the subject area. This occasional use of the wetland resources resulted in a sparse scatter of stone artefacts and it was believed that larger camp sites were located on more elevated ground, outside of the study area.

### **Initial Archaeological Assessments of St Mary Development Site (SMDS) and Development of the Strategic Management Model (SMM)—1994 to 1997<sup>26</sup>**

Between 1994 and 1997 Brayshaw McDonald and subsequently JMcDCHM were commissioned to prepare a series of archaeological assessments aimed at managing the Aboriginal archaeological resources within the SMDS. These initial desktop assessments were subsequently refined by pedestrian survey and later test excavation.

The archaeological assessments drew together geomorphological data, hydrology, historical disturbance, as well as ethnographic and archaeological data from across the Cumberland Plain to develop a predictive model for archaeological resources within the SMDS. This model was subsequently refined and developed into the SMM. Areas of archaeological potential and significance were identified to create a zoning plan for the SMDS which provided for the conservation of a representative sample of landforms with archaeological potential within the proposed Regional Park. Specific Aboriginal heritage management outcomes were outlined for each of the four zones within the SMM.

Representativeness was key concept of the SMM, in that landforms which hold little potential to conserve Aboriginal objects were also important to conserve in order to provide a clear picture of how Aboriginal people used the landscape holistically by preserving a variety of archaeological site types representing both intensive and non-intensive use.

Test excavation was undertaken in 1997 at five locations across the SMDS in order to ground truth the SMM and refine the boundaries for the conservation zones of the wider site.<sup>27</sup> Each test excavation location was selected in order to investigate the major landforms within the SMDS, including the Quaternary floodplains, Tertiary alluvial terraces and Shale hillslopes as well as the assigned management zone and creek proximity.<sup>28</sup>

The predictive model of the SMM was generally confirmed through the results of the 1997 test excavation program, with some refinement of the proposed conservation zones and mapping of zones of disturbance.

### **St Marys Development Site (SMDS) Western Precinct Excavations**

Continuation of the work detailed above, saw six areas subject to archaeological salvage excavation in the Western Precinct, now the suburb of Jordan Springs, under AHIP No. 10996059. Each area was selected to test a variety of representative landforms against the predictive model. The following provides a synopsis of the results of excavations in WP1, WP2, WP3, WP4, WP5 and WP6 in relation to the predictive model developed for the SMDS.

#### *Ridgetops near First Order Streams (WP2 and WP3)*

Based on the predictive model, Aboriginal archaeology on ridgetop locations near first order (impermanent) streams was expected to be limited, although isolated knapping floors and other forms of one-off occupation may be present. This was owing to the perceived unfavourable nature of this type of location for long-term camping (ie lack of permanent water and generally more exposed, sloping ground).

Excavation of WP2 and WP3 recovered unexpectedly high densities of artefacts with evidence for repeated and intensive on-site knapping of silcrete and silicified tuff and the production of elongate flakes and backed blades. Much less evidence for raw material rationing, especially of silicified tuff was noted in these ridgetop locations. Overall the two ridgetop locations in the Western Precinct appeared to be more of a focus for Aboriginal occupation than was anticipated by the predictive model.

#### *Lower Hillslopes near First, Second and Third Order Streams (WP1, WP4 and WP5)*

The predictive model hypothesises that with increasing stream order (ie water permanence) evidence for Aboriginal occupation would become denser, more continuous and that evidence for more complex activities may be present.

Some support for increasing intensity and complexity of site occupation was observed in relation to increasing stream order in WP4 and WP5. Evidence for the on-site production of backed blades was observed at both sites and raw material rationing was less evident than expected.<sup>29</sup>

At WP1, a lower hillslope near a third order stream, the predictive model hypothesised evidence for prolonged and intensive Aboriginal occupation such as increased artefact density and a wider range of activities. However, of all the landforms excavated in the Western Precinct, WP1 contained the lowest artefact densities with the average artefact density from test excavation being 1.1 artefacts/m<sup>2</sup>. Little evidence of intensive on-site knapping was observed in this location, although two possible ground ovens were identified. Comparative results were obtained from the earlier excavation of the Xavier College site, 650m west along the same tributary. Based on descriptions in the excavation report, a potential ground oven may have also been observed at the Xavier College site although it was not interpreted as such at the time.<sup>30</sup>

#### *Alluvial Flats near Third Order Streams (WP6)*

Only one site within the Western Precinct, WP6<sup>31</sup>, was located on an alluvial flat. WP6 was located near a third order stream and was anticipated to provide evidence of more repeated and possibly long-term occupation with people camping in this location for several days and possibly weeks.

However mean artefact densities recovered during test excavation were much lower than expected for this type of landform and stream order combination.

Discrete areas of intensive occupation, flaking and formal tool production were observed at WP6 in Trenches 2 and 3 but more continuous evidence of this nature was expected to be found in close proximity to permanent freshwater. However, formal tools unusual for this region of the Cumberland Plain were found in Trench 3, which could be suggestive of more complex lithic activities being carried out here as opposed to more casual tool maintenance and production.

### **Central Precinct and North Dunheved Precinct Excavations**

In 2013 GML + JMcDCHM undertook test excavation within the Central Precinct and the North Dunheved Precinct of the SMDS. Located across the alluvial floodplains west of South Creek, these precincts are most closely related geomorphologically, environmentally and archaeologically to the current study area.<sup>32</sup> Test excavations focused on alluvial terraces to investigate the potential for stratified deposits in association with higher order streams (ie South Creek).

Results from the test excavation suggested a general lack of correlation with the Cumberland Plain Predictive Model. Of the six Central Precinct test excavation areas, five were located on alluvial soils in association with high order streams (fourth+/South Creek). For Aboriginal archaeological sites in proximity to streams of this size, it was predicted that high artefact densities would be present, with evidence for the continuous complex use of areas in close proximity to permanent water sources that can sustain larger populations. Artefact densities across the alluvial soils in proximity to South Creek/larger order streams were relatively low, indicating the need for further research and investigation of the nature of Aboriginal occupation, both on alluvial soils in general across the Cumberland Plain and within the SMDS itself.

One area in North Dunheved (ND2) revealed deep, intact alluvial profiles containing Aboriginal objects with high integrity. Some evidence for a shift from silicified tuff to silcrete over time was observed however test excavation did not recover a large enough sample to determine whether this was statistically significant. Salvage excavation of ND2 under AHIP No. C0000475 will occur prior to development occurring in that area.

Salvage excavation of four areas (CP1, CP3, CP4 and CP6) was undertaken in 2014 under AHIP No. C0000362.<sup>33</sup> Approximately 14,000 lithics were recovered from 500m<sup>2</sup> of excavation and analyses of the results of this excavation are currently ongoing. Preliminary results suggest that some stratified evidence of technological change from at least early Bondaian to late Bondaian phases exists within the alluvial terraces. Comparative analysis between the shale hillslopes and alluvial floodplains is ongoing.

Preliminary results from the excavation of alluvial terraces within the SMDS indicate that some vertical stratification of Aboriginal sites has occurred and technological changes over time may be able to be observed in these open sites. However further analysis is required to examine whether Aboriginal occupation of alluvial floodplains was more permanent, repeated and complex than the surrounding hillslopes and thereby test the hypotheses of the currently predictive model.

### **Contrast of Prior Work to the Study Area**

Prior archaeological excavation within the region have included a number of different soil landscapes and landform types. Contract against the study area identifies that sites such as WP6 and CP1 to CP6 are in similar alluvial soil landscapes. However, all of these excavated sites were located on very specific landforms, connected to raised terraces above an adjacent flood plain. In

each case historical disturbance could be described as minimal, where soils retained good condition and integrity. The current study area does possess the same landforms or soil conditions.

Application of the SMDS to the current study area<sup>34</sup>, on the basis of predictive modelling and land use history would designate the entire area Zone 4, low archaeological potential, with no identified constraint to development across the area.

### 3.3 Visual Inspection of the Study Area

A visual inspection of the study area was undertaken to clarify the land use history and visual aesthetics of the place. This inspection was not an Aboriginal archaeological survey. The study area contains numerous elements, which are described below and shown in Figures 3.1 to 3.4.

The study area contains well maintained lawns and polo grounds (Figure 3.1). There are slight slopes towards the water courses, which have also been modified and maintained, with the addition of water features and planting of imported tree species (Figure 3.2 and Figure 3.3). The Blue Mountains make a distinct panorama surrounding the subject area (Figure 3.4).



**Figure 3.1** Across a polo ground and the line of young trees in the background. (Source: GML, 2016)



**Figure 3.2** To the lagoon, with modified flood prone landforms in the foreground and a row of young trees in the background. (Source: GML, 2016)



**Figure 3.3** One of the dams located within the study area. The banks are planted with exotic trees. (Source: GML, 2016)



**Figure 3.4** On the eastern margins of the study area, across agricultural lands with turf grass. The open landscape provides a panoramic view to the Blue Mountains. (Source: GML, 2016)

### 3.4 Aboriginal Community Consultation

Aboriginal community consultation was not undertaken as part of this desktop assessment. GML's prior work in the region has included discussions with the local Aboriginal community and Local Aboriginal Land Council on regional heritage values. Of note are comments relating to the Blue Mountains being part of a wider cultural landscape. The Aboriginal community has noted aesthetic, spiritual and social values connected with the Blue Mountains.

### 3.5 Synopsis of the Desktop Assessment and Visual Inspection

Previous archaeological work in the region surrounding the study area has focused on stone artefact sites and academic assessment of Aboriginal stone resource gathering. This work reflects the detailed archaeology that has been created in association with regional landforms and landscape features, hydrology, geology and soils. No previous archaeological work has focused on lands within or immediately adjacent to the study area.

The study area is visually tied to the Blue Mountains, with panoramic views available from the study area. GML has undertaken community consultation in prior archaeological work, which indicated that the Blue Mountains hold a strong connection to Aboriginal cultural heritage. As such, views from the study area towards the Blue Mountains are considered a component of the wider regional Aboriginal cultural landscape. However, the views observed from the study area are not uniquely limited to the study area. These views are available from locations across Richmond and all areas associated with flood plains in the Hawkesbury area.

In summation, the assessments based on prior work and the visual inspection have not identified any specific social, historical, and or scientific value connecting the study area to local Aboriginal cultural heritage. The aesthetic values associated to the Blue Mountains can be considered regional and not specific to the study area.

## 4.0 The Proposed Works and Potential Impacts

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### 4.1 Description of the Proposed Works

The proposed 'work' is changes to the statutory planning uses under current land zoning—RU2. The proposal seeks to change the permissible future land uses. At the current time, a potential range of future uses has been proposed. These uses will be subject to their own assessments and approvals through Council. As such the current proposal would not result in a direct impact to the study area.

The future uses of the study area are designed to support the existing and future use of the area for polo (notably the Polo World Cup), function centres, tourist accommodation and other uses. Detailed description of the proposed works is provided in the Planning Proposal. The below summary has been taken from the final planning proposal.<sup>35</sup>

The proposed additional uses for the study area are:

- Development for the purpose of advertisement.
- Advertising structure.
- Car park
- Food and drink premises.
- Light industry.
- Kiosk.
- Shop.
- Eco-tourist facilities. A building or place that:
  - provides temporary or short-term accommodation to visitors on a commercial basis;
  - is located in or adjacent to an area with special ecological or cultural features; and
  - is sensitively designed and located so as to minimise bulk, scale and overall physical footprint and any ecological or visual impact.
- Function centres. A building or place used for the holding of events, functions, conferences and the like, and includes convention centres, exhibition centres and reception centres, but does not include an entertainment facility.
- Market. An open-air area, or an existing building, that is used for the purpose of selling, exposing or offering goods, merchandise or materials for sale by independent stall holders, and includes temporary structures and existing permanent structures used for that purpose on an intermittent or occasional basis.
- Medical centre. Premises that are used for the purpose of providing health services (including preventative care, diagnosis, medical or surgical treatment, counselling or alternative therapies) to out-patients only, where such services are principally provided by health care professionals. It may include the ancillary provision of other health services.

- Recreation facility (major). A building or place used for large-scale sporting or recreation activities that are attended by large numbers of people whether regularly or periodically, and includes theme parks, sports stadiums, showgrounds, racecourses and motor racing tracks.
- Recreation facility (outdoor). A building or place (other than a recreation area) used predominantly for outdoor recreation, whether or not operated for the purposes of gain, including a golf course, golf driving range, mini-golf centre, tennis court, paint-ball centre, lawn bowling green, outdoor swimming pool, equestrian centre, skate board ramp, go-kart track, rifle range, water-ski centre or any other building or place of a like character used for outdoor recreation (including any ancillary buildings), but does not include an entertainment facility or a recreation facility (major).
- Sewage reticulation system. A building or place used for the collection and transfer of sewage to a sewage treatment plant or water recycling facility for treatment, or transfer of the treated waste for use or disposal, including associated:
  - pipelines and tunnels;
  - pumping stations;
  - dosing facilities;
  - odour control works;
  - sewage overflow structures; and
  - vent stacks.
- Sewage system. Any of the following:
  - biosolids treatment facility;
  - sewage reticulation system;
  - sewage treatment plant; and
  - water recycling facility.
- Sewage treatment plant. A building or place used for the treatment and disposal of sewage, whether or not the facility supplies recycled water for use as an alternative water supply.
- Veterinary hospital. A building or place used for diagnosing or surgically or medically treating animals, whether or not animals are kept on the premises for the purpose of treatment.
- Industrial retail outlet.
- Water supply system. Any of the following:
  - a water reticulation system;
  - a water storage facility; and
  - a water treatment facility.

## 4.2 Possible Impacts Arising from the Proposed Projects

Whilst the change in approved land use under RU2 will not result in a physical impact to the study area, the consequential developments that could become permissible may present an impact. As such, this assessment takes into account possible actual future land use.

The works detailed above could result in localised top soil disturbance and removal in association with their footprints. The extent of the development could influence the amount of impact and disturbance. The details provided in the planning proposal, in general, suggest a low impact development. With the retention of land for polo fields and agricultural use along with the preservation of wetlands and river banks, the overall footprint of the development will be small.

If Aboriginal objects were present within a specific work item's footprint, the proposed works could result in a degree of harm to the Aboriginal objects. However, this due diligence report has identified that the study area generally holds a low level of Aboriginal archaeological potential for Aboriginal objects. The study has not identified any specific local landforms or places which could have been a focus for Aboriginal activities, resulting in the creation of Aboriginal objects. Furthermore, the history of land use has significant impact both to the condition and integrity of soil horizons.

As such, the potential change in land uses under RU2, and the consequential uses and development are unlikely to impact known Aboriginal heritage objects, and/or the general low level of archaeological potential ascribed to the study area.

The recommended Aboriginal heritage management takes into account both the proposed extent of development and findings of this due diligence approach.

## 5.0 Recommendations and Conclusions

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### 5.1 Findings of the Due Diligence Process

This due diligence report has found that the study area has a low potential for Aboriginal objects. There are no specific landforms or places which may have been a focus for Aboriginal activities, which could have resulted in the creation of Aboriginal objects. Furthermore, as the whole study area has been subject to significant and repeated ploughing, cropping, part use as a turf farm, development of the polo club and the general landscaping over the last 60 years, if Aboriginal objects were present they would most likely be in a disturbed context.

As such, it is recommended that the current planning proposal can proceed subject to caution without the need for an Aboriginal Heritage Impact Permit, under Section 90 of the *NPW Act 1974*. This recommendation is subject to the following Aboriginal heritage management requirements (Section 5.2).

### 5.2 Required Aboriginal Heritage Management

This due diligence assessment report has found that the rezoning proposal can proceed subject to caution without an AHIP, the best practice aboriginal heritage approach prior to future development should involve:

- determining the footprint and associated impacts possible for area of development, including works and laydown areas;
- engaging the Local Aboriginal Land Council and an Aboriginal archaeologist to inspect the footprint to confirm the absence of Aboriginal objects and potential Aboriginal cultural heritage.
- If no Aboriginal objects or potential for Aboriginal cultural heritage are present, and the potential of the zone subject to development does not hold Aboriginal archaeological potential, the proposed development could proceed with caution.
- Should Aboriginal objects and/or an area with the potential for Aboriginal objects be identified, the proponent must apply the OEH 2010 *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW*.<sup>36</sup> Should one or more Aboriginal object be identified the proponent should ideally modify the proposal footprint to avoid harm (eg conservation of the Aboriginal objects, and thus Aboriginal heritage values). If harm is to occur to an Aboriginal object, then the proponent must seek an AHIP before harm occurs. Aboriginal heritage mitigation, such as test and/or salvage excavation may be required to mitigate against harm.

## 6.0 Endnotes

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- <sup>1</sup> DECCW 2010. NPWS Act 1974. *Fact sheet 1*. September 2010.
- <sup>2</sup> DECCW. 24 April 2009. *Due diligence guidelines for protection of Aboriginal objects in NSW*. Accessed Online.
- <sup>3</sup> DECCW 2010. NPWS Act 1974. *Fact sheet 2*. September 2010.
- <sup>4</sup> SM Bannerman & PA Hazelton, *Soil Landscapes of the Penrith 1:100 000 Sheet*, Sydney, Soil Conservation Service of NSW, 1990.
- <sup>5</sup> JG Speight, 'Landform' in *Australian Soil and Land Survey Field Handbook*, RC McDonald et al. (eds), 2nd ed., Melbourne, Inkata Press, 1990, pp. 9–57.
- <sup>6</sup> Bannerman and Hazelton.
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