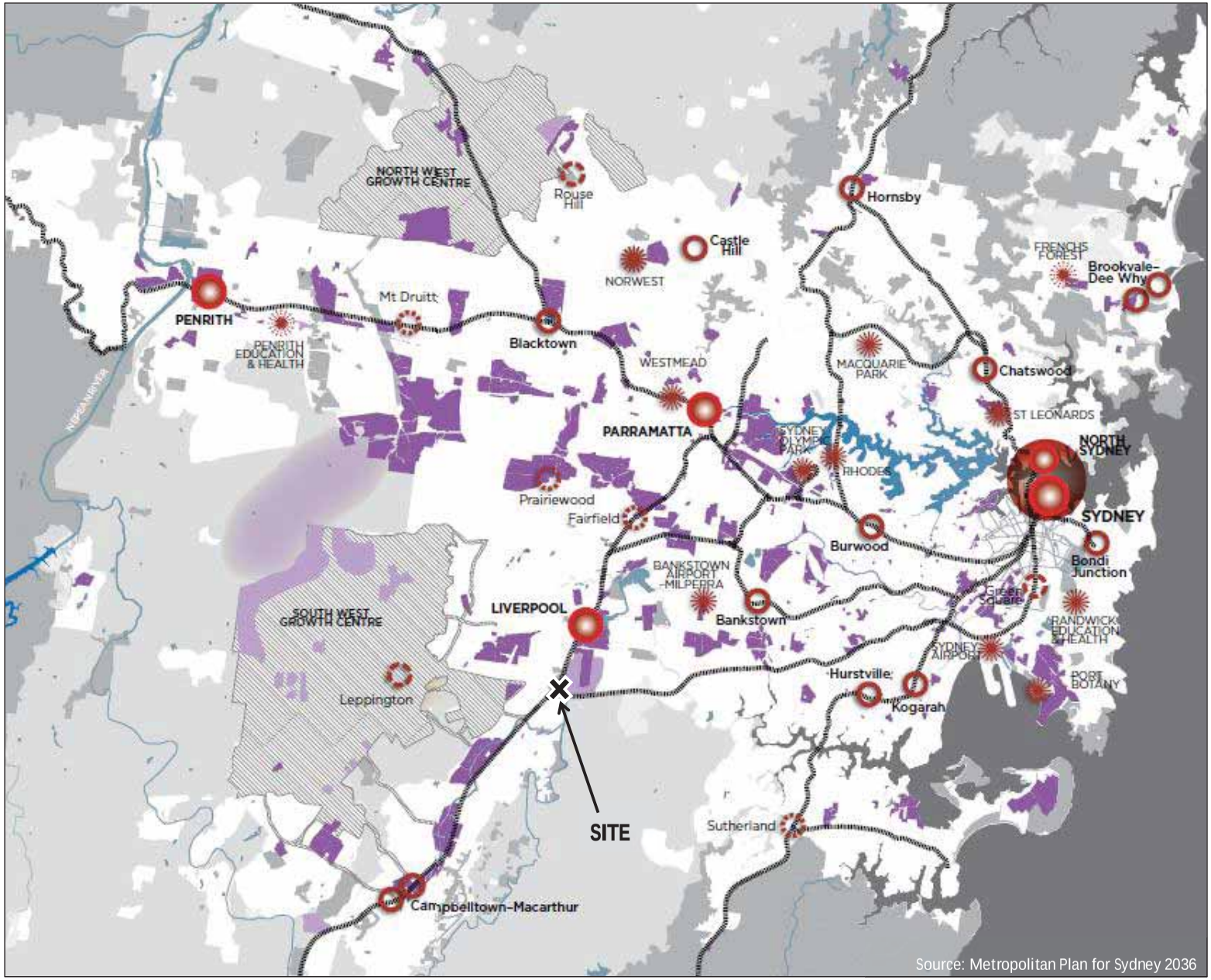
Appendix 19

Employment Lands



Legend

EMPLOYMENT LANDS

- GLOBAL SYDNEY
- REGIONAL CITY
- SPECIALISED CENTRE
- POTENTIAL SPECIALISED CENTRE
- MAJOR CENTRE
- PLANNED MAJOR CENTRE
- POTENTIAL MAJOR CENTRE
- RAIL NETWORK
- WESTERN SYDNEY EMPLOYMENT AREA POTENTIAL EXPANSION
- GROWTH CENTRE
- EXISTING ZONED EMPLOYMENT LANDS
- PROPOSED EMPLOYMENT LANDS

Map Title:	Metrolpolitan Sydney Employment Lands					**Date:**	31 May 2012
Location:	Metropolitan Sydney, NSW Australia	**Version No:**	V01	**Map/DWG No:**	**1** of **1**	**Job Ref:**	11012

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Appendix 20

Sydney Urban Footprint

Legend

- FUTURE URBAN AREAS (MDP RELEASE AREAS; GROWTH CENTRES; PROPOSED EMPLOYMENT LANDS)
- EXISTING URBAN AREAS/ RURAL SETTLEMENTS
- NATIONAL AND STATE PARKS; DEFENCE LANDS
- RURAL AND RESOURCE LANDS
- RAIL NETWORK

Map Title:	Sydney's Urban Footprint in 2010					**Date:**	31 May 2012
Location:	Metropolitan Sydney, NSW Australia	**Version No:**	V01	**Map/DWG No:**	**1** of **1**	**Job Ref:**	11012

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Appendix 21

Campbelltown City Council Cumberland Recovery Plan

Reports from the Planning and Environment Committee Meeting held at 7.30pm on Tuesday, 24 May 2011.

APOLOGIES

ACKNOWLEDGEMENT OF LAND

DECLARATIONS OF INTEREST

Pecuniary Interests

Non Pecuniary – Significant Interests

Non Pecuniary – Less than Significant Interests

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Minutes of the Planning and Environment Committee held on 24 May 2011

Present

Councillor R Kolkman (Chairperson)
Councillor J Bourke
Councillor G Greiss
Councillor P Hawker
Councillor M Oates
Councillor R Thompson
General Manager - Mr P Tosi
Director Planning and Environment - Mr J Lawrence
Manager Environmental Planning - Mr P Jemison
Manager Compliance Services - Mr A Spooner
Manager Waste and Recycling Services - Mr P Macdonald
Manager Community Resources and Development - Mr B McCausland
Environmental Planning Coordinator - Mrs R Winsor
Corporate Support Coordinator - Mr T Rouen
Executive Assistant - Mrs D Taylor

Apology **(Oates/Hawker)**

That the apology from Councillor Matheson be received and accepted.

CARRIED

Acknowledgement of Land

An Acknowledgement of Land was presented by the Chairperson Councillor Kolkman.

DECLARATIONS OF INTEREST

Declarations of Interest were made in respect of the following items:

Pecuniary Interests

Non Pecuniary – Significant Interests

Councillor Kolkman – Item 2.4 – Lot 3004 DP 1152287 Stowe Avenue, Campbelltown - Six to eight storey mixed-use commercial, retail and residential apartment development proposal - Councillor Kolkman advised that he is a member of the Joint Regional Planning Panel (JRPP) and that he will leave the Chamber and not take part in debate nor vote on the matter.

Councillor Kolkman – Item 3.2 – Minto Urban Renewal Project - Subdivision of Stage 10 - Councillor Kolkman advised that he is a member of the Joint Regional Planning Panel (JRPP) and that he will leave the Chamber and not take part in debate nor vote on the matter.

Councillor Hawker – Item 2.4 - Lot 3004 DP 1152287 Stowe Avenue, Campbelltown - Six to eight storey mixed-use commercial, retail and residential apartment development proposal - Councillor Hawker advised that he is a member of the Joint Regional Planning Panel (JRPP) and that he will leave the Chamber and not take part in debate nor vote on the matter.

Councillor Hawker – Item 3.2 - Minto Urban Renewal Project - Subdivision of Stage 10 - Councillor Hawker advised that he is a member of the Joint Regional Planning Panel (JRPP) and that he will leave the Chamber and not take part in debate nor vote on the matter.

Non Pecuniary – Less than Significant Interests

2.3 Adopted Recovery Plan for the Cumberland Plain

Reporting Officer

Manager Environmental Planning

Attachments

1. Adopted Cumberland Plain Recovery Plan – Executive Summary (distributed under separate cover).
2. Council owned or managed priority conservation lands (distributed under separate cover).

Purpose

To inform Council that the Recovery Plan for the Cumberland Plain has been adopted and to highlight those actions for which Council is responsible.

History

The Draft Cumberland Plain Recovery Plan was placed on public exhibition from the 9 November to the 18 December 2009. On 15 December 2009, Council considered a report on the Draft Plan and resolved to endorse some, but not all of the Recovery Plan's actions. The outcome of these considerations was reflected in Council's submission on the Draft Recovery Plan to the NSW Office of Environment and Heritage (OEH) dated 17 December 2009. Subsequently, Council has been identified as a responsible agency for the implementation of such actions within the final Cumberland Plain Recovery Plan.

Report

The NSW Office of Environment and Heritage (formerly known as the Department of Environment, Climate Change and Water) adopted the Cumberland Plain Recovery Plan in January 2011 under the NSW Threatened Species Conservation Act 1995. The purpose of this Plan is to provide for the long-term survival of the Cumberland Plain's threatened biodiversity and to inform land use planning decisions. The Recovery Plan addresses six (6) threatened flora species, one (1) threatened fauna species, four (4) threatened populations and nine (9) endangered ecological communities (EECs) listed under the Threatened Species Conservation Act, 1995 (TSC Act). Five (5) of the threatened flora species and two (2) of the EECs are also listed under the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act).

The Plan's executive summary is provided as Attachment 1. The full Recovery Plan can be viewed at: http//:www.environment.nsw.gov/resources/threatenedspecies/20100501 CumberlandPlain.pdf.

The Recovery Plan identifies recovery actions for implementation by all levels of government including Councils. These actions are grouped under the following themes:

- Building the protected area network;
- Delivering best practice management;
- Promoting awareness, education and engagement; and
- Enhancing information, monitoring and enforcement.

In accordance with Section 69(1) of the NSW TSC Act 1995, Ministers and public authorities (including local Councils) are to take any appropriate action available to them to implement those measures included in a Recovery Plan for which they are responsible and must not make decisions that are inconsistent with the provisions of a Recovery Plan.

Under the Plan Council, has been identified as a responsible authority for the implementation of those recovery actions which it has previously endorsed (as reflected in Council's submission to the OEH dated 17 December 2009). These actions are as follows:

- Action 1.4: Local Councils will have regard to the priority conservation lands in identifying areas for inclusion in environmental protection and regional open space zones.

- Action 2.1: Preferentially target any future investment associated with the management of the Cumberland Plain's threatened biodiversity to the priority conservation lands where practicable.

- Action 2.2: Support and promote the adoption of best practice standards for bushland management and restoration (as specified in Appendix 2 of the Recovery Plan) on public and private lands within the Cumberland Plain.

- Action 3.4: Work collaboratively with local government authorities and other organisations to inform communities about the value and role of remnant vegetation on the Cumberland Plain, the best practice standards for its management, and any opportunities to participate in the recovery program.

- Action 3.5: Work with Aboriginal communities, landholders, community groups and students to deliver best practice management in priority conservation lands, and to identify opportunities for involvement in the recovery program.

- Action 3.7: Develop interpretative programs for key local reserves that contain examples of threatened biodiversity addressed in the Recovery Plan.

- Action 4.3 (formerly Action 4.4 with the Draft Recovery Plan): The Office of Environment and Heritage will encourage local councils to prepare or review biodiversity strategies to be consistent with the Recovery Plan that guide protection, management and strategic investment in threatened biodiversity, both within and outside of priority conservation lands.

- Action 4.4 (formerly Action 4.5 within the Draft Recovery Plan): The Office of Environment and Heritage will work collaboratively with local Councils to enhance the compliance and enforcement program with regard to unauthorised clearing of bushland on the Cumberland Plain.

In regards to actions 1.4 and 2.1 four priority conservation areas either occur or partially occur within the Campbelltown Local Government Area at Macquarie Fields (93.2 ha), Kentlyn (93.4ha), Mt Annan (40ha) and Gilead (233.4ha). Two of these areas comprise Council owned or managed land. One of these areas consists of Simmos Beach Reserve and surrounding lands and the other is located in the vicinity of Peters Meadow Creek, Kentlyn (Attachment 2).

Whilst Council will aim to effectively implement the above actions, any investment towards their implementation will need to be prioritised in light of other local conservation priorities and projects, as well as existing responsibilities under other relevant State and Commonwealth Recovery Plans, threat abatement plans and priority action statements. It is anticipated that the Campbelltown Biodiversity Strategy once completed, will help prioritise the implementation of such actions and responsibilities. This will, in turn, assist in Council's consideration of the allocation of resources to biodiversity related activities.

Officer's Recommendation

That the information be noted.

Committee's Recommendation: (Oates/Bourke)

That the Officer's Recommendation be adopted.

CARRIED

Council Meeting 31 May 2011 (Kolkman/Oates)

That the Officer's Recommendation be adopted.

Council Resolution Minute Number 104

That the Officer's Recommendation be adopted.

Appendix 22

Archaeology and Aboriginal Heritage Report

ABORIGINAL HERITAGE PRELIMINARY ASSESSMENT

GLENFIELD WASTE DISPOSAL

FOR

ENVIRONMENTAL PROPERTY SERVICES

The western quadrant of the subject site, looking west.

Final Report

May 2012

AHMS

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GLOSSARY

Aboriginal Cultural Heritage Assessment	A document developed to assess the archaeological and cultural values of an area, generally required as part of an Environmental Assessment (EA).
Aboriginal Heritage Impact Permit (AHIP)	The statutory instrument that the Director General of the Office of Environment and Heritage (OEH) (formerly the Department of Environment, Climate Change and Water (DECCW)) issues under Section 90 of the *National Parks and Wildlife Act 1974* to allow the investigation (when not in accordance with certain guidelines), impact and/or destruction of Aboriginal objects. AHIPs are not required for a project subject to Part 3A of the *Environmental Planning and Assessment Act* 1979 or State Significant Major Developments subject to Part 4 of the Act.
Aboriginal object	A statutory term defined under the *National Parks and Wildlife Act 1974* as, 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.
Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales	A series of guidelines developed by DECCW (now OEH) that prescribe the structure and content of certain Aboriginal Cultural Heritage Assessments and associated archaeological investigations/excavations. The Code of Practice applies to non-State Significant projects subject to Parts 4 and 5 of the *Environmental Planning and Assessment Act, 1979*.
Department of Environment, Climate Change and Water (DECCW)	Now known as the Office of Environment and Heritage (OEH).
Department of Planning and Industry	A NSW government department that, among other things, is the assessing authority for State Significant developments subject to Part 3A and 4 of the *Environmental Planning and Assessment Act 1979.* In such developments..
Director General's Requirements (DGRs)	Project specific requirements of the Director General, Department of Planning (now the Department of Planning and

	Infrastructure (DPI) for State Significant development under Part 3A or 4 of the *EP& A Act*.
Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales	A series of guidelines developed by DECCW (now OEH). These guidelines prescribe the structure and content of a two stage process to determine whether Aboriginal objects and/or areas of archaeological interest are present within a subject area. The results of a due diligence assessment can find that an Aboriginal Cultural Heritage Assessment may be subsequently required.
Guidelines For Aboriginal Cultural Heritage Impact Assessment and Community Consultation , July 2005	Requirements for Aboriginal heritage assessments for projects subject to Part 3A of the *Environmental Planning and Assessment Act, 1979*. The Guidelines include site assessment and Aboriginal community consultation process and are now also used for Part 4 State Significant developmnts.
National Parks and Wildlife Act 1974	Legislation that protects Aboriginal cultural heritage in NSW. Part 6 of the Act outlines the protection afforded to and offences relating to disturbance of Aboriginal objects. The Act is administered by the OEH.
Office of Environment and Heritage (OEH)	Formerly the Department of Environment, Climate Change and Water (DECCW). A State government agency that manages and regulates Aboriginal cultural heritage under the *National Parks and Wildlife Act, 1974*.
Proponent	A corporate entity, Government agency or an individual in the private sector that proposes to undertake a development project. The proponent for this project is the L.A. Kennett Enterprises Pty Ltd.

ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHMS	Archaeological and Heritage Management Solutions Pty Ltd
BP	Before present (AD 1950)
CHL	Commonwealth Heritage List
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water (now OEH)
DGRs	Director General's Requirements.
DP	Deposited Plan
DPI	Department of Planning and Industry
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LTO	Land Titles Office
NHL	National Heritage List
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage (formerly DECCW)
PAD	Potential Archaeological Deposit
PEA	Preliminary Environmental Assessment
SSD	State Significant Development

ACKNOWLEDGMENTS

- Georgie Kennett, L.A. Kennett Enterprises Pty Ltd;
- Simon Duffy and Meaghan MacDonald, Environmental Property Services;
- Glenda Chalker, Cubbitch Barta Native Title Claimants; and
- Elwyn Brown and Neil Sampson, Tharawal Local Aboriginal Land Council (Tharawal LALC).

EXECUTIVE SUMMARY

Background

- In mid-2012 Archaeological and Heritage Management Solutions (AHMS), was commissioned by Environmental Property Services Pty Ltd for L.A. Kennett Enterprises Pty Ltd to undertake an Aboriginal Heritage Assessment of the southern portion of the Glenfield Waste Disposal site, Glenfield, NSW. The assessment was to form two roles: 1) to provide information to inform a proposed re-zoning of the subject site from rural to industrial; and 2) to provide information to assist with the development of a proposed State Significant Development application for a recycling facility within the subject site. This report forms the basis for (1);

- This report was undertaken in accordance with the *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*, (DEC, 2005), and broadly the *Code of Practice for Archaeological Investigations of Aboriginal Objects in New South Wales* (DECCW, 2010), and *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010) as specific best practice standards and processes for Aboriginal heritage assessment in NSW;

- Aboriginal consultation was undertaken informally (due to time constraints) and included the Tharawal LALC and Cubbitch Barta Aboriginal Corporation. Formal Aboriginal consultation in accordance with OEH guidelines has begun and is ongoing;

- The assessment included an archaeological predictive model which was informed by a detailed background analysis of previous archaeological investigations in the region and information from the AHIMS database. A site survey was also undertaken in conjunction with the Aboriginal communities;

- The assessment identified that most of the subject site was heavily disturbed and/or previously developed, and the potential for preservation of archaeological materials was low. Two areas were identified as having received

limited impact – an undisturbed piece of bushland in the western quadrant of the subject site, and a minor tributary in the eastern quadrant of the transmission line. Ultimately, four Aboriginal objects/sites were identified within subject site, all within one of these undisturbed areas;

- Archaeological finds included *Glenfield ST* (#45-5-2428) and GWD 1, both scarred trees located near a house in the western quadrant of the site. For ease of management, both trees have been identified and recorded separately, however it is considered that GWD 1 is a culturally modified tree (and possibly one recorded several years ago by Anthony English) while Glenfield ST is unlikely to be of cultural origins (and was incorrectly identified as the tree recorded by Anthony English). An isolated find, Glenfield 1 (#45-5-3531), was previously recorded on a track in the northwest quadrant of the subject site. This track is currently used for ongoing railway expansion, and it is considered that the site is probably destroyed. GWD 2 was a large alluvial terrace on the bank of Georges River and encompassing a minor tributary in the eastern quadrant of the subject site.

- While several of these sites require further assessment and/or management as part of any development, it is considered that there is no heritage reason why the proposed rezoning should not proceed;

- The assessment identified the following recommendations:

    - Based on the findings of this study, there are no Aboriginal heritage issues that indicate that the re-zoning of the subject site from rural to industrial should not proceed;
    - It is considered that Glenfield ST (#45-5-2428) is not a scarred tree of cultural origins, and it is recommended that the AHIMS recording of this site is modified to 'not a site';
    - It is recommended that GWD 1 and GWD 2, a scarred tree and potential archaeological deposit identified as part of this assessment, are listed on the AHIMS database;
    - It is recommended that prior to any proposed impact, further assessment and characterisation is undertaken of the four Aboriginal objects/sites, Glenfield 1 (#45-5-3531), Glenfield ST (#45-5-2428), GWD 1 and GWD 2. Should they prove to be Aboriginal objects/sites as defined by the *National*

Parks and Wildlife Act 1974, appropriate assessments and permits under this Act would be required prior to their disturbance.

- A copy of this final report should be provided to the Tharawal LALC and Cubbitch Barta Aboriginal Corporation.

1. INTRODUCTION

1.1 Proponent Details

This report has been prepared by Archaeological & Heritage Management Solutions (AHMS) for Environmental Property Services (EPS) on behalf of the proponent, L.A. Kennett Enterprises Pty Ltd (**Table 1**).

Table 1. Proponent Contact Details.

Proponent	Archaeological Advisor
Environmental Property Services Level 1, 19 Stockton Street, Nelson Bay NSW 2315 **Contact Person:** Simon Duffy T. 02 4981 1600 E: simonduffy@enviroproperty.com.au	**Archaeological & Heritage Management Solutions Pty Ltd** 349 Annandale Street Annandale NSW 2038 **Contact Person:** Alan Williams T. 02 9555 4000 F. 02 9555 7005 M.0408 203 180 E: awilliams@ahms.com.au

1.2 Purpose of the Assessment

This report has been prepared by Archaeological & Heritage Management Solutions Pty Ltd (AHMS) for EPS to present the findings of a Preliminary Aboriginal Heritage Assessmentof the Glenfield Waste Disposal, Glenfield, NSW (hereafter 'subject area').

The Kennet Group is proposing to re-zone the subject area from 1(a) rural to industrial. At the same time, development plans for a new recycling facility in the subject area are being detailed. It is understood that the development will be subject to Part 4 (Division 4.1) of the Environmental Planning & Assessment Act 1979.

This report provides a study of the Aboriginal heritage constraints and opportunities within the subject area to inform both the re-zoning and the proposed development. This report was

undertaken in broad accordance with Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005) as well as the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, April 2011), Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, April 2010), and Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, September 2010).

1.3 Subject Area

The study area comprises the southern portion of the Glenfield Waste Disposal site, Glenfield, NSW (**Figure 1**). The site is broadly constrained to the north by the East Hills railway line (which is within the subject area), to the east by the Georges River, to the west by the Southwest railway line and to the south by Cambridge Avenue (**Figure 2**). However, the transmission line immediately south of Cambridge Avenue is also considered as part of this study.

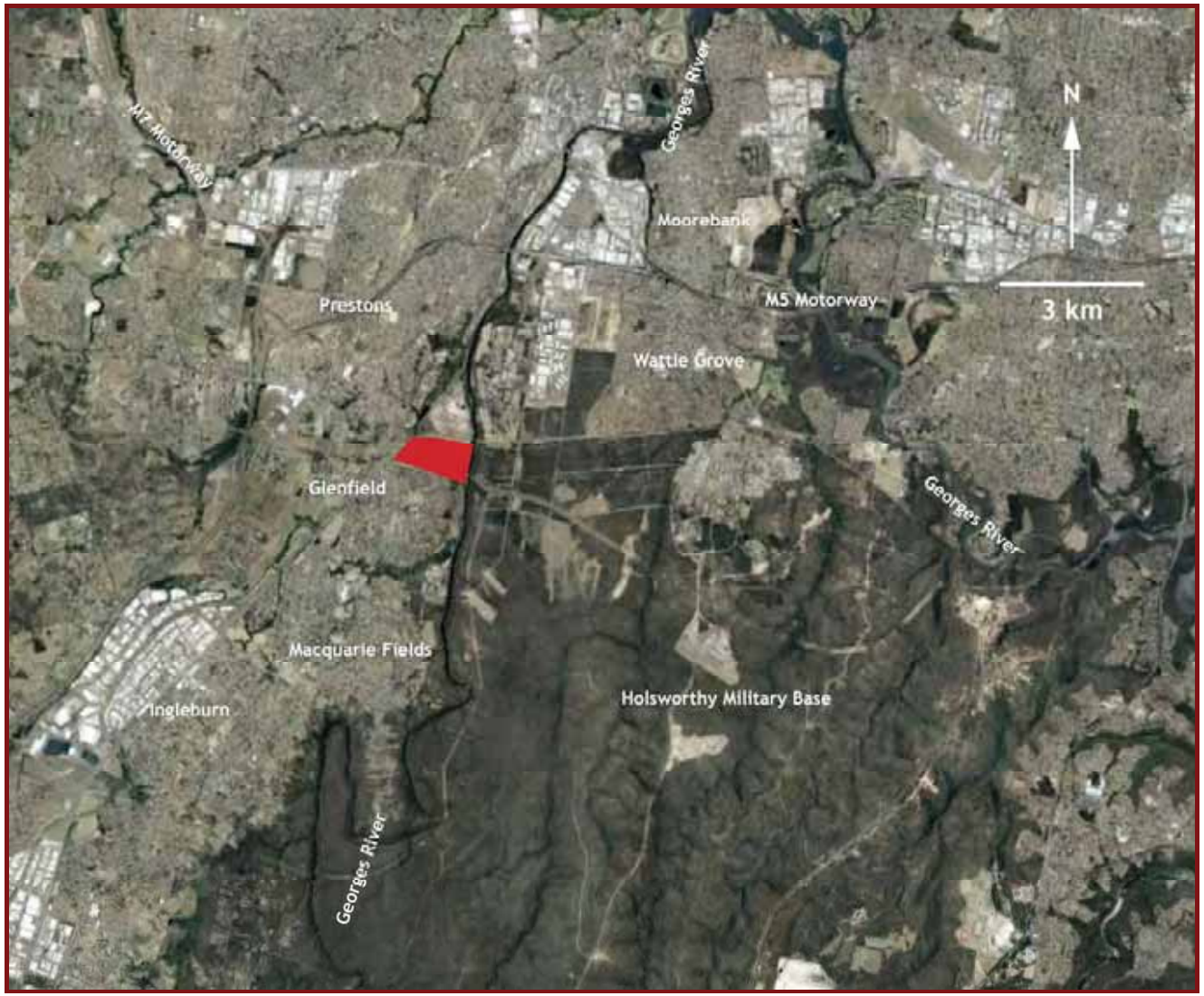

Figure 1. Location of Subject Area.

Figure 2. The subject area.

1.4 Proposed Development & Approval Context

The Glenfield Waste Disposal site is currently zoned rural, however given the industrial nature of the site and the current developments in the area (including the SIMTA site, and the upgrade of the Southwest rail link), the Kennett Group proposes to re-zone the site to industrial. The re-zoning submission is required by early June 2012 to ensure its integration into the review of the Campbelltown Local Environment Plan, which is currently ongoing and nearing completion.

In addition, Kennett Enterprises Pty Ltd is proposing to construct a large recycling facility near the existing landfill site in the subject area. While specific details are not yet available, the facility's construction footprint is broadly an L-shape running along the southern and western sides of the existing landfill site (**Figure 3**). L.A. Kennett Enterprises Pty Ltd has advised that the development will be subject to Part 4 (Division 4.1 – State Significant Development) of the *Environment Planning and Assessment Act 1979*. The application for the development is to be lodged in July 2012.

1.5 Report Aims and Objectives

The principle aims of the preliminary assessment are to:

- Outline the statutory requirements relevant to the subject area with regard to Aboriginal cultural heritage;
- Carry out background research to identify known Aboriginal objects, sites and places, and to identify the potential for any unknown objects and places of significance;
- Undertake Aboriginal Community Consultation in accordance with the OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*;
- Carry out a survey of the subject area to rediscover and assess known items, identify previously unrecorded items, and assess the Aboriginal archaeological potential of the subject area;
- Develop preliminary mapping of the known and potential Aboriginal cultural heritage sites in the subject area;
- Assess the archaeological (scientific) significance of any Aboriginal sites or objects that may be impacted by the proposed development;

- Identify any possible constraints to the proposed development;
- Assess the potential for direct and indirect impact to Aboriginal cultural heritage; and
- Identify and recommend measures to mitigate any potential adverse heritage impacts.

1.6 Limitations

This report is based on existing and publically available environmental and archaeological information, reports about the subject area, and relevant site visits. It did not include any independent verification of the results or interpretations of externally sourced reports (except where the site inspection and field survey indicated inconsistencies). This report includes some predictions about the probability of subsurface archaeological materials occurring in certain landforms/landscapes of the subject area. The predictions were based on surface indications noted during the field investigation, and environmental context. It is acknowledged, however, that sub-surface materials may survive in landform/landscape contexts despite surface and environmental indicators that may suggest that they do not. The converse also applies.

The Aboriginal Heritage Information Management System (AHIMS) information was provided to AHMS by OEH. Information in the archaeological assessment report reflects the scope and the accuracy of the AHIMS site data, which in some instances is limited.

1.7 Investigator and Contributors

This report was written by Alan Williams, B.Sc., M.Sc., MAACAI, Senior Archaeologist, AHMS. Lisa Newell, Associate Director, AHMS reviewed and edited the draft report and provided statutory and mitigation action input.

Figure 3. The proposed recycling development footprint (approximate).

2. STATUTORY CONTEXT

2.1 Commonwealth legislation

2.1.1 The Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act, 1984* (Commonwealth) was enacted at a Federal level to preserve and protect areas (particularly sacred sites) and objects of particular significance to Aboriginal Australians from damage or desecration. Steps necessary for the protection of a threatened place are outlined in a gazetted *Ministerial Declaration* (*Sections 9* and *10*). This can include the preclusion of development.

As well as providing protection to areas, it can also protect objects by *Declaration*, in particular Aboriginal skeletal remains (*Section 12*). Although this is a Federal Act, it can be invoked on a State level if the State is unwilling or unable to provide protection for such sites or objects.

No Aboriginal sites or places within the subject area are currently subject to a Declaration.

2.1.2 The Environment Protection & Biodiversity Conservation Act 1999

The *Environment Protection & Biodiversity Conservation Act, 1999* (Commonwealth) provides for the protection of natural and cultural heritage places. The Act establishes (amongst other things) a National Heritage List (NHL) and a Commonwealth Heritage List (CHL). Places on the NHL are of natural or cultural significance at a national level and can be in public or private ownership. The CHL is limited to places owned or occupied by the Commonwealth which are of heritage significance for certain specified reasons.

Places listed on the NHL are considered to be of State and local heritage value, even if State or local various heritage lists do not specifically include them.

The heritage values of places on the NHL or the CHL are protected under the terms of the *EPBC Act*. The Act requires that the Minister administering the *EPBC Act* assess any action

which has, will have, or is likely to have, a significant impact on the heritage values of a listed place. The approval (or rejection) follows the referral of the matter by the relevant agency's Minister.

No Aboriginal sites or places within the subject area are currently listed on the NHL or CHL.

2.1.3 The Native Title Act 1993

The *Native Title Act, 1993* (Commonwealth) provides recognition and protection for native title. The Act established the National Native Title Tribunal to administer land claims by Aboriginal people. The Act also provides for Indigenous Land Use Agreements, which allow native title claimants and/or holders control over the use and management of affected land and waters.

A search of the National Native Title Tribunal Registers was undertaken on 22 May 2012, and returned the following results in the subject area:

Register Type	NNTT Reference Numbers
National Native Title Register	Nil
Register of Native Title Claims	Nil
Unregistered Claimant Applications	Nil
Register of Indigenous Land Use Agreements	Nil

2.2 NSW State legislation

2.2.1 Environmental Planning & Assessment Act 1979

The *Environmental Planning and Assessment Act, 1979* (EP&A Act) requires that environmental impacts are considered in land-use planning, including impacts on Indigenous and non-Indigenous heritage. Various planning instruments prepared under the Act identify permissible land use and development constraints.

Where Project approval is to be determined under Part 4 (Division 4.1) of the Act, further approvals under the *National Parks & Wildlife Act, 1974* which protects Aboriginal cultural heritage in NSW are not required. In those instances, management of Aboriginal heritage

follows the applicable Aboriginal assessment guidelines (*the Guidelines For Aboriginal Cultural Heritage Impact Assessment and Community Consultation, July 2005*) and any relevant statement of commitments included in the Part 3A Development Approval.

It should be noted that the legislation has recently been modified, with Part 3A being modified and re-created as Part 4 (Division 4.1). Therefore, the guidelines above relate to the now defunct Part 3A process, rather than the new process. They are currently the latest guidelines available, but they may be modified as Part 4 (Division 4.1.) becomes more established.

2.2.2 National Parks & Wildlife Act 1974

The *National Parks & Wildlife Act, 1974* (NPW Act) provides blanket protection for Aboriginal objects (material evidence of indigenous occupation) and Aboriginal places (areas of cultural significance to the Aboriginal community) across NSW. An Aboriginal object is defined as:

> *"...any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains."*

An Aboriginal place is any place declared to be an Aboriginal place by the Minister for Environment & Heritage, under Section 84 of the NPW Act.

One declared Aboriginal Place is located near the subject area. Collingwood Precinct is located approximately 1.5 kilometres to the north of the subject area, and is very unlikely to be impacted by the proposal.

The provisions of the NPW Act that require various approvals or permits to disturb or discover Aboriginal deposits, objects and places are not applicable to Part 4 (Division 4.1) Projects.

2.2.3 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act, 1983* allows for the transfer of ownership to an Aboriginal Land Council of vacant Crown land not required for an essential purpose or for residential land. These lands are then managed and maintained by the local Aboriginal Land Council.

No places within the subject area are currently subject to Aboriginal Land Claims.

3. ABORIGINAL COMMUNITY CONSULTATION

3.1 General

Due to the two planning and development processes (the re-zoning and the pending application for the proposed recycling facility) , Aboriginal consultation was undertaken in two different ways.

Informal consultation was undertaken to identify any impacts or issues associated with the proposed rezoning. This involved communication and a site visit with Aboriginal organisations known to practice cultural heritage in the region, specifically Tharawal Local Aboriginal Land Council (TLALC) and Cubbitch Barta Aboriginal Corporation. Discussions were focussed on the proposed re-zoning application (**Section 2.2**).

For the proposed re-cycling development, formal Aboriginal consultation in accordance with the Part 3A *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC July 2005) has commenced and is currently ongoing (**Section 2.3**). These guidelines actually refer to a now defunct set of Office of Environment & Heritage guidelines for specific Aboriginal consultation procedures. Therefore, the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* have been adopted, as they currently form the best practice for consultation.

The 2010 guidelines have six broad phases:

1. Pre-notification – identification of the Aboriginal parties by contacting various State government agencies.
2. Notification – contacting identified Aboriginal parties and advertising in the local print media for interested Aboriginal parties.
3. Presentation of Project – advising the Registered Aboriginal Parties (RAPs) of the project, which may involve meetings and/or site visits.
4. Methodology – providing the RAPs with the proposed field methodology and information on obtaining cultural knowledge.
5. Impacts and Mitigation Options – discussion of potential impacts to heritage and appropriate mitigation options before developing the report.
6. Report review – review of the final report.

The consultation process has two aims. The first is to consult with knowledge holders to identify cultural places and values that may be affected by the project. The second is to obtain input on the proposed assessment methodology, and comment on the assessment report and management recommendations.

3.2 Proposed Re-zoning

As part of the re-zoning, AHMS contacted TLALC and Cubbitch Barta Aboriginal Corporation. These two Aboriginal stakeholders are two of the most well-established organisations in the region, and are known to practise cultural heritage.

AHMS invited representatives from the two organisations to undertake a site visit and discuss both the re-zoning and proposed development. A site visit was undertaken with Glenda Chalker (Cubbitch Barta Aboriginal Corporation) and Neil Sampson (TLALC) on 18 May 2012.

The entire site was inspected, and discussions on the proposed re-zoning and development were undertaken. While some Aboriginal sites were identified, no objections or issues were raised in relation to the proposed re-zoning.

3.3 Proposed Recycling Facility

3.3.1 Pre-Notification

The initial stage of the formal consultation process has been undertaken. As per the guidelines, it has included the identification of Aboriginal people/organisations who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and places within the subject area. The following organisations have been contacted with a request for information:

- OEH;
- Tharawal Local Aboriginal Land Council;
- Office of the Registrar, *Aboriginal Land Rights Act, 1983*;
- National Native Title Tribunal;
- NTSCorp;
- Campbelltown City Council; and

- Sydney Metropolitan Catchment Management Authority.

Only one response has been received to date from the Native Title Tribunal, which indicated no claims were active or finalised over the study area.

3.3.2 Notification and Registration of Interest

Yet to be undertaken.

3.3.3 Presentation of Information/Methodology

Yet to be undertaken.

3.3.4 Field Investigations

Yet to be undertaken.

3.3.5 Review of Recommendations and Report

Yet to be undertaken.

4. ETHNOGRAPHIC INFORMATION

4.1 General

This section presents a summary of Aboriginal life at contact, as recorded by early European settlers in documents, maps, plans, images and ethnographic records. By studying these sources, we can reconstruct aspects of traditional Aboriginal lifestyle and economy. Although such accounts are fragmentary and present a biased European view of Aboriginal culture, they provide an important insight about traditional Aboriginal use and occupation of the land.

The Sydney Basin was occupied and used by Aboriginal people for thousands of years before European settlement. Within the Sydney Basin (which includes the current subject area), creeks, floodplains, swamps and woodlands provided Aborigines with rich and varied resource zones and occupation areas. Aboriginal sites across the Sydney Basin provide tangible evidence and an on-going link with the long history of Aboriginal use and occupation of this area.

4.2 The Traditional Owners

The first people known to have an association with the subject area were people of the *Darug* language group. There is considerable ongoing debate about the nature, territory and range of the pre-contact Aboriginal language groups of the greater Sydney region. These debates have arisen largely because, by the time colonial diarists, missionaries and proto-anthropologists began making detailed records of Aboriginal people in the late 19th Century, pre-European Aboriginal groups had been broken up and reconfigured as a result of European settlement activity. Sydney region archaeologist and historian Val Attenbrow has cautioned:

> '*Any boundaries mapped today for (these) languages or dialects can only be indicative at best. This is not only because of an apparent lack of detail about such boundaries in the historical documents, but because boundaries between language groups are not always precise lines'* (Attenbrow, 2002:34-35).

4.3 Clans

In general, resource and land ownership was focused on extended family groups or *clans.* These groups are sometimes called local clans, territorial clans or local descent groups. A number of clans would often travel together in a larger group. Group borders were generally physical characteristics of the landscape such as waterways or the limits of a particular resource. Clans also shared spiritual affiliations, often a common dreaming ancestor, history, knowledge and dialect.

Ethnohistoric sources indicate the clan that occupied the modern day Liverpool area may have been the *Gahbrogal* (Attenbrow 2002:23-25), who lived along the Georges River. (Collins 1798 [1975:462]).

4.4 Subsistence

Early observers indicate that the subsistence and economy of Aboriginal groups depended largely on the environment in which they lived. The differences in available food resources between coast and hinterland influenced the diet and subsistence patterns of the groups living in each zone. The current subject area is in hinterland along the Georges River.

Inland population densities were assessed by early settlers as being lower than those on the coast. The relative scarcity of resources in the hinterland and the greater work required to procure terrestrial foods through hunting meant that the hinterland was more thinly populated than the coast (Attenbrow 2002:17).

During a trip along the Hawkesbury-Nepean during 1791, Watkin Tench wrote that hinterland people primarily subsisted on small animals and roots, probably yams. (Tench 1793 [1979]:122). However, fish, shellfish and birds were also collected from resource rich swamps and lagoons (**Figure 4**) (Attenbrow, 2002:88). Important plants and animals were also found in wetlands, providing medicines, fibres, vitamin and food sources.

Kangaroos, wallabies, possums, koalas, bandicoots, dingoes, wombats, echidnas, fruit bats (flying foxes) and other smaller mammals were amongst the wide range of land animals that inhabited the Sydney region and were available to both coastal and hinterland people. Most Australian land animals are not migratory and therefore their seasonal availability and abundance do not vary markedly (Attenbrow 2002:70). The diet also included honey produced by native bees, as well as ants and their eggs. Many foods were

harvested by tree climbing. Birds and tree dwelling mammals could be captured, and birds eggs and honey could be collected in this way (**Figure 5**) (Tench 1793 [1979]:126).

Figure 4. Joseph Lycett c.1817 'Aborigines Hunting Waterbirds" (Lycett 1830).

Open woodland areas were grazing habitat for macropods, and formed an important part of the economy of the Aborigines living on the Cumberland Plain, and were hunted with the aid of deliberately lit fires (Barrallier, 1802 [1975]: 2-3) (**Figure 6**) or by ambushing them (Mathews in Havard, 1943c:237).

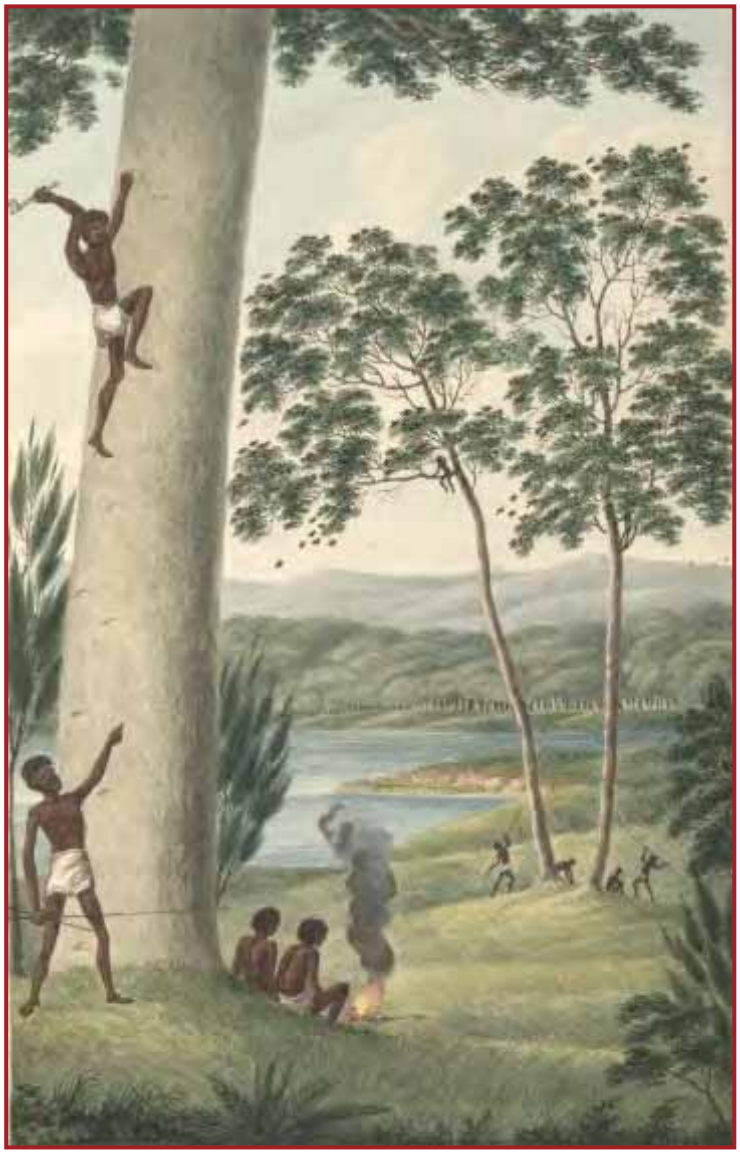

Figure 5. *Joseph Lycett c.1817 "Aborigines climbing a tree, with two Aborigines sitting beside a fire, others spearing birds" (Lycett, J. 1830).*

Figure 6. Joseph Lycett c.1817 'Aborigines using fire to hunt kangaroo' (Lycett, J. 1830).

4.5 Plant Management

Plant management practices similar to those reported in northern Australia were also conducted in the Sydney area. For instance, there is good evidence that Aborigines practiced fire-stick farming in and around Sydney. (Hunter 1793 [2006:74-75]).

Plant management also enabled Aboriginal groups to broaden their range of food sources. Tench provides an interesting account of 'a poor convict' trying to eat a poisonous yam (probably *Dioscorea bulbifera*) and getting violently sick. Tench had seen Aborigines digging this same yam and concluded that they have a way of preparing the roots before they eat them 'which renders these last an innocent food' (Tench 1789 [1979]:83).Such plant management and processing practices were an important part of the economies of Aboriginal groups.

4.6 Shelters

Aboriginal groups in the Sydney Basin lived in bark huts and rockshelters formed from natural sandstone overhangs (**Figure 7**). Tench described how native huts were

constructed by laying pieces of bark together in the form of an 'oven'. The end result consisted of a low shelter, which was opened at one end and sufficient to accommodate one person lying down (Tench 1789 [1979]:81).

Figure 7. *Joseph Lycett c. 1820 A family of Aborigines taking shelter during a storm (Lycett 1830).*

The rockshelters, referred to by Tench are abundant throughout sandstone country represented within the subject area. These shelters, especially those located close to water sources, such as those along the Georges River and Peter Meadows Creek, provided valuable shelters for Aboriginal people.

4.7 Weapons and Equipment

Many different tools and weapons were used to obtain food and raw materials, carry small items, make equipment, and for defensive and offensive purposes. These included fishing and hunting spears, spear-throwers, fishing hooks and lines, stone hatchets, shields, clubs, digging sticks, baskets, net bags and other containers, as well as canoes, animal traps, torches, small adzes and scrapers, awls, stones for pounding and beating plant foods and raw materials, stone wedges and fire. In addition, unmodified shells and stones were used

opportunistically on some occasions as cutting or adzing tools and missiles. Most tools and weapons were highly portable and also multi-purpose (Attenbrow 2002:85).

Collins pointed out that the spears of the hinterland groups were distinguishable from those of the coast people as they were armed with bits of stone in place of broken oyster shell. Amongst the hinterland groups, stone was hafted into the end of the spear thrower instead of shell (Collins, 1798 [1975:122]).

Tools used for such tasks as cutting/incising, adzing, 'scraping', and beating/pounding were made of stone, bone and shell, and historical accounts indicate that the latter two materials were used for these tasks both in the hinterland and along the coast (Attenbrow, 2002:92).

The archaeological evidence of tools and equipment used in the Sydney region is limited to the more durable implement parts such as bone, shell and stone. These items are not always identifiable as a component of a specific historically described implement, and there are also other artefacts that are not described in the historical accounts (Attenbrow 2002:86).

4.8 Stone

Aboriginal stone artefacts are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as Carbon dating cannot be applied.

The main source locations for stone materials in the Sydney region are gravel beds and palaeo-channels associated with the Nepean-Hawkesbury and antecedent river systems and their tributaries, conglomerate pebbles in the Hawkesbury sandstone, and volcanic formations. The western half of the Sydney region appears to have a greater number and wider distribution of source locations as well a greater range of stone types suitable for making stone tools than the coastal zone. Knowledge of source locations for suitable materials for tool manufacture is of great importance in determining movements, and trade and exchange patterns of the people who inhabited the sites at which artefacts are found (Attenbrow 2002:43).

Temporal changes in stone materials used may have been associated with changes in the range of tools made (the introduction and later disappearance of Bondi points for instance) or in the way stone tools were made (increased use of the bipolar technique, for example). New subsistence methods or changes in conditions of access to raw materials sources (due to cultural factors such as changes in group alliances or group boundaries that may have affected trade and exchange) are also likely reasons (Attenbrow 2002:121).

Bipolar technique is argued to have been adopted under circumstances where there is a need to gain maximum flakes by reducing cores to their minimum flakeable size. Such circumstances include raw material scarcity. Decreased mobility is also claimed to be associated with an increased use of the bipolar technique (Attenbrow 2002:122).

Research has shown that silcrete is naturally relatively widely distributed in the Sydney region and is also present, albeit in lesser abundance, in the coastal zones and hinterland. On the Western Cumberland Plain, where sources of raw material are more common and more widespread than along the coast, the distance between source and manufacturing/use sites is usually much shorter. Within this part of the hinterland many clans would have had sources within their country (Attenbrow 2002:123).

4.9 Contact History

The decrease in population after British colonization is well documented. The traditional life of the local people was broken through the course of the early 19th century. The impact of smallpox and influenza decimated the Aboriginal population. There was an outbreak of influenza in 1820 which killed large numbers of people in the Liverpool districts (Leah 1984).

Early European settlement of traditional hunting lands deprived Aboriginal groups of access to food sources, and camping and ceremonial sites. People who survived outbreaks of disease and massacres were forced to live in marginal areas, integrate with European settlers or resist (Liston 1988). Resistance by Aboriginal groups was often met with retaliatory action by white settlers and the colonial administration.

Factors including disease, dislocation and violence led to the demise of traditional lifestyles and a decrease in the Aboriginal population, particularly in and around the early centres of colonial settlement in Sydney, Parramatta and Liverpool.

5. ARCHAEOLOGICAL CONTEXT

5.1 General

This section discusses the regional and local archaeological context within which the subject area is situated. For the purposes of determining settlement and site location patterns, archaeologists examine regional and local trends in the distribution of known sites in relation to environment and topography. This provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types, site locations and the nature of the archaeological resource in any given area.

5.2 Regional Context

The subject area falls within the Cumberland Plain region. The archaeology of the region has been well documented through a large number of academic studies, regional management studies and impact assessment investigations over the past 30 years.

5.2.1 Early Occupation

Aboriginal occupation in the region dates back well into the Pleistocene period (i.e. before 10,000 years ago). This evidence comes from radiocarbon dates retrieved from excavated sites at Cranebrook Terrace (41,700 years before present [BP]), Shaw's Creek K2 (14,700 BP), and George & Charles St Parramatta (c.25,000 – 30,000 BP) (Jo McDonald Cultural Heritage Management, 2005; Kohen et al., 1984; Nanson et al., 1987). Other sites include Burrill Lake and Bass Point on the south coast with dates >15,000, and Loggers Shelter and Tempe House, the latter a hearth on Cooks River, both dating to early Holocene (5-10,000 years BP) (Attenbrow, 1987; Bowdler, 1976; Lampert, 1971; Jo McDonald Cultural Heritage Management, 2006). More recently, AHMS has recently obtained ages of between 12,000 – 15,000 years BP for PT12, an artefact scatter within a sand dune overlooking Hawkesbury River in Pitt Town (AHMS, 2010). The dating of Cranebrook Terrace is currently under review (Attenbrow, 2002), so at this time the George and Charles Street site is considered as the oldest reliable date for Aboriginal occupation in the Sydney region, although these dates similarly have interpretation issues.

The early occupation sites dating to the late Pleistocene/early Holocene have been found in deep stratified rockshelter deposits and within alluvial deposits, particularly on the margins of large rivers such as the Hawkesbury-Nepean and Parramatta Rivers. Drawing on this evidence, McDonald has recently argued that early occupation of the Sydney basin was focused on these primary river systems and characterised by a high degree of 'residential mobility' between a small number of sites (McDonald, 2005). However, the survivability and taphonomic loss of older sites in such a heavily urbanised environment must also be considered.

5.2.2 Intensification During the Holocene

The vast majority of dated sites in the Sydney region are less than 5000 years old (35 out of a total of 48 dated sites) (Attenbrow, 2002). It has been argued that this is a result of increased populations and 'intensification' of cultural activity during this period. The prevalence of sites dating to the last 5000 years may also be a result of the last significant rise in sea level, approximately 7000 years ago (Sloss *et al*. 2007). The sea level rise would have submerged many of the older sites along the coastal fringe and forced Aboriginal groups westward to the current coastline.

In an attempt to better understand changes in use and occupation during the Holocene period, Val Attenbrow undertook a detailed study of the Upper Mangrove Creek catchment to the north of Sydney (Attenbrow, 2006). Attenbrow's study found significant changes in site patterning during the Holocene. She concluded that population was unlikely to have changed, but the use of sites, most notably in the last 2000 years did. This increased use of sites appeared in the archaeological record as increasing population.

Holdaway *et al.* (2008), similarly suggest that populations did not increase in the late Holocene, but the changes seen in the archaeological record reflect taphonomic change. Conversely, Smith et al. (2008) and Williams et al. (2010), both suggest that populations were in fact larger in the last 2000 years than any preceding period. Using radiocarbon data and regional studies, they demonstrate that there is an increasing use of sites in all locations at this time, which cannot be explained by movement of people across the landscape, but rather points to increasing numbers of people using more of the landscape.

This issue is still widely contested in archaeological literature, but whatever the reason, archaeological sites within the Sydney Basin are dominated by late Holocene sites.

5.2.3 Regional Site Patterns

More than 4,500 sites have been recorded and registered with the OEH *Aboriginal Heritage Information Management System* (AHIMS) for Sydney, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken.

The dominant site types in the Sydney region (in the 15 - 20 per cent frequency range) are rock shelters with midden deposit, rock shelters with art, rock art engravings and open artefact scatters (Attenbrow, 2002). Site types in the 5 - 15 per cent range include rock shelters with artefacts, grinding grooves and open middens (Attenbrow, 2002). The distribution, density and size of sites are largely dependent on environmental context. For instance, middens are found in close proximity to marine, estuarine and less often, freshwater bodies. Rock shelters are only found in areas of exposed sandstone escarpment and grinding grooves are found on areas of exposed flat bedded sandstone near a source of water.

A study of the regional archaeology of the Cumberland Plain by Kohen made a number of findings about site location patterns in the Sydney area. The study demonstrated that proximity to water was an important factor in site patterning. Kohen found that 65 per cent of open artefact scatter sites were located within 100 meters of permanent fresh water (Kohen, 1986). Only 8 per cent of sites were found more than 500 meters away from permanent fresh water. In short, Kohen argued that open artefact scatters are larger, more complex and more densely clustered along permanent creek and river lines. Kohen's study also found that Silcrete (51 %) and Chert (34 %) are the most common raw materials used to manufacture stone artefacts. Other raw materials include quartz, basalt and quartzite.

Although the patterns described above have been generally supported by subsequent investigations, Kohen's study was limited by a reliance on surface evidence. Extensive excavation across the Cumberland Plain has since shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is a critical consideration in aggrading soil landscapes, such as those commonly found across the Cumberland Plain. In a 1997 study of the Cumberland Plain, McDonald (1997) found that:

- 17 out of 61 excavated sites had no surface artefacts before excavation.
- The ratio of recorded surface to excavated material was 1:25.

- None of the excavated sites could be properly characterised on the basis of surface evidence. In short, surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material.

The results of McDonald's study clearly highlight the limitations of surface survey in identifying archaeological deposits in this landscape. The study also shows the importance of test excavation in establishing the nature and density of archaeological material on the Cumberland Plain.

McDonald has undertaken over 20 years of consulting archaeology in the Cumberland Plain, and like Kohen has developed predictive models for the distribution of Aboriginal objects. In a recent publication, White & McDonald (2010:29) summarised this model as follows:

> *'Topographic and stream order variables correlate with artefact density and distribution. High artefact density concentrations may have resulted from large number of artefact discard activities and/or from intensive stone flaking. Highest artefact densities occur on terraces and lower slopes associated with 4th and 2nd order streams, especially 50 – 100 meters from 4th order streams. Upper slopes have sparse discontinuous artefact distributions but artefacts are still found in these landscape settings'.*

5.2.4 Stone Artefacts

Aboriginal stone artefacts are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as radiocarbon dating cannot be applied. A technological sequence for stone artefacts for the region was first described in the late 1940s by Fred McCarthy and has since been refined by various authors. Currently, the most widely accepted typological sequence is known as the 'Eastern Regional Sequence' (Hiscock & Attenbrow, 1998; 2002). The ERS phases are as follows:

- Capertian – is distinguished by large uniface pebble tools, core tools, horsehoof cores, scrapers and hammerstones. Backed artefacts occasionally present. Generally dates to before 5,000 years BP.

- Early Bondaian – Aspects of the Capertian assemblage continue, but backed artefacts and ground-edged artefacts increase. Artefacts during this period were predominantly made from fine-grained silicious stone such as silcrete and tuff. Generally dated from 5000 BP to 2800 years BP.
- Middle Bondaian – Characterised by backed artefacts, particularly Bondi Points and ground-edged artefacts. Artefacts made from silicious materials, however quartz becomes more frequent. Generally dated from 2800 - 1600 BP.
- Late Bondaian – characterised by bipolar technology, eloueras, ground-edged artefacts, and bone and shell artefacts. Bondi points are virtually absent and artefacts are predominantly made from Quartz. Generally dated from 1600 BP to contact.

5.2.5 Local Context

Archaeological studies have been undertaken in the vicinity of Glenfield since the early 1980s. The earliest investigations were focussed on Lucas Heights during the development of a waste disposal facility. Studies by Silcox, Brayshaw, Attenbrow & Negerevich, Koettig and McDonald recorded extensive numbers of sites in the vicinity of Bardens and Mill Creeks, located some 10 -15 kilometres to the south-east of the subject area (Silcox, 1980; Brayshaw, 1982; Attenbrow & Negerevich, 1981; Koettig & McDonald, 1984). These sites were predominantly rockshelters containing art and/or deposits. Studies that have been carried out in close proximity to the subject area are shown in **Figure 8.**

Investigations carried out at a number of the sites indicate that initial occupation of this area commenced relatively late in the Holocene period, that is, less than 3000 years ago and continued until close to the time of European arrival. Cultural material present in excavated deposits reflects a predominantly 'inland' economy with minimal exploitation of estuarine resources (Navin Officer Heritage Consultants 1997: 4-45).

Similar findings occurred on surveys undertaken in Wedderburn (20 kilometres south of the subject site) by Smith & Crew and Sefton - an investigation of Yeoman's Estate located eight sites, including five rockshelters, two grinding grooves and a culturally modified tree (Smith & Crew, 1988, 1989; Smith, 1991; Sefton, 1981, 1982, 1986, 1987, 1990).

On the nearby Cumberland Plain, studies by Koettig & Hughes, and Boot at East Hills-Glenfield Railway and Wattle Grove, respectively, revealed several artefact scatters (#45-5-0889, #45-5-0890, #45-5-0891, #45-5-0892,#45-5-0972, #45-5-2355, #45-5-2369 (Koettig & Hughes, 1983; Boot, 1990, 1992, 1993, 1994a, 1994b).

Figure 8. Map of locations of heritage assessments near the subject area (outlined in red). 1 – Dallas (1988); 2- Dallas (2006); 3- Steele and Dallas (2001); 4- Central West Archaeology and Heritage Services (2002); 5- Boot (1990, 1992, 1993, 1994a, 1994b); 6- Navin Officer (1997); 7- Cultural Heritage Connections (2006); 8 – AHMS (2012); 9 – AMBS (2008).

Of note was an extensive study of the Holsworthy Military Area (immediately south of the subject site) as a possible location for the second Sydney airport in the late 1990's. Navin Officer built on extensive studies already undertaken of the military area by the Sydney Prehistory Group and Australian Museum Business Services. Before the field investigations, some 295 sites were documented (Navin Officer Heritage Consultants 1997: 4-57).

At the completion of the field inspections, Navin Officer documented over 800 archaeological sites in the Holsworthy Military Area. These sites were almost exclusively constrained to the deeply incised creek valleys and ravines running through the military area, and were comprised of isolated finds (n=37), artefact scatters (n=19), culturally modified trees (n=48), grinding grooves (n=185), open engraving sites (n=15), open sites and grinding grooves and engravings (n=10), rock shelters (n=659) (Navin Officer Heritage Consultants 1997: 5-14).

In 2002, Jim Kelton carried out an archaeological assessment of a proposed sewerage transfer from the Hoxton Park Release Area to the Liverpool Sewerage Treatment Plant (STP) (Central West Archaeology and Heritage Services, 2002). The development involved laying 7 kilometres of pipeline between the two locations using trenching and tunnelling methods. No Aboriginal sites or objects were located during the field survey. Two PADs, however, were identified adjacent to the corridor: on the northern and southern banks of Cabramatta Creek, Hoxton Park (adjacent to the Hinchinbrook Creek junction) and the northern bank and adjacent alluvial terrace of the second crossing of Cabramatta Creek (approximately 400 meters east of the Hinchinbrook Creek junction). It was recommended that archaeological monitoring of development works be carried out in these two areas.

More recently, studies by Cultural Heritage Connections, AHMS, AMBS and Mary Dallas have been undertaken in the vicinity of the subject area. Cultural Heritage Connections undertook a preliminary assessment of the proposed Southern Sydney Freight Line situated just west of the Georges River. This assessment, running from Macarthur to Ingleburn identified 17 archaeological sites in close proximity to the subject area. These sites were predominantly artefact scatters (n=10), culturally modified trees (n=5) and a potential archaeological deposit (Cultural Heritage Connections, 2006). No sites were recorded within the study area.

A further study by AMBS on the Glenfield railway station was undertaken in 2008. Part of the AMBS investigation for the station encompassed the northwestern part of the subject site. The survey identified two sites, an isolated object on a track between the railway track and the subject site; and a scarred tree located in the western quadrant of the subject site; and an area of potential sensitivity was also observed (**Figure 9**).

Figure 9. *Map showing the scarred tree and zones of archaeological sensitivity identified by AMBS in 2008 within the subject site (source: AMBS, 2008).*

Mary Dallas undertook an assessment of a proposed housing subdivision in south Casula – just north and west of the subject area on the west side of the Georges River (Mary Dallas, 1988). The study identified two artefact scatters and three culturally modified trees on a series of spurs overlooking Glenfield Creek (#45-5-0720, #45-5-0721, #45-5-0722, #45-5-0723, #45-5-0724).

In 2001, Steele and Dallas undertook an assessment of the Moorebank Defence area (Steele & Dallas, 2001) to the northwest of the study area. The study indicated that the defence area had been completely impacted by the past activities, and that no Aboriginal sites were, or were likely to be present. A follow up study was undertaken by AHMS in 2012 on the Moorebank Defence area, as part of the Sydney Intermodal Terminal Alliance (SIMTA) development. This study investigated both the defence site, and a proposed railway that ran along the northern edge of the Eastern Hills railway line (and included then northern portion of the Glenfield Waste Disposal). The assessment concurred with Steele & Dallas (2001), but did highlight several areas of archaeological interest in the bushland surrounding the Georges River (**Figure 10**).

Figure 10. Map showing archaeological findings of AHMS 2012 study of the SIMTA site. Isolated artefacts (shown by numbers) and potential archaeological deposits (PADs) are presented. Area 1 (shaded blue) along the western edge of Georges River was identified by Aboriginal participants as an area of cultural interest. (Source: AHMS, 2012).

5.2.6 AHIMS Search Results

A search of the Aboriginal Heritage Information Management System (AHIMS) database, maintained by OEH, was carried out on 11 May 2012.

This search identified 96 sites in an area of some 10 km^2 centred on the subject site. Seven of these sites occur within 1 km of the study area. The 96 sites were composed of 40 (42%) artefact scatters, three (3%) shelters with art, six (6%) scarred trees, five (5%) isolated objects and 42 (44%) unidentified (**Figure 11**). Several further isolated finds and three PADs were also identified by AHMS 2012 study of the nearby SIMTA site (**Figure 10**), which have not yet been listed on the AHIMS database.[1]

In general, these sites are focussed in south Casula, Wattle Grove and Holsworthy Military Area. The sites to the west (#45-5-0720, #45-5-0721, #45-5-0722, #45-5-0723, #45-5-0724) were identified by Mary Dallas during an assessment of a proposed sub-division. Sites to the east were predominantly identified by Dr. Phil Boot as part of the assessment works for the suburb of Wattle Grove. Those within Holsworthy Military Area were most likely identified as part of Navin Officer's extensive study of the area in 1997.

Seven sites are located in, or within 1,000 metres of, the subject area. Of most relevance is two sites located within the study area - *Glenfield 1* (#45-5-3531) and *Glenfield ST* (#45-6-2428), an isolated object and culturally modified tree respectively. Both sites are located in the northwest quadrant of the study area. The two sites were recorded by AMBS in 2008 as part of the Glenfield station study (**Section 5.2.5**).

The isolated object was a piece of heat-shattered silcrete on a track near the railway. It could not be relocated as part of the site visit, but is considered probably destroyed following the extensive development of this area through the Glenfield station and Southwest Freight line developments.

The scarred tree was identified in a similar area near the East Hills railway line. The site was relocated as part of this study. The tree identified is very young, probably less than 50 years old, and combined with the irregular scar on the tree is unlikely to be of cultural origin in AHMS' opinion. A similar view was held by the representatives of TLALC and Cubbitch Barta Aboriginal Corporation. However, a review of the AMBS report indicates that this scarred tree was originally recorded by Anthony English several years previously.

[1] *Note: due to some sites retaining multiple site types (for example a rockshelter with a grinding groove), the total number of AHIMS entries may not reflect the actual number of sites types recorded.*

Given its original identification may have occurred prior to the widespread use of hand held GPS, it is considered that Anthony English may have been referring to another scarred tree found some 100 m northeast of AMBS' find (see **Section 8.1**), but that the spatial recording of the tree may have been poor historically.

5.3 Summary

In summary, studies in the local area have revealed extensive occupation by prehistoric populations. Excavations of rock shelters in Lucas Heights indicate that this occupation probably occurred in the late Holocene (<3000 years ago) during a period of significant change in prehistoric populations. This change most likely involved population intensification, a greater reliance on these areas, and/or perhaps the loss of coastal resources through sea level rise. Within the Hawkesbury sandstone country, sites are almost exclusively rock shelters or grinding grooves, all located in deeply incised valleys or ravines. Within the subject area and the surrounding Cumberland Plain, archaeological sites are dominated by artefact scatters, culturally modified trees and potential archaeological deposits. Studies within the local area and including the subject area identified the presence and/or potential for such site types to occur.

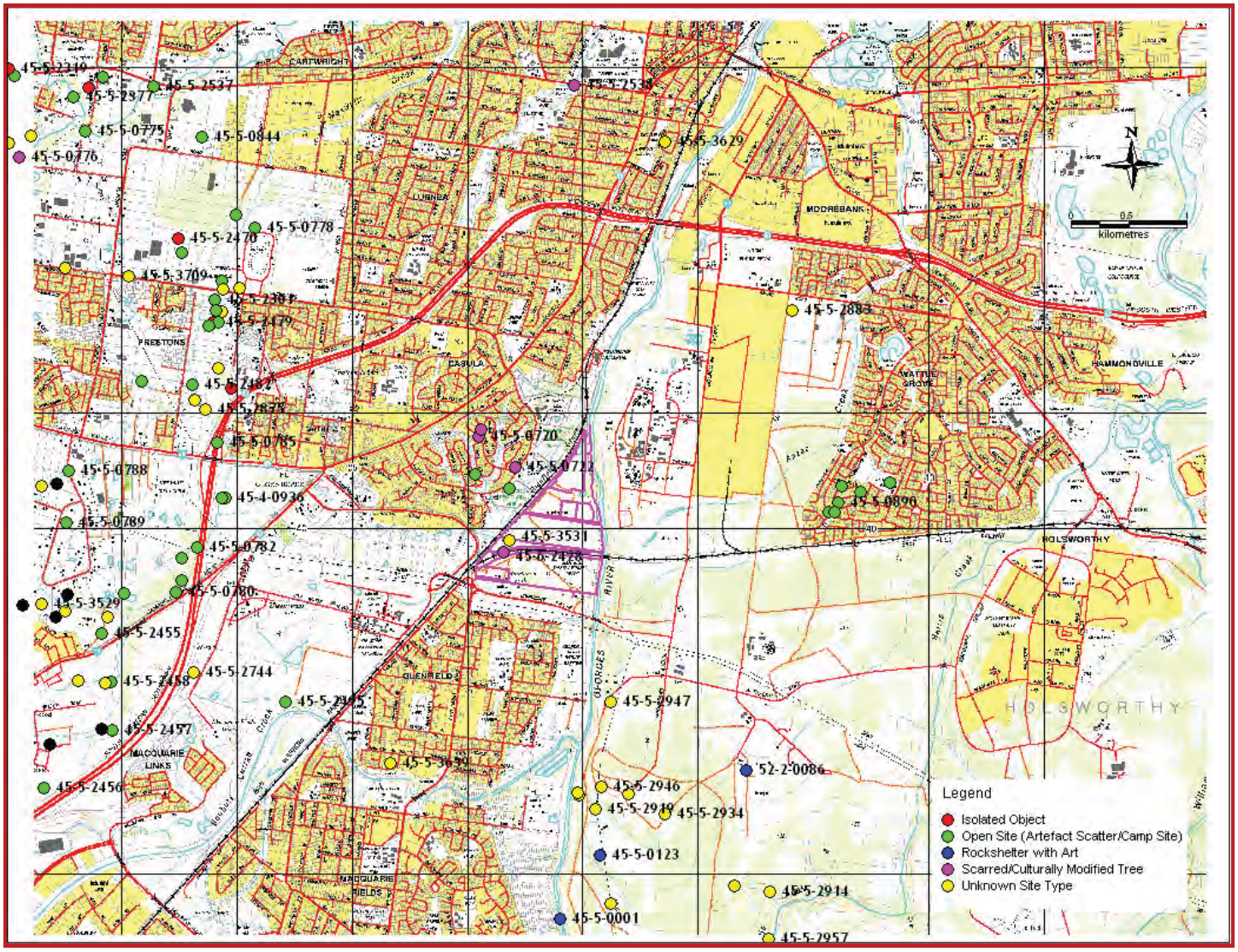

Figure 11. *Map of archaeological sites previously recorded in the Glenfield Waste Disposal site (purple outline) and documented in OEH's AHIMS database.*

6. LANDSCAPE CONTEXT

Environmental and landscape characteristics contribute to the availability of natural resources. In turn, landscape characteristics and available natural resources influence land use. Ultimately, these affect the types of archaeological sites that may exist in a given area. A determination of the past environmental context is essential to develop accurate models of cultural activity, site distribution patterns and the archaeological potential of any given area. The environmental context of the subject area is discussed below.

6.1 Landscape Characteristics

The subject area is situated adjacent the Georges River, a significant fresh water and food resource during prehistoric occupation. Fluvially derived sediments would have created a landscape that may have resembled a series of sloping river terraces, however, recent urban activities have heavily modified the landscape. Specifically, the Glenfield Waste Disposal has led to extensive earthworks across most of the subject site.

Based on aerial photographs, the subject site appears to have been originally composed of a low hill to the west, gently sloping down towards the Georges River in the east. A minor tributary running primarily along the western side of the railway line, also ran through the centre of the waste disposal site prior to the East Hills railway line. Topography varies between 16 and 22 meters AHD, and the entire site is above the 1 in 100 year flood line. Historical information suggests that the original vegetation would have been open, most likely Cumberland Plains Woodland, given its preference for the Ashfield Formation geology of the subject area. At present, vegetation on much of the subject area is limited to grassed areas between extensive modifications and other structures, although relatively undisturbed bushland is present in the south and western parts of the subject site, and running along the edge of Georges River. While this bushland appeared young visually, historical photographs suggest it is at least 80 years of age.

6.2 Geology and Soils

The subject site is located immediately north of Holsworthy Barracks (Liverpool Military Area), which is located on the *Woronora Ramp* geological feature that forms part of the south side of the Sydney Basin. The Woronora Ramp gradually rises from the Cumberland

Plain in the north and terminates at the Woronora plateau to the south of the subject area.

Based on Department of Mineral Resources 1:100,000 Geological Series Sheets of Wollongong - Port Hacking and Penrith, the general area contains Mesozoic and Cainozoic geology. The former includes Hawkesbury Sandstone, Mittagong Formation and Ashfield Shale, while the latter includes Pliocene clayey quartzose sands and Quaternary alluvial deposits. Given the northern part of the waste disposal is subject to sand extraction, it is presumed that the subject site is part of the Ashfield Formation.

More recent Quaternary deposits, specifically those of Pleistocene and Holocene age, have high potential for both natural and anthropogenic information. The Georges River, Williams Creek and Harris Creek all contain evidence of Quaternary deposits, although presence of these deposits within the subject site is yet to be specifically demonstrated.

The 1:100,000 Penrith Soil Landscape Series Sheet 9030 indicates that the subject site includes soils from the Berkshire Park Soil Group (Bannerman and Hazelton, 1990). These are characterised as shallow clayey sand soils with frequent ironstone pisoliths, and are typically found on low rises and terraces of the Hawkesbury/Nepean river systems. In some area, Luddenham Soil Landscape may also occur (Bannerman and Hazelton, 1990:63). These are characterised by loams overlying clays, and dark prairie topsoils, and some sandy clays and sandy loams, on undulating low hills overlying Wianamatta Group Shales.

6.3 Vegetation

The natural vegetation of a landscape is an important consideration in an Aboriginal cultural heritage assessment because it provides an indication of the natural resources once available to Aboriginal people. Bark from trees could be stripped to make canoes, shields and other items. The vegetation itself could provide food resources, such as edible plants, and also habitats for animals, such as possums and birds, which could be hunted.

The original vegetation associated with the Berkshire Park Soil Landscape within the Sydney region is open forest. Species would have typically included broad-leaved ironbark (*Eucalyptus fibrosa*), narrow-leave apple (*Angophora bakeri*) and scribbly gum (*E. Sclerophylla*) and paperbarks (*Melaleuca sp.*) (Bannerman & Hazelton 1990: 75-77). A study of the nearby SIMTA site also identified the presence of Sugar Gum (*Eucalyptus cladocalyx*), Forest Red Gum (*E. tereticornis*), Scribbly Gum (*E. sclerophylla*) and native

grasses, including Kangaroo Grass (*Themeda australis*), Sand Couch (*Cynodon dactylon*) and *Danthonia sp.* (LesryK Environmental Consultants, 2000 cit. AHMS, 2012).

The Luddenham Soil Landscape originally supported wet sclerophyll forest (Bannerman & Hazelton 1990:63).

Following the site visit, it was evident that most of the study area comprised of low-lying grasses intermixed with heavily modified landscapes (such as areas of landfill, tracks or structures). The transmission line to the south was also dominated by low grasses. However, the south and western quadrants of the subject site did appear to have an open woodland dominated by broad-leaved ironbark (*E. fibrosa*) and scribbly gum (*E. Sclerophylla*), with occasional forest red gum (*E. tereticornis*). While the appearance of this woodland was relatively young, historical photographs suggest that the woodland has been present on the site for at least 80 years. This type of woodland was also present on the tributary at the eastern end of the transmission line.

Vegetation on the Georges River was not observed in detail due to access issues, but appeared to be characterised as a dense woodland including broad-leaved ironbark (*E. fibrosa*), scribbly gum (*E. Sclerophylla*), and forest red gum (*E. tereticornis*). Dense bushes of exotic species (such as lantana) were also present.

6.4 Previous Land Use and Disturbance

A review of historical photographs of the region since 1930 show that significant impact has occurred to several parts of the subject site (**Figures 12 - 18**). Early photographs suggest that impacts between 1930-1960 were relatively minor – the eastern quadrant of the study area was used primarily for agriculture, while the western quadrant was untouched bushland. The house still present in the western quadrant is present by 1950 (**Figure 13**). Some suggestion that the tributary had been modified, as well as the installation of a large dam was also present through this period. The transmission line to the south was also bushland with some impacts through the earlier alignment of Cambridge Avenue in this area.

From 1960, more significant activities begin to occur. In the 1960 and 1974 photographs, sand or other quarrying extraction is evident in several parts of the northern portion of the waste disposal site, and these extend into the east quadrants of the subject site (**Figures 14** and **15**). The dam in the western quadrant is more substantive, and

bushland has been removed from most of the eastern quadrant, as well as most of the transmission line.

By 1982, most of the eastern quadrant of the subject site is undergoing extensive earthworks (**Figure 16**). This is probably the earliest beginnings of the land fill that is still ongoing today. Cambridge Avenue has been re-aligned to its current location by this time. This photograph is one of the clearest to demonstrate the first order tributary running from the south into the eastern quadrant of the transmission line – indicating the tributary is not a later landscape modification.

Photographs from 1994, 2002 and present day, all show continuing development in the region. By this time the Eastern Hills railway has gone through the site, and further extensions of the landfill have occurred (**Figures 17** and **18**). The bushland in the western quadrant is still relatively untouched, although frequent tracks and roads have been put through them.

The transmission line to the south was not evident in any of the historical photographs and suggest development since 2002, it is unclear the level of impact this installation would have had on the soil profile in this region.

In summary, the eastern and northern quadrants of the subject site appear heavily impacted by past extraction and landfill activities (**Figure 19**). The western quadrant appears to have received far less impacts historically, but tracks, structures and dams are still present throughout. With the exception of vegetation clearance and the installation of transmission pylons, the transmission line appears to have been less disturbed than other parts of the site. Along with small parts of the bushland in the west of the subject site, the tributary located in the eastern quadrant of the transmission line appears to be the most undisturbed part of the site.

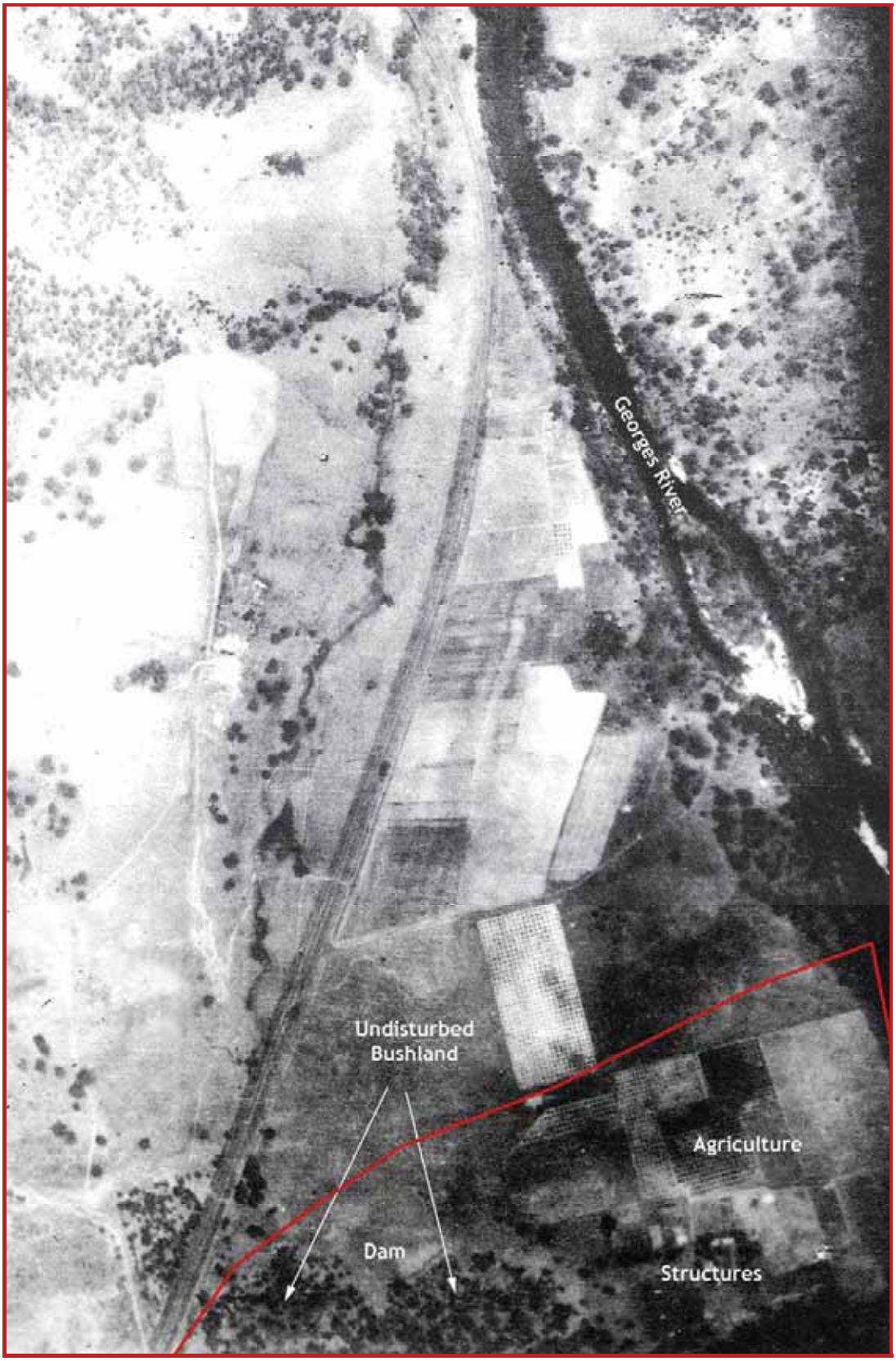

Figure 12. Historical aerial photograph of the subject site from 1930. While only capturing a small part of the study area, it does show the undisturbed bushland in the southern and western quadrants, and the agricultural practises in the eastern quadrant (source: Land & Property Information Services).

Figure 13. Historical aerial photograph of the subject site from 1951. One of the original tributaries running through the site is evident, as is the extensive agriculture in the eastern quadrant. With the exception of a structure, the western quadrant is relatively undisturbed (source: Land & Property Information Services).

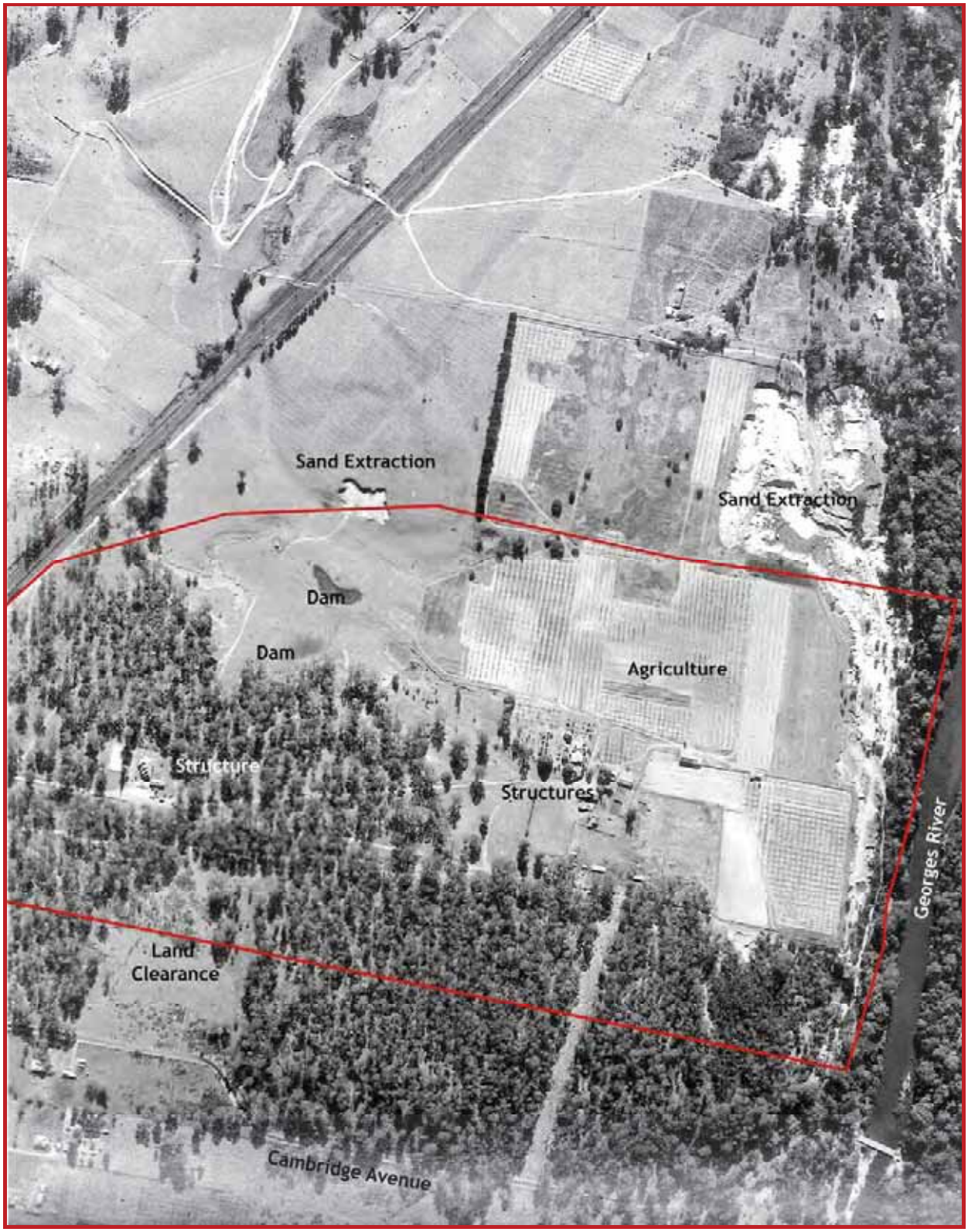

Figure 14. Historical aerial photograph of the subject site from 1961. By this time, extraction along the river's edge is occurring, as well as modifications to the north quadrant of the subject site. Some clearance is also occurring on the transmission line. Note the different alignment of Cambridge Avenue – this previous alignment would have impacted GWD 2 discussed in ***Section 8.1*** *(source: Land & Property Information Services).*

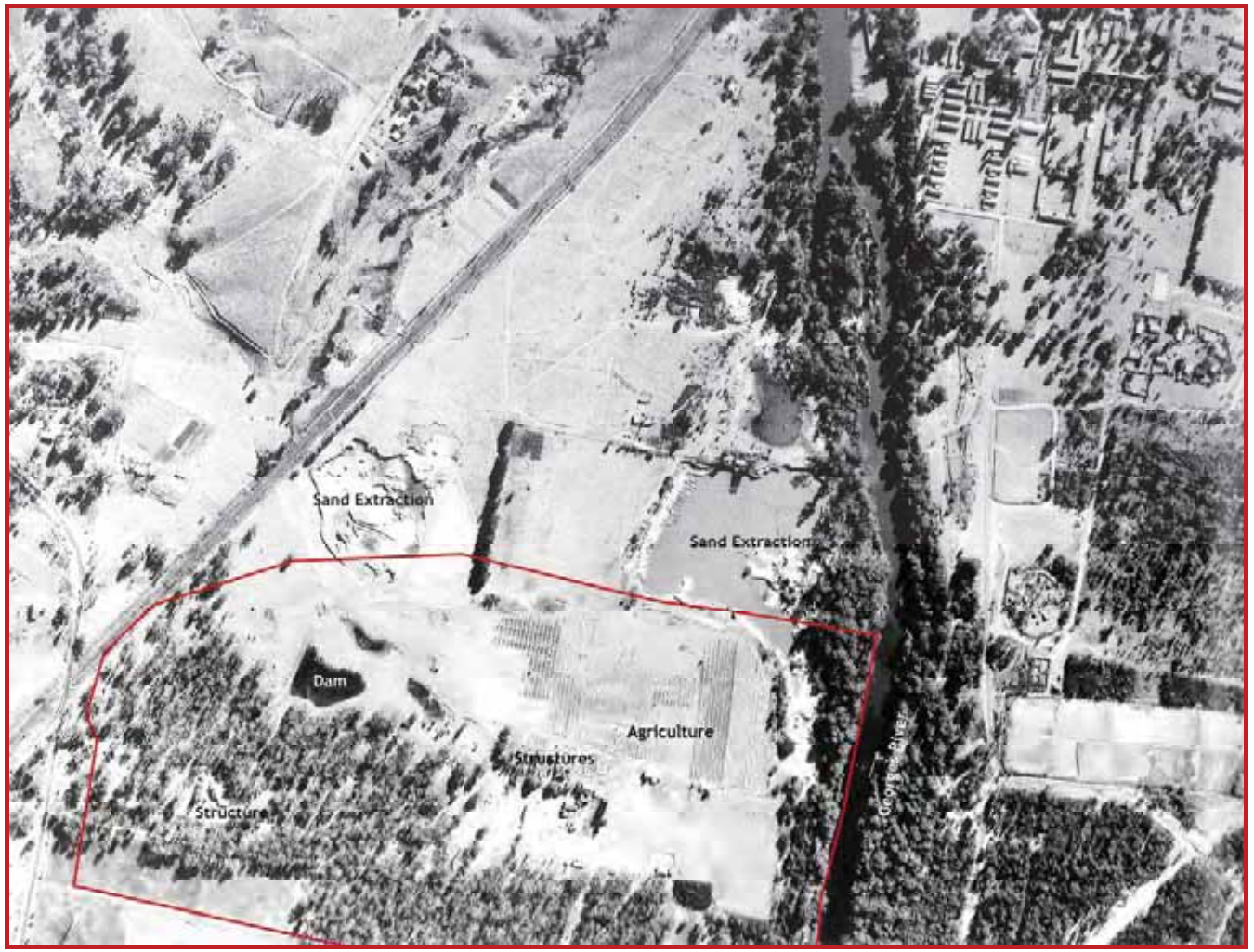

Figure 15. Historical aerial photograph of the subject site from 1970. Extensive quarrying and/or sand extraction has now encroached on much of the northern quadrants of the subject site. The dam and surrounding area in the northwest have also been expanded. The west and southwest quadrants still appear relatively undisturbed (source: Land & Property Information Services).

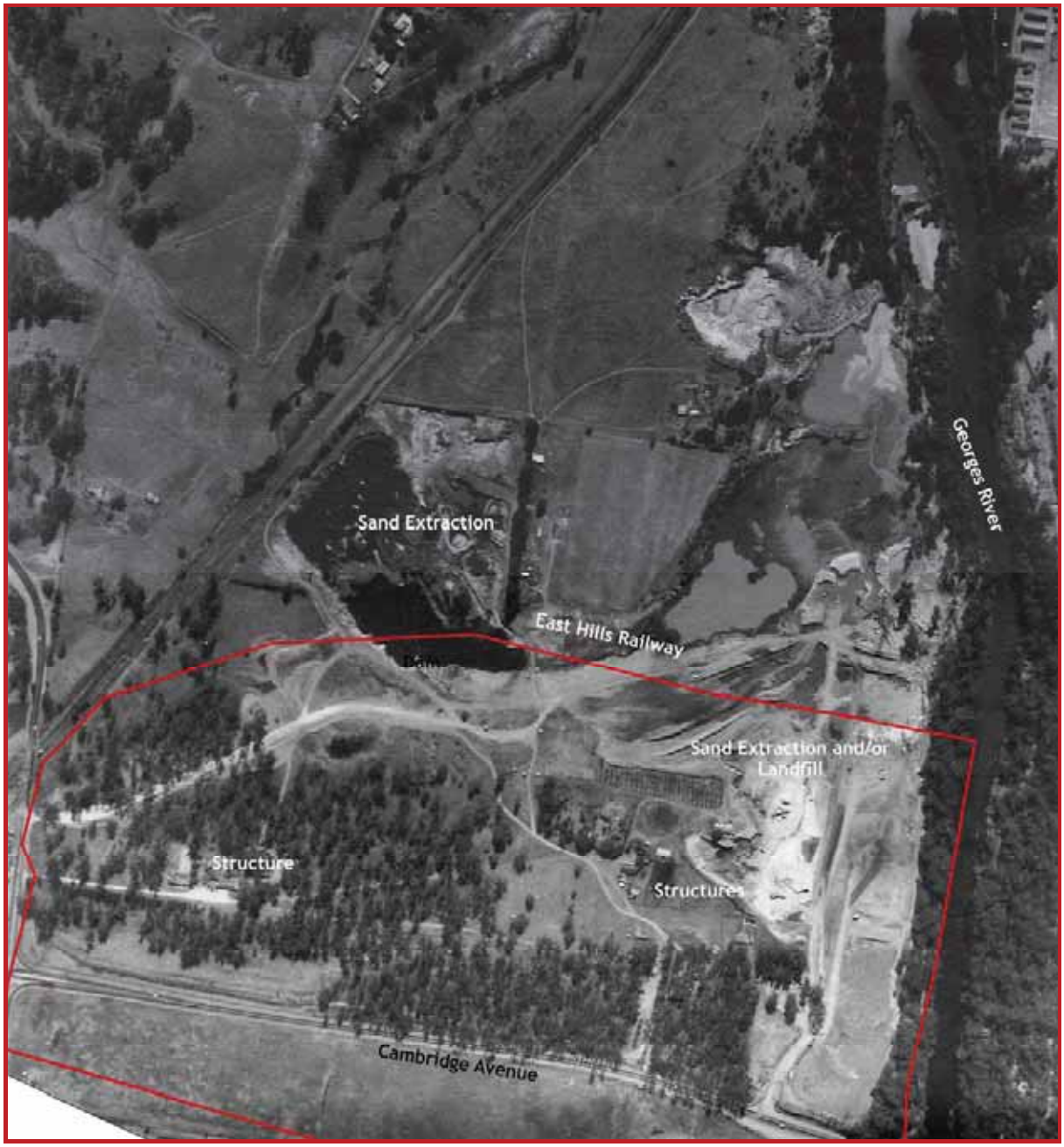

Figure 16. Historical aerial photograph of the subject site from 1982. Sand extraction and/or landfill has now extensively impacted the north and eastern quadrants of the subject site. The transmission line to the south has been cleared. Several earthworks in the northern and parts of the western quadrant may relate to the East Hills railway constructed during this period (source: Land & Property Information Services).

Figure 17. Historical aerial photography of the subject site from 1994. The subject site has largely reached its current appearance by this stage, with extensive landfill in the east, and sand extraction to the north. Note the East Hills railway is now constructed. The western and southern bushland still appears relatively undisturbed, as does parts of the small tributary located in the southeast corner of the study area (east end of the transmission line) (source: Land & Property Information Services).

Figure 18. Historical aerial photography of the subject site from 2002. Few changes are different from 1994 – the landfill operations and sand extraction are more formalised, but impacts remain largely the same for the purpose of this study (source: Land & Property Information Services).

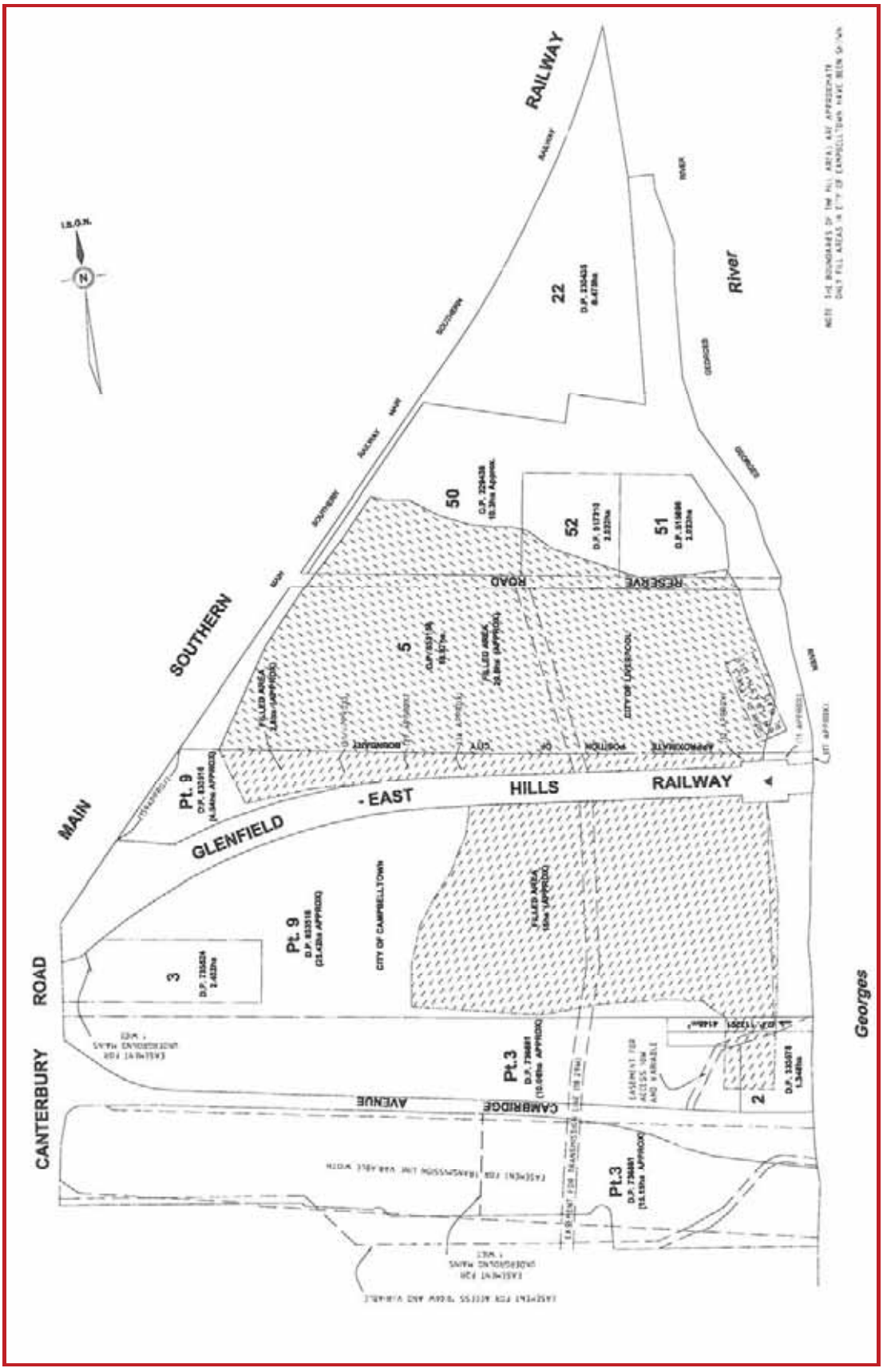

Figure 19. *Map showing the current extent of landfill (hatched) within the subject site.*

7. REGIONAL CHARACTER

This section provides a synthesis of the archaeological and environmental information for the subject site to identify key issues and develop predictions in relation to the presence of Aboriginal objects.

7.1 Archaeology

Based on the regional and local archaeological context of Glenfield, a number of conclusions can be reached regarding the Aboriginal archaeological potential of the subject area.

It is apparent that Aboriginal people have occupied and utilised the region within the Sydney Basin for a considerable period of time, certainly throughout the Holocene (10,000 years ago to present). Some evidence also points to occupation in the late Pleistocene (10,000 - 50,000 years ago). Archaeological studies pertaining to the region suggest that site distribution is characterised by proximity to permanent water sources, and landform types such as lower slopes, river terraces and alluvial flats. Importantly, sites are generally found above the flood zone, especially in the south-west of Sydney where the upper catchments of several large rivers are located.

The subject area is primarily situated above the flood zone associated with the Georges River and two other minor tributaries (one of which is no longer evident). Therefore, it is considered an ideal location for archaeological material to occur based on regional patterns.

Archaeologically, the local area is characterised by two very different types of land use strategy in the past. In the Hawkesbury sandstone country, most evident in the Holsworthy Military Area to the south of the subject site, archaeological sites are dominated by rock shelters and grinding grooves. These sites are generally constrained to the valley floors and ravines where sandstone caves and overhangs occur. These types of sites are extensive in the local area with the military area retaining over 600 rock shelters. On the surrounding Cumberland Plain, encompassing Liverpool, Moorebank, and the subject area, sites were generally artefact scatters, isolated finds, culturally modified trees and/or potential archaeological deposits. Studies both to the east and west of the subject area have identified the presence of artefact scatters and culturally modified trees in close proximity to the subject area.

7.2 Existing Disturbance

While the regional and local archaeological records suggest high potential for archaeological material within the subject area, the past land use history indicates significant disturbance has occurred reducing the likelihood of any such sites surviving.

Historical aerial photographs show that the subject area underwent significant ground disturbance and earthworks since the 1970s through to the present day, and included the levelling, cutting and filling of large sections of ground for sand extraction and/or landfill use. While the area of highest potential would have been in the vicinity of the two creeks and the banks of Georges River, historical photographs show that these areas (with the possible exception of the transmission line) have been subject to extensive earthworks.

Only two areas appear to have been only minimally disturbed in the past, a section of bushland in the western quadrant of the subject site, and a tributary (and surrounding landform) in the eastern quadrant of the transmission line. In relation to the bushland, several structures, trees and a large dam are present suggesting some impacts have occurred through the area.

A section of bushland to the south of the subject site also appeared to be relatively undisturbed based on the historical photography, but site inspection (**Section 6.4**) demonstrated that extensive ground disturbance (from heavy machinery) had occurred.

It is acknowledged that fluvial sand beds and terraces have been excavated elsewhere in the Sydney basin and revealed artefacts at considerable depth. AHMS personnel have investigated other sites in Sydney where the fill was placed directly over the top of the original soil profile, and it was possible to re-expose and re-investigate the original deposits, but these were generally small sites (<3,000 m^2).[2] However, the level of disturbance in many of parts of the study area (such as the sand extraction) precludes the possibility of deep deposits occurring. Further, given the industrial scale and depth of the fill across the site, it is considered unlikely that an intact A and A2 soil profile would be present in most areas.

2 AHMS has recently undertaken excavations at Reserve 4, Rosemeadow and for the proposed Windsor Police Station, Mileham Street. In both cases, an intact soil profile (comprised of A and A2 horizons) were found beneath varying levels (generally <50 cm) of introduced fill.

7.3 Site Predictions

A review of the archaeology of the region suggests that the subject site would have high potential for Aboriginal objects/sites to occur. The location of the subject site adjacent Georges River, above the flood zone, and in close proximity to two tributaries all increase the likelihood of the region being used by Aboriginal people in the past.

However, a review of the historical land use of the study area demonstrates that several parts of the subject site have experienced significant modification – most likely leading to the destruction of any Aboriginal objects/sites that may have been present. Specifically, the use of the subject site for both sand extraction and as a landfill, have led to the complete destruction of large parts of the eastern, northern and southern quadrants of the site.

Only two areas within the subject area appear to have both potential for Aboriginal objects/sites to occur and have not been extensively impacted: 1) the bushland in the western quadrant of the study area; and 2) the tributary in the eastern quadrant of the transmission line (**Figure 20**).

Historical photographs suggest that the bushland in the western quadrant of the subject site has been present since before 1930, although several minor impacts (e.g. tracks) have occurred throughout. This bushland would have been within 200 m of a former tributary (which has now been completely destroyed by the East Hills railway) and therefore is of archaeological interest.

The tributary to the east of the transmission line, similarly, reveals limited to no impact since the 1930's, although it must be acknowledged that a transmission line has been installed in this area since 2002.This tributary joins, and is in close proximity to Georges River (<200 m), and therefore has high potential for Aboriginal objects/sites to occur.

Based on the above observations and combining evidence drawn from our understanding of settlement patterning, geotechnical investigation and assessment of site disturbance, the subject area is characterised in accordance with the following classes of archaeological sensitivity **(Figure 20**):

High Archaeological Sensitivity: These areas appear to be relatively undisturbed, and are likely to be above the 100 year flood-level. They are located close to fresh water on river and creek flats, and river terraces, all of which are landforms considered to have Aboriginal archaeological potential. Soil consistent with the original soil profile in the area was identified in these areas.

Low Archaeological Sensitivity: All areas that have been previously impacted by historical footings/foundations and/or more recent development, including quarrying/sand mining, construction of the East Hills Rail Line. These areas are considered to be significantly disturbed and unlikely to retain any *in situ* Aboriginal archaeological deposits.

Figure 20. *Map of archaeological sensitivity based on the background review. Areas in red are considered highly disturbed and retain little potential for Aboriginal objects to occur.*

8. SITE INSPECTION

A site inspection was undertaken by Alan Williams (Senior Archaeologist AHMS), Neil Sampson (Tharawal LALC), Glenda Chalker (Cubbitch Barta Aboriginal Corporation), Simon Duffy and Meaghan MacDonald (EPS) on the 18 May 2012.

The site inspection focussed on re-locating previously recorded Aboriginal sites and areas where low disturbance had occurred. These areas were primarily located along the southern and western quadrants of the subject site, and the transmission line south of Cambridge Avenue. A cursory inspection was undertaken of areas in the eastern and northern quadrant of the subject site, but these areas contained a current landfill operation and the East Hills railway line, and were clearly heavily disturbed.

The southern and western quadrants of the site were characterised as undulating slopes covered by an open woodland of scribbly gums and rough leaved ironbarks, and occasional forest red gums (**Figures 21 - 25**). Ground cover was composed of a dense knee-high grass, which significantly reduced visibility. Ground exposures were, however, frequent and demonstrated a texture contrast soil across much of the subject site. In many areas, only the truncated subsoil remained suggesting both land clearance and soil erosion in the past (**Figure 23**).

Despite the open woodland extending into the southern quadrant of the subject site, the site inspection indicated that extensive earthworks and/or clearing had occurred through the trees (**Figure 23**). All exposures revealed deeply incised vehicle and heavy machinery tracks, which had significantly impacted the soil profile throughout. Further, the landfill and earthwork modifications to the north of the subject site have led to hydrological changes in parts of the woodland in the form of numerous swampy and boggy areas.

To the west, the subject site appears far less disturbed, trees are generally older in appearance and the soil profile largely intacted where observed (**Figure 24**). From a landform perspective, this area is the highest point on the site and slopes down to the East Hills railway to the north and west (**Figure 25**). However, no indication of the original tributary known to run through this area was evident. Visibility in this area was again low due to dense grass cover.

The transmission line was characterised as a long gentle slope rising from the west and dropping to Georges River in the east (**Figures 26** and **27**). Vegetation had been cleared leaving only a dense grassland beneath two large transmission lines. Exposures were readily apparent around the transmission pylons (although probably disturbed) an indicated a shallow texture contrast soil. Towards the east end of the transmission line, a vegetated tributary was present on a terrace overlooking the Georges River. While some disturbance was exhibited (most notably the old Cambridge Road alignment), it was in general undisturbed, and had good potential for Aboriginal sites/objects to occur.

The site inspection re-located one of the two previously recorded sites in the subject site, and identified two further sites. These are outlined in **Section 8.1**.

Figure 21. The southern quadrant of the subject site, looking west. While the area initially appeared undisturbed, several activities (such as the structures shown here) have impacted this area.

Figure 22. The southern quadrant of the subject site, looking west. This area was characterised by open woodland of stringybark gum and rough leaved ironbarks. Visibility was poor.

Figure 23. The southern quadrant of the subject site, looking west. While the area initially appeared undisturbed, several activities (such as the heavy machinery tracks shown here) have impacted this area.

Figure 24. The western quadrant of the subject site, looking north. This area was characterised as open woodland and had only minor impacts such as the road shown here. This area forms the likely location of the proposed recycling facility.

Figure 25. The western quadrant of the subject site, looking northwest. This area shows the dam evident in several of the historical photographs, and was probably part of a minor tributary running toward Georges River. The southwest railway line is also visible in the background.

Figure 26. The transmission line forming the southern portion of the subject site, looking east. The transmission line shows that the subject site originally was a large gently sloping hill running up from Glenfield, and down towards Georges River.

Figure 27. The transmission line forming the southern portion of the subject site, looking west.

8.1 Aboriginal Objects/Sites

As outlined in **Section 5.2.6** two Aboriginal sites had been previously recorded within the subject site – *Glenfield 1* (#45-5-3531) and *Glenfield ST* (#45-6-2428). A further two sites were identified as part of the site inspection – *GWD 1* and *GWD 2*, a scarred tree and a potential archaeological deposit (**Figure 28**).

To avoid confusion each site has been identified by its own unique identifier, although it is considered likely that the scarred tree identified as part of this study (GWD 1) is the same one recorded by Anthony English (Glenfield ST) (and erroneously located).

Glenfield 1 (#45-5-3531) – Isolated Object

MGA Area 56 306252E, 6239702N

This site was an isolated piece of heat-shattered silcrete located on an access track in the northwest quadrant of the subject site. The access track is currently being used by the Southwest Freight railway line and/or Glenfield railway station upgrades and experiences heavy vehicle traffic. While access could not be obtained (due to the construction) at time of site inspection, it is considered highly likely that this site has been destroyed through these activities.

Glenfield ST (#45-6-2428) – Scarred Tree

MGA Area 56 306217E, 6239617N

This site was a scarred tree recorded by AMBS in 2008 based on an earlier recording of the site by Anthony English. The site is located on top of the hill in the western quadrant of the subject site, immediately west of the house in this location.

The scar appears to be on a very thin (and probably relatively young) scribbly gum. It is a long twisted scar running from the ground to about 1.5 m up the tree (**Figure 29**). There was no evidence of axe marks or tree healing. It is AHMS opinion and that of the Aboriginal stakeholders that this was not a culturally modified tree, it is believed that Anthony English may have been referring to the site we now identify as GWD 1, rather than the tree identified here by AMBS.

GWD 1 – Scarred Tree

MGA Area 56 – 306217E, 6239617N

This site was a scarred tree located some 70 m north of the house in the northwest quadrant of the subject site. The tree had the appearance of a red forest gum of some age with a girth of 320 cm (**Figures 30** and **31**). The scar was located on the western side of the tree and was 110 x 35 cm in size. The scar was oval in shape and demonstrated evidence of bark healing around the edges. However, the base of the scar was close to the ground and due to tree rot, it is unclear if the base of the scar was intact or open at the base – if the latter the potential for the scar to be of cultural origins is significantly reduced. It is recommended that an arborist investigates this tree further before formal identification of this site.

It is believed that this may be the scarred tree Anthony English originally recorded, rather than *Glenfield ST* as it is currently assigned.

GWD 2 – Potential Archaeological Deposit

MGA Area 56 – 306730E, 6239318N; 306702E, 6239190N; 307109E, 6239189N; 307084E, 6239099N

This site consists of a large undulating terrace feature (some 400 x 100 m in size) encompassing a tributary and the edge of Georges River at the eastern end of the transmission line (**Figures 32** and **33**). This area was identified based on its proximity to Georges River and its confluence to the minor tributary, and the general lack of disturbance in this part of the subject site.

For ease of management this site has been recorded as a large rectangle, but it is acknowledged parts of this area have been impacted through the former Cambridge Avenue alignment and the transmission lines. In addition, the areas closet to Georges River could not be accessed, so their potential and/or disturbance could not be accurately determined.

Figure 28. Map of archaeological sites within the subject site.

Figure 29. Glenfield ST (#45-5-2428), looking north. This scarred tree was recently recorded by AMBS in 2008, and may relate to an earlier recording by Anthony English in this general vicinity. We do not believe this scar to be of cultural origins, and hypothesize that Anthony English's reference was actually to nearby GWD 1.

Figure 30. GWD 1, a possible scarred tree, looking east. This tree was located some 50 m north of the house structure in the western quadrant of the subject site. Glenda Chalker poses for scale.

Figure 31. GWD 1, a possible scarred tree, looking east.

Figure 32. GWD 2, a potential archaeological deposit, looking east along the transmission line. The tree-line represents part of a minor tributary that runs into the Georges River, and appears relatively undisturbed since the 1930's.

Figure 33. *GWD 2, a potential archaeological deposit, looking west. The creek line is shown to the left of the photograph.*

9. CONCLUSIONS & RECOMMENDATIONS

9.1 The Archaeological Resource

The study area is located on the banks of Georges River. Historically, it would have been a low gentle hill sloping down towards the river, and encompassed two first order tributaries. Since the 1970s, the subject site has been used for sand extraction and landfill, and these activities have significantly impacted several areas of the site.

Based on regional data, archaeological deposits in this area are likely to be constrained to artefact scatters, isolated finds, scarred trees and/or potential archaeological deposits. When overlaying archaeological potential with areas of known disturbance, only two areas have potential for Aboriginal objects/sites to occur, an area of unmodified woodland in the western quadrant of the subject site; and the alluvial terrace on the eastern edge of the transmission line.

A review of the archaeological record and a site inspection, both of which identified four Aboriginal object/sites in these areas, confirms the contextual assumptions. The sites identified consisted of two scarred trees (one of which AHMS does not believe to be culturally modified), an isolated find (which may have been destroyed through the recent railway modifications) and a potential archaeological deposit (**Figure 28**).

These findings and conclusions were discussed with the Aboriginal stakeholders on site, and were verbally supported.

9.2 Subject Site Management

The findings of this assessment indicate that there are no reasons to object to the proposed rezoning on Aboriginal heritage grounds. This is because none of the Aboriginal objects/sites are considered of conservation potential at this stage, although further investigation of GWD 1 and 2 is required to firmly identify their scientific and cultural values as part of development planning.

Should potential impacts to any of the Aboriginal objects/sites be required, further assessment would be required to characterise and assess their significance. Should they prove to be Aboriginal objects/sites, Aboriginal Heritage Impact Permits and associated documentation would need to be lodged with Office of Environment & Heritage for consideration prior to any development.

9.3 Conclusions and Recommendations

- Based on the findings of this study, there are no Aboriginal heritage issues that indicate that the re-zoning of the subject site from rural to industrial should not proceed;
- It is considered that Glenfield ST (#45-5-2428) is not a scarred tree of cultural origins, and it is recommended that the AHIMS recording of this site is modified to 'not a site';
- It is recommended that GWD 1 and GWD 2, a scarred tree and potential archaeological deposit identified as part of this assessment, are listed on the AHIMS database;
- It is recommended that prior to any proposed impact, further assessment and characterisation is undertaken of the four Aboriginal objects/sites, Glenfield 1 (#45-5-3531), Glenfield ST (#45-5-2428), GWD 1 and GWD 2. Should they prove to be Aboriginal objects/sites as defined by the *National Parks and Wildlife Act 1974,* appropriate assessments and permits under this Act would be required prior to their disturbance.
- A copy of this final report should be provided to the Tharawal LALC and Cubbitch Barta Aboriginal Corporation.

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