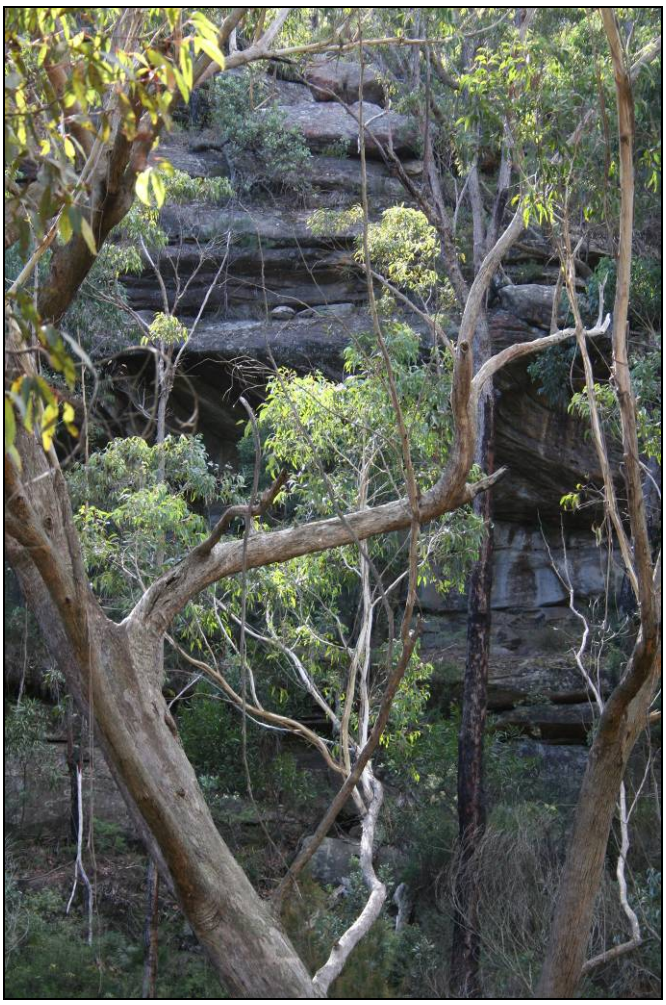
APPENDIX E

CULTURAL HERITAGE / ARCHAEOLOGICAL IMPACT ASSESSMENT (BIOSIS)

BIOSIS
RESEARCH



West Cliff Colliery Stage 3 Coal Wash Emplacement Archaeological and Cultural Heritage Assessment

Report for BHP Billiton

June 2007

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- Caryll Sefton and the Illawarra Prehistory Group
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ABBREVIATIONS

AHC	Australian Heritage Council
AHIMS	Aboriginal Heritage Information Management System
ATSIC	Aboriginal and Torres Strait Islander Commission
CHL	Commonwealth Heritage List
DECC	Department of Environment and Climate Change
DEH	Department of Environment and Heritage
EP&A	Environmental Protection and Assessment
EPBC	Environment Protection and Biodiversity Conservation
GSV	Ground surface visibility
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MGA	Map Grid of Australia – unless otherwise specified all coordinates are in MGA
NHL	National Heritage List
NNTT	National Native Title Tribunal
NPWS	National Parks and Wildlife Service (now part of DECC)
REP	Regional Environment Plan
RNE	Register of the National Estate
SHI	State Heritage Inventory
SHR	State Heritage Register

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EXECUTIVE SUMMARY

Biosis Research Pty Ltd was commissioned by BHP Billiton Illawarra Coal to undertake an archaeological and cultural heritage assessment of the proposed Stage 3 West Cliff Coal Wash Emplacement Area. The coal wash emplacement area is situated to the north west of the existing West Cliff Colliery workings and the Stage 1 and 2 coal emplacement areas (Figure 1).

The principal aims of this cultural heritage investigation were to identify, record and assess any Aboriginal or historic archaeological evidence within the study area, and assess the potential impacts and provide mitigation measures for the proposed coal wash emplacement area. Extensive environmental and archaeological background research was undertaken prior to field work to understand site processes and patterning within the study area.

A detailed archaeological assessment was undertaken over two weeks in late February 2007 by Jamie Reeves and Melanie Thomson (Biosis Research Pty Ltd), Glenda and Rebecca Chalker (Cubbitch Barta Native Title Claimants Aboriginal Corporation), and Leanne Hestelow and Wendy Lewis (Tharawal Local Aboriginal Land Council). The archaeological survey methods included systematic block survey of the emplacement area and sample transect survey of other locations within West Cliff Colliery.

Two previous archaeological and cultural heritage assessments had been undertaken within West Cliff Colliery (Sefton 1989; Navin Officer 2000). Sefton's (1989) archaeological survey resulted in four Aboriginal sites being recorded, including a shelter with art (52-2-1368), a single grinding groove (52-2-1371), a shelter with art (52-2-1372) and a shelter with art and deposit (5-2-1373). Two shelters with potential archaeological deposits (PAD) were also identified within the present study area. More recently, the Dendrobium Coal Project (Navin Officer 2000) identified a shelter with deposit (D11) and a shelter with PAD (D10) within the north west section of the study area.

The present cultural heritage assessment relocated all previously recorded Aboriginal archaeological sites and shelters with PAD within the current study area. Updated photographs and assessments of significance were completed for each site. Five new Aboriginal archaeological sites were also identified within the West Cliff site boundaries (Figure 3).

The proposed Coal Wash Emplacement Stage 3 area will impact directly on four Aboriginal archaeological sites and two Potential Archaeological Deposit sites, through emplacement on top of these features:

- BC 2 (AHIMS 52-2-1368), LOW archaeological significance;
- BC 5 (AHIMS 52-2-1371), LOW archaeological significance;
- BC 6 (AHIMS 52-2-1372), MODERATE archaeological significance;

- West Cliff 4, LOW archaeological significance;
- BCPAD4, Potential Archaeological Deposit; and
- BCPAD5, Potential Archaeological Deposit.

Four Aboriginal archaeological sites will be indirectly impacted through close proximity to the emplacement landform, or related infrastructure:

- WC2, HIGH archaeological significance;
- BC7 (AHIMS 52-2-1373), MODERATE significance;
- D11, MODERATE significance; and
- WC3, Potential Archaeological Deposit.

Three Aboriginal archaeological sites are at no risk of impact from the proposal:

- D10 (AHIMS 52-2-2228), LOW archaeological significance;
- WC1, MODERATE archaeological significance; and
- WC5, LOW archaeological significance.

Two historical archaeological sites of low local significance will be impacted by the emplacement footprint:

- WCHS1, LOW archaeological significance; and
- WCHS2, LOW archaeological significance.

RECOMMENDATIONS

Site Specific Recommendations

Statutory Requirements

- **BC2** – BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.
- **BC5 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **BC6 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **WC4 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy for this site.

- **BCPAD4** - BHP Billiton should apply to DECC for a Section 87 Preliminary Research Permit to test the Potential Archaeological Deposit at this site. The permit must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **BCPAD5 -** BHP Billiton should apply to DECC for a Section 87 Preliminary Research Permit to test the Potential Archaeological Deposit at this site. The permit must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

Other Management Requirements

- **BC7 -** The site should be sign-posted and marked on plans to protect it from impact during construction. The site should be monitored regularly whilst the emplacement is being constructed nearby to ensure there are not impacts.

- **D11 -** The site should be sign-posted and marked on plans to protect it from impact during construction. The site should be monitored regularly whilst emplacement is being constructed nearby to ensure there are not impacts.

- **WC2** - The site should be sign-posted and marked off during the construction and operation of the construction road. In addition to this the site should be monitored to monitor potential impacts from dust and vibration to the art throughout the emplacement operation.

- **WC3** - The site should be sign-posted and marked on plans to protect it from impact during construction.

- **WCHS1** - This site should be mapped and photographed prior to impact.

- **WCHS2** - This site should be mapped and photographed prior to impact.

General Recommendations

- In consultation with the relevant Aboriginal communities BHP Billiton should develop a Cultural Heritage Management Plan that includes specific details, monitoring requirements and chronology regarding management requirements for all sites identified in this report.

- The Cultural Heritage Management Plan should be incorporated into the relevant Operational Management Plan for the Stage 3 emplacement project.

1.0 INTRODUCTION

Cultural heritage legislation protecting Aboriginal and historic heritage places applies in New South Wales. These places are an important part of our heritage. They are evidence of more than 50,000 years of occupation of New South Wales by Aboriginal people, and of the more recent period of post-contact settlement.

Heritage places can provide us with important information about past lifestyles and cultural change. Preserving and enhancing these important and non-renewable cultural resources is encouraged.

It is an offence under sections of legislation to damage or destroy heritage sites without a permit or consent from the appropriate body (see Appendix 1 for a discussion of relevant heritage legislation and constraints).

When a project or new development is proposed, it must be established if any cultural heritage places are in the area and how they might be affected by the project. Often it is possible to minimise the impact of development or find an alternative to damaging or destroying a heritage place. Therefore, preliminary research and survey to identify heritage places is a fundamental part of the background study for most developments.

The first stage of a study will involve background research to collect information about the land within the West Cliff Colliery study area. The second stage will involve detailed field surveys and consultation with relevant Aboriginal stakeholder groups.

Possibly the most important part of the study involves assessing the cultural heritage significance of heritage places in the study area. Understanding the significance of a heritage place is essential for formulating management recommendations and making decisions.

The subject matter of this report involves the use of a number of technical words and terms with which the reader may be unfamiliar. An extensive glossary has been included at the end of the report and reference to this may be of assistance.

1.1 Project background

West Cliff Colliery operates a coal washery and coal wash emplacement facilities that service BHP Billiton's collieries within the Illawarra Region. The current, approved coal wash emplacement facilities, Stages 1 and 2, are nearing capacity and it is necessary to seek approval to develop an emplacement area that will service all operations into the foreseeable future.

During the approvals process associated with the Dendrobium Coal Project in 2000-2001 an area within the West Cliff Colliery lease was investigated as a potential site for the expansion of existing emplacement operations. The proposal to expand the existing operations into the area then defined as Stage 3 requires further consideration from the Minister for Planning in accordance with Condition 1.1(c) of the Dendrobium Mine development consent. Factors that

need to be addressed in the application to seek the further approval from the Minister for Planning, including the assessment of Aboriginal cultural heritage, are outlined in Condition 5.1 of the Dendrobium Mine development consent.

Illawarra Coal has actively investigated the technical and commercial aspects of using alternatives to the proposed coal wash emplacement within the Brennans Creek Valley at West Cliff Colliery, pursuant to Section 5.1 of the Dendrobium Colliery Conditions of Consent. These alternatives include but are not limited to:

- Coal wash for brick making;
- Road pavement and civil construction usage;
- Co-production technology energy plants;
- Underground disposal options including overburden grout injection for subsidence mitigation and underground emplacement for goaf filling;
- Use of coal wash for power generation;
- Filling up existing waste emplacement areas; and
- Investigation of potential new emplacement sites.

Several of the alternative uses for coal wash have been promising, and provide an alternative disposal option for a percentage of the coal wash that is produced. However none of the alternatives to date are able to account for the amount of coal wash that is produced at current and predicted production rates.

BHP Billiton proposes the placement of coal wash within the Brennans Creek line/valley from its coal mining activities in the Illawarra region. This has the potential to bury a number of Aboriginal archaeological sites and reduce overall cultural heritage values of the creek valley within the study area. This report assesses the likely impacts associated with the proposed coal wash emplacement on indigenous and historical archaeological sites and cultural heritage places.

This report has been commissioned in order to identify and assess Aboriginal and historic cultural heritage values of the proposed West Cliff Colliery Stage 3 Emplacement Area. Results of this investigation will be used to identify predicted impacts to heritage items and places associated with the proposed development area. Recommendations will be designed to minimise impacts to cultural heritage places in accordance with legislative constraints and ‘best practice’ heritage management.

1.2 Study area

The study area is located within Brennans Creek valley, at the north western end of the existing West Cliff Colliery site, east of the township of Appin, NSW (refer to Figure 1). Situated within the Wollondilly Local Government Area (LGA) on the Woronora Plateau, the study area is bounded by Bulli Appin Road to the south and Wedderburn Road to the north,

within a Mining Lease area currently managed by BHP Billiton. Brennans Creek runs north west through the centre of the study area. The extent of the study area is shown in Figure 2.

The study area is dissected by Brennans Creek and a number of smaller tributaries and drainage lines. The creek valley consists of moderate to steep sandstone overhangs, while large open areas of sandstone can be found within sections of the creek channel. Much of the study area is vegetated by sandstone woodlands and upland swamp vegetation.

In recent years, the West Cliff Colliery study area has been subject to ongoing mining activities, including seismic lines, boreholes, vehicle access tracks/roads, water pipelines, coal washery, water supply and management dams and coal stock piles. Such activities have resulted in moderate to high levels of disturbance in some areas of the Mining Lease. Other infrastructure that is situated within the study area includes the gas pipeline and two overhead transmission lines.

1.2.1 Proposed Development

The existing coal wash emplacement facilities, Stage 1 and Stage 2 at West Cliff are nearing capacity and it is necessary to seek further approval to develop a Stage 3 emplacement area required to provide further deposition of coal wash that will service all operations for an estimated 13 years. The Proposal will continue Stage 2 coal wash emplacement operations into Stage 3. Coal wash from West Cliff and Port Kembla coal preparation plants will progressively fill benches across the emplacement area that will advance gradually down Brennans Creek Valley. In preparation for the deposition of coal wash all existing features including surface rock, logs and topsoil would be excavated and translocated to the surface of completed emplacement areas. At the completion of each phase of the active emplacement area, the area will be topsoiled and revegetated with native vegetation sourced from the site.

The proposed Stage 3 emplacement area including all associated infrastructure covers 66.3 ha with a total capacity of approximately 33.5 Mt and a maximum design height of approximately 353 m AHD. Up to 60.5 ha of native vegetation will be required to be cleared. Associated infrastructure includes the proposed construction of haul roads, dams, dam construction roads, clean water diversion channels and dirty water management ponds (Figure 2). It also includes alterations of existing drainage patterns via the construction of a number of new emplacement catch ponds and a new water storage/treatment pond on the pit top. This system will be entirely independent to the pit top water management system and this will result in a vast improvement in the quality of water being released from the emplacement catch ponds into Brennans Creek Dam. Other infrastructure includes the construction of two clean water diversion channels along the east and west perimeter of the Emplacement Area. Each diversion channel will collect run-off from areas upslope of the emplacement area to the east and west of the emplacement and divert that water into Brennans Creek Dam. The Proposal will be subject to the water quality requirements under existing EPA license conditions.

1.3 Planning approvals

In regard to the assessment of cultural heritage impacts from the proposal, the project will be assessed under the following legislation and instruments:

- Dendrobium Mine development consent;
- *Environmental Planning and Assessment Act* 1979 (NSW);
- *National Parks and Wildlife Act* 1974 (NSW); and
- *Environmental Protection and Biodiversity Conservation Act* 1999 (Cth).

1.4 Aims

The following is a summary of the major objectives.

- Conduct heritage register searches to identify any previously recorded cultural heritage sites within the survey area. Searches will include the Aboriginal Heritage Information Management System (AHIMS), the National Heritage List, Commonwealth Heritage List, Register of the National Estate, State Heritage Register, Local Environmental Plan and National Trust heritage lists.
- Conduct additional background research in order to recognise any identifiable trends in site distribution and location.
- Consult with identified Aboriginal stakeholders in the area.
- Undertake an appropriate survey of the study area to identify any previously unknown sites, and make an independent assessment of the archaeological and heritage potential of the study area.
- Record and assess sites identified during the survey in compliance with the guidelines issued by the NSW Department of Environment and Climate Change (DECC) and the NSW Heritage Office.
- Identify impacts to all identified Aboriginal and historical cultural heritage sites and places as a result of the proposed development.
- Make recommendations to minimise or mitigate impacts to cultural heritage values within the study area.
- Make recommendations to manage the cultural heritage values within the study area.

1.5 Consultation

1.5.1 Interim Community Consultation Requirements

A cultural heritage consultation program was undertaken as part of the West Cliff Coal Wash Emplacement Area 3 Project as per the DECC Part 6 *Interim Community Consultation Requirements for Applicants.*

Public notifications following the DECC *Interim Community Consultation Requirements for Applicants* were made in June 2006. Respondents were forwarded copies of survey methodology for comment.

In accordance with the DECC's *Part 6 Approvals – Interim Community Consultation Requirements for Applicants* Biosis Research notified the following bodies on 23 June 2006 of the West Cliff Stage 3 Emplacement Area Project:

- Tharawal Local Aboriginal Land Council;
- The Registrar of Aboriginal Owners;
- Native Title Services;
- The Wollondilly Shire Council; and
- The NSW Department of Environment and Conservation.

In addition to the written notifications, advertisements were placed in the following local print media on 27 June 2006:

- *The Macarthur Chronicle; and*
- *The Wollondilly Advertiser.*

A register for interested parties was opened on 27 June 2006 and registrations were received by Biosis Research until 12 July 2006.

The following bodies responded to the above calls for registrations. These bodies are referred to below as 'the registered stakeholders':

- Cubbitch Barta Native Title Claimants (Glenda Chalker);
- Northern Illawarra Aboriginal Collective Inc. (Chris Illert);
- Office of the Registrar Aboriginal Land Rights Act 1983 (NSW) (Megan Mebberson); and
- Wollondilly Shire Council (Ally Dench).

2.0 ASSESSMENT METHODOLOGY

2.1 Philosophy

A methodology is a system of principles that are formulated to govern the way an assessment is carried out. In archaeological and cultural heritage assessments the methodology employed is influenced by several factors including: the type of development or project, environmental factors, ethnographic and historical land-uses, and previous archaeological and cultural heritage work.

2.2 Guiding Principles

The methodology employed for this investigation has been designed to conform to the requirements of the relevant advisory documents and guidelines. These guidelines and documents are:

- DECC *National Parks and Wildlife Act* 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants (2004);
- DECC Draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (July 2005);
- The Australia ICOMOS Burra Charter;
- NSW NPWS (DECC) Working Draft Aboriginal Cultural Heritage Standards and Guidelines Kit (1997); and
- DECC Guidelines for Aboriginal Heritage Impact Assessment (DRAFT) (no date).

In line with these documents, the methodology adheres to the following principals:

- Aboriginal people are the primary determinants of the significance of their heritage;
- Input from those Aboriginal people with a cultural association to the land is an essential part of assessing the significance of Aboriginal heritage objects and values that could be impacted by an activity;
- Aboriginal heritage can have both cultural and scientific/archaeological significance and both should be the subject of assessment;
- Aboriginal community involvement needs to take place early in the assessment process to ensure that their values and concerns are fully taken into account, and so that their own decision-making structures are able to function adequately; and
- Consideration should be given to measures that could be implemented to avoid, mitigate or offset likely impacts.

The DECC *National Parks and Wildlife Act* 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants states that the community consultation process

ensures that Aboriginal communities have the opportunity to positively influence assessment outcomes by:

- Influencing the design of the assessment of cultural and scientific significance;
- Providing relevant information in relation to cultural significance values; and
- Contributing to the development of cultural heritage management recommendations.

2.3 Methodology

The following is a detailed outline of the methods employed for this assessment.

2.3.1 Background Research

The following activities will be undertaken during the background research phase:

- Search for sites on the NSW DECC AHIMS for the study area and surrounding vicinity.
- Review of relevant site records for the study area and Woronora Plateau.
- Review of relevant reports from the region.
- Search of the NSW Heritage Office database and State Heritage Register.
- Search of the National Heritage List and Register of the National Estate.
- Inspection of heritage lists in relevant local planning instruments.
- Search of the National Trust Heritage Register.

This data was collated and mapped to show the locations of the previously recorded sites. The data will also be used to formulate predictive statements regarding Aboriginal archaeological site distribution within the study area. The predictive statements will be based on terrain units, and will be used to help determine the specific locations of the field survey.

2.3.2 Cultural and Archaeological Survey

The cultural and archaeological survey will be conducted as follows:

- Known sites will be revisited to confirm their location, and to make a record of their current condition.
- Pedestrian survey will be undertaken across the entire area of the proposed emplacement site.
- The location of all sites will be recorded using a hand-held GPS unit.
- Survey data will be recorded on purpose-designed recording forms.
- Details of sites will be recorded using purpose-designed recording forms.

- Appropriate plans and maps will be prepared.
- Photographs of all sites and features will be taken.
- Appropriate Aboriginal Community representatives will be invited to assist with the field assessment.

2.3.3 Assessment of Significance

The NSW DEC recognises that 'Aboriginal community are the primary determinants of the significance of their heritage' (NSW DEC 2004). Biosis Research recognises that our role in the cultural heritage assessment process is to provide specialist skills, particularly in regard to archaeological and heritage management expertise. These specialist skills can be articulated and enhanced through consultation with the Aboriginal community, with the aim of providing a holistic assessment of cultural heritage significance.

Archaeologists study the material cultural heritage—artefacts, sites and structures—of past peoples and societies. However, not all places and sites of cultural heritage value and significance have material evidence. Places, sites and objects have heritage value because of what they mean to people, and because of the values they represent for people. Places, sites and objects will have different heritage values for different people. These different values may require negotiation among various stakeholders and can shape what decisions are made about conservation. Cultural heritage management is the process of investigation, consultation and making decisions about the conservation of heritage places through the assessment of heritage values.

Heritage management is based on the principle that the heritage significance of a place will guide all future decisions that affect the place. The determination of cultural heritage significance relies on a comprehensive approach to heritage assessments and to the values that are attached to heritage places. Cultural heritage significance can be considered to be the importance of a place, site or object arising from the combination of values attributed to it. These values determine the 'what' and 'how' of conservation and direct management decisions. The categorisation and significance of a place or site will also determine the statutory protection that may be afforded to it.

This approach is laid out in the Australia ICOMOS Burra Charter (1999), which has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. The Burra Charter identifies the following categories of values: aesthetic, historic, scientific and social. Most assessment approaches also include a ranking of significance – high, moderate or low for example. For each value associated with a place, an attempt is made to assess the degree or level of significance in terms such as *unique, important, representative, rare* and so on – which relies on a comparison of that value in relation to other places. One of the more common applications of the significance assessment process is to mitigate or control landscape modifying activities, including the protection or conservation of identified heritage values.

Both professional and community understandings are important when determining heritage and its significance. 'Expert' interpretation will often need to be integrated with other understandings and assessments of heritage. This is particularly relevant in a discussion of Aboriginal cultural heritage, where there can be differences in the way places are valued and in understandings of how knowledge can be used. As a consequence, outcomes should rely on processes and practices that promote integration and an effective incorporation of different values in decision making.

For example, an 'archaeological' site can be of broader interest to groups other than archaeologists. There are additional scientific interests in archaeological sites than those that arise through archaeology alone. Many types of scientific research or 'informational' interests can use data from archaeological sites, and these can all contribute the 'scientific value' of a place or site. Also, the wider interests of the general community can be complementary to archaeological values. In terms of Aboriginal communities, heritage places – including those that are otherwise defined as 'archaeological sites' – will attract differing values. These may include custodianship obligations, education, family or ancestral links, identity, and symbolic representation.

History and traditions are important: this generation has an obligation to future generations to retain certain things as they are currently seen and understood. This includes retaining alternative understandings to those that come through scientific assessments. Heritage places are often more complex than is identified through the scientific determination of value. Cultural and social values can be complex and rich - the past is a vital component of cultural identity. Feelings of belonging and identity are reinforced by knowledge of the existence of a past, and this is further reinforced and maintained in the protection of cultural heritage.

Assessment of Cultural Heritage Significance

As well as the ICOMOS Burra Charter, DEC has issued the *Guidelines for Aboriginal Impact Assessment*. The relevant sections of the *Guidelines* are presented and discussed below.

The *Guidelines* state that an area may contain evidence and associations which demonstrate one or any combination of the following Aboriginal heritage values. The values described by the *Guidelines* are drawn from the Burra Charter.

Social value (sometimes termed Aboriginal value) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day Aboriginal community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with one or more Aboriginal communities.

Historic value refers to the associations of a place with a person, event, phase or activity of importance to the history of an Aboriginal community. Historic places may or may not have

physical evidence of their historical importance (such as structures, planted vegetation or landscape modifications). Gaining a sufficient understanding of this aspect of significance will often require the collection of oral histories and archival or documentary research, as well as field documentation. These places may have 'shared' historic values with other (non-Aboriginal) communities. Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage, and the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives.

Scientific value refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

Aesthetic value refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.

All Aboriginal sites and places, including those that are considered to be 'archaeological' – for example, middens or artefact scatters – may have a particular value and meaning to Aboriginal people.

Cultural Landscapes

In addition to these four definitions of value, the *Guidelines* also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Determination of Cultural Heritage Significance

The Burra Charter suggests that heritage practitioners 'should prepare a succinct statement of cultural significance, supported by, or cross referenced to, sufficient graphic material to help identify the fabric of cultural significance'. The statement must be clear and concise, and must not simply restate the physical or documentary evidence presented as part of the assessment.

This study will present determinations of cultural heritage significance as *statements of significance* that preface a concise discussion of the contributing factors to the cultural heritage significance.

Reference to each of the categories defined above will be made when evaluating cultural significance for sites and places. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category will also be proposed. Consideration of the thresholds for each level of value for the categories will be guided by the contributing factors defined above for each category. The categories are:

- *Social value*
- *Historic value*
- *Scientific value*
- *Aesthetic value*
- *Cultural landscape value*

The determination of cultural landscape value will be applied to both individual sites and places (to explore their associations) and also, to the study area as a whole.

3.0 HERITAGE STATUS AND PLANNING DOCUMENTS

3.1 Commonwealth Registers

3.1.1 National Heritage Registers

The *Environment Protection and Biodiversity Conservation* Act 1999 (Cth) establishes two mechanisms for protection of heritage places of National or Commonwealth significance. The National Heritage List provides protection to places of cultural significance to the nation of Australia. The Commonwealth Heritage List comprises natural, Aboriginal and historical heritage places owned and controlled by the Commonwealth and therefore mostly includes places associated with defence, communications, customs and other government activities.

Nominations to these two lists are assessed by the Australian Heritage Council (AHC), who also compiles the Register of the National Estate, a list of places identified as having national estate values. There are no management constraints associated with listing on the RNE unless the listed place is owned by a commonwealth agency.

APPLICATION TO THE STUDY AREA – NATIONAL HERITAGE REGISTERS

There are two items listed on the Register of the National Estate that are situated within Stokes Creek, over 5 kilometres north of the present study area. The sites comprise an Aboriginal shelter with art and a rock engraving site (Stokes Creek 1 and Stokes Creek 2). Both sites are also registered on the DECC's AHIMS.

3.1.2 National Native Title Register

The Commonwealth *Native Title Act* 1993 (Cth) establishes the principles and mechanisms for the recognition, determination of Native Title for Aboriginal people.

The purpose of searching the register is to identify any Traditional Owner groups will current registered claims close to the study area that may identify themselves as relevant stakeholders with traditional knowledge or experience.

APPLICATION TO THE STUDY AREA – NATIONAL NATIVE TITLE REGISTER LISTINGS

A search of the National Native Title Register, the Register of Native Title Claims and the Register of Indigenous Land Use Agreements was completed on 12 March 2007. There are no lands determined to have native title, no registered native title claims or indigenous land use agreements within the study area or its immediate vicinity.

3.2 State Registers

3.2.1 Heritage Act Registers

The NSW Heritage Office, part of the Department of Planning, maintains registers of heritage and archaeological items that are of State or local significance to New South Wales.

State Heritage Register: The State Heritage Register (SHR) contains items that have been assessed as being of State Significance to New South Wales. The State Heritage Inventory (SHI) contains items that are listed on Local Environmental Plans and/or on a State Government Agency's Section 170 registers that are deemed to be of local significance.

If an item or place does not appear on either the SHR or SHI this may not mean that the item or place does not have heritage or archaeological significance; many items have not been assessed to determine their heritage significance. An assessment is required for items that are 50 years or older. Items that appear on either the SHR or SHI have a defined level of statutory protection. This is discussed more fully in Appendix 1.

APPLICATION TO THE STUDY AREA – NSW STATE HERITAGE REGISTER LISTINGS

The study area contains no items that are listed on the State Heritage Register and no items listed on the State Heritage Inventory.

S.170 provisions: In addition, Section 170 of the NSW *Heritage Act 1977* requires that culturally significant items or places managed or owned by Government agencies be listed on departmental Conservation and Heritage Registers. Information in these Registers has been prepared according to NSW Heritage Office guidelines and should correspond with information in the State Heritage Inventory.

APPLICATION TO THE STUDY AREA – GOVERNMENT AUTHORITY S.170 REGISTER

The study area contains no sites that are listed on the government authority s170 Heritage and Conservation Registers as there are no state agency assets located within the study area.

3.2.2 Environmental Planning and Assessment Act Registers

The *Environmental Planning and Assessment Act 1979* includes provisions for local government authorities to consider environmental impacts in land-use planning and decision making. Such impacts are generally considered in relation to the planning provisions contained in the Local Environment Plan (LEP) or regional Environment Plan (REP).

Local Environmental Plans (LEP): Each Local Government Area (LGA) is required to create and maintain a LEP that includes Aboriginal and historic heritage items. Local Councils

identify items that are of significance within their LGA, and these items are listed on heritage schedules in the local LEP and are protected under the *EP&A Act 1979* and *Heritage Act 1977*.

APPLICATION TO THE STUDY AREA – WOLLONDILLY LEP YEAR SCHEDULE 1991

The study area contains no items listed in the heritage schedule of the Wollondilly LEP 1991.

3.3 Non-Statutory Registers

3.3.1 The National Trust of Australia (NSW)

The National Trust of Australia (NSW) is a community-based conservation organisation. The Trust maintains a Register of heritage items and places. Although the Register has no legal foundation or statutory power, it is recognised as an authoritative statement on the significance to the community of particular items, and is held in high esteem by the public. The National Trust lists items or places that have heritage or cultural value to the community and, as such, the Trust encourages and promotes the public appreciation, knowledge, and enjoyment of heritage items for future and present generations.

APPLICATION TO THE STUDY AREA – NATIONAL TRUST OF AUSTRALIA (NSW)

The study area contains no heritage items classified (listed) by the National Trust of Australia.

4.0 ENVIRONMENTAL CONTEXT

4.1 Geology, Soils and Landforms

The West Cliff study area occurs in the south-east of the Sydney Basin, a geological province that consists of Permian and Triassic aged sedimentary rocks. The surface geology of the Sydney Basin in the West Cliff area is characterised by shales of the Wianamatta Group and sandstones of the Hawkesbury Sandstone, which both date to the middle-Triassic. Below this lie the sedimentary units of the Narrabeen Group, and the Illawarra Coal Measures which include the Bulli and Wongawilli coal seams (Branagan and Packham 2000: 56-8).

The area is located on the edge of the Woronora Plateau (Hazelton and Tille 1990), a physiographic region that is capped with Hawkesbury sandstone and lies above and between the Cumberland Lowlands (Cumberland Plain) and the Illawarra Escarpment and adjacent coastal plains. The Woronora Plateau is a deeply incised and dissected plateau with convergent drainage lines that drain east-west into the Hawkesbury-Nepean River, which essentially forms the boundary between the plain and the plateau. The major drainage features in the vicinity of the West Cliff study area include Cataract River, Georges River, Stokes Creek and O'Hares Creek (Figure 1). The major drainage feature of the West Cliff study area is Brennans Creek, an upper tributary of the Georges River. The confluence of the two drainage lines is immediately west of the study area, just below Appin township. Brennans Creek has been subject to modification from activities associated with the West Cliff mine site including damming for water storage in its lower reaches, and emplacement of coal wash in its upper reaches. Downstream from the coal wash emplacement Brennans Creek valley becomes increasingly incised and narrows to a steep-sided gorge; as it approaches the confluence with the Georges River it opens to a wider valley near the confluence.

Hazelton and Tille (1990) have defined two soil landscapes within the study area. The physiographic features of the landscape have been incised by the Georges River and Brennans Creek, as well as small creek lines and tributaries. Each soil landscape has distinct morphological and topological characteristics. This results in each landscape having different archaeological potential. Because they are defined by a combination of soils, topography, vegetation and weathering conditions, soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure. There is one colluvial landscape (Hawkesbury) and one residual landscape (Lucas Heights) in the study area (Hazelton and Tille 1990: 23-6, 45-9). Residual soil landscapes are characterised by areas where soils are derived from the long-term, in situ weathering of parent materials. Examples of these types of soil landscapes are flats, plains and plateaus with poorly defined drainage lines. Colluvial soil landscapes are dominated by areas where mass movement is the principal agent of accumulation. Cliffs, scarps, and steep slopes are examples of colluvial soil landscapes.

In the study area, the Hawkesbury soil landscape is confined to the gorges and drainage lines around the Georges River and Brennans Creek and accounts for approximately 90% of the

study area land surface. The Hawkesbury soil landscape is described by Hazelton and Tille (1990: 45) as 'steep, rugged sandstone slopes and ridges' with local relief between 100 – 200 m and slope grades between 20% and 70%. Rock outcrops and surface rocks are abundant, occurring as sandstone benches, broken scarps and boulders, with the scarps being up to 10 m high. The soils in this landscape are shallow, discontinuous and generally sandy. The sandstone formations of this landscape provide overhangs with suitable surfaces for rock art, and benches suitable for grinding grooves making this landscape archaeologically sensitive. The shelters can also contain small accumulations of cultural deposits; although the potential for deep, stratified archaeological sites is very limited (see for example Sefton 1990). Previous archaeological work in the region has demonstrated an abundance of rock art associated with this landscape, and the steep gorges and gullies are where most archaeological survey has been focused, including previous work in the Brennans Creek valley (Navin Officer 2000, Sefton 1990, 1998).

The Lucas Heights landscape is located along the western edge of the study area and accounts for approximately 10% of the land surface of the area in question. This soil landscape is a residual landscape that characterises much of the Woronora Plateau and the Cumberland Lowlands. It has gently undulating crests, ridges and plateau surfaces of the Mittagong Formation, although rock outcrop is generally absent. Local relief is between 10 and 50 m with slopes of less than 10% grade. Gently undulating plateau surfaces and ridges 200-1000 m wide with level to gentle slope gradients are the dominant topography of this landscape (Hazelton and Tille 1990: 23). The soils consist of moderately deep podzols and soloths (acid soils) on ridges, plateau surfaces and crests and earthy sands in valley flats. Such soils have reasonable potential to contain archaeological deposits, including stone artefact scatter sites. However, limited ground surface archaeological exposure and visibility in the study area at West Cliff means such sites, should they be present, will be difficult to locate.

4.2 Climate

The climate at Picton (15 kilometres west of the Appin) generally consists of mild summers with an average maximum of 28.6 degrees and minimum of 15.4 degrees in February, and cold, wet winters with an average minimum of 1.7 degrees and a maximum of 16.8 degrees in July (Bureau of Meteorology 2004). Recorded rainfall readings taken in 2004 indicate an average annual rainfall of 803.6 millimetres. The average number of rain days at Picton is 10 days during summer and 28 days during winter (Hazelton and Tille 1990). Whilst conditions and temperatures are wide ranging, the conditions in the study area can be summarised as being mild and very suitable for year round hunter-gatherer habitation of all parts of the region.

4.3 Flora and Fauna

The study area is located at the transition zone of two major vegetation communities. These vegetation communities are indicative of the species that once thrived across these areas prior to exploration and settlement in New South Wales. In total, five plant communities have been

identified within the wider West Cliff Colliery Site. These communities are Exposed Sandstone Scribbly Gum Woodland, Sandstone Gully Apple Peppermint Forest, Sandstone Gully Peppermint Forest, Upland Swamps and Upper Georges River Sandstone Woodland (Specht 1970; Richardson *et al* 2007). Only two of these communities, Sandstone Gully Peppermint Forest and Exposed Sandstone Scribbly Gum Woodland, occur within the proposed emplacement footprint.

Exposed Sandstone Scribbly Gum Woodland is the dominant plant community recorded within the study area, occurring along the exposed ridgetops upslope of Brennans Creek gully (Richardson *et al* 2007). Some areas of this have been partially altered through the construction of tracks, electricity transmission easements and pipelines and the existing Stage 1 and 2 coal wash emplacements. This community comprises a dominant canopy species of *Eucalyptus sieberi, Corymbia gummifera, E. racemosa* and *E. glodoidea.* A midstory including *Banksia ericifolia, B. serrata* and *Leptiospermum trinervium* and shrub layer including *Acacia terminalis, Banksia spinulosa, Bossiaea obcordata, Dillwynia retorta, Eriostemon australasius, Hakea dactyloides, H. teretifolia, H. sericea, Lambertia formosa, Persoonia levis, P. pinifolia* and *Petrophile sessilis.* The ground layer comprises *Epacris microphylla, Caustis flexuosa, Cyathochaeta diandra. Entolasia stricta, Lomandra cylindrica, Lomatia silaifolia, Patersoonia glabrata* and *Xanthorrhoea media.*

*Sandstone Gully Peppermint Forest i*s the dominant plant community along Brennans Creek gully. Minimal disturbance has occurred to date, although some access tracks and easements do dissect this community. This vegetation community is dominated by *Eucalyptus globoidea, E. racemosa, E. agglomerata* and *E. piperita,* with *Corymbia gummifera* also occurring on higher slopes. The smaller midstory later consists of *Allocasuarina littoralis, Ceratopetalum gummifera, Banksia serrata, B. ericifolia, Elaeocarpus reticulatus, Persoonia levis, Hakea sericea* and *Leptospermum trinervium,* with juvenile *Eucalyptus* spp. (canopy dominants) also occurring. The shrub layer comprises *Acacia terminalis, Banksia serrata, B. ericifolia, B. spinulosa, Dillwynia retorta, Dodonaea triquetra, Persoonia pinifolia, P. levis, Petrophile pulchella, Platysace linearifolia, Leptospermum polygalifolium, Lepidosperma laterate, Lomandra longifolia, Hibbertia nitida* and *Pultenaea daphnoides,* while the ground layer includes *Lomandra longifolia, L. multiflora, Baumea microphylla, Epacris pulchella, Pteridium esculentum, Cyathochaeta diandra, Lepidosperma laterale, Lomatia silaifolia, Patersonia glabrata* and *Woollsia pungens. Todea Barbara* was also recorded in this plant community along the edge of the creekline.

Sandstone Gully Apple Peppermint Forest is situated on the northern side of Brennans Creek dam. The construction of the dam and adjacent picnic area has caused some disturbance. This plant community is dominated by canopy trees including *Eucalyptus globoidea, Angophora costata, E. piperita, Corymbia gummifera, E. sieberi* and *E. racemosa*. The midstory canopy is dominated by *Banksia serrata, Ceratopetum gummiferu* and *Acacia longifolia,* while the shrub layer consists of *Acacia terminalis, Persoonia levis, Banksia spinulosa, Leucopogon ericoides, Hibbertia nitida* and *Leptospermum trinervium.* A small number of ground layer

species also occur dominated by *Lepidosperma filiforme, Caustis flexuosa, Lomandra spp., Cyathochaeta diandra* and *Entolasia stricta*.

Upland Swamps are located some distance from the emplacement area, occurring on small areas of impeded drainage on ridge tops and upper slopes at the margins of the West Cliff Colliery Site. There is no dominant canopy tree layer within this community. Primarily, the vegetation community comprises a large shrub layer of *Banksia ericifolia, B. paludosa, Dillwynia rudis, Isopogon anethifolius, Petrophile pulchella* and *Leptospermum squarrosum*. The small shrub layer is dominated by *Micromytus ciliata, Leptospermum arachnoids* and *Baeckea sp.* The ground layer is limited and includes *Schoenus brevifolius, Lepyrodia scariosa* and *Leptocarpus tenax*.

Upper Georges River Sandstone Woodland is located in a small pocket around Brennans Creek Dam and in the north-east of the study area. The dominant canopy species include *Eucalyptus racemosa, E. punctata, Corymbia gummifera* and *E. sieberi*. The midstory comprises small trees including *Banksia serrata, B. ericifolia* and *Leptospermum trinervium*, while the shrub layer is dominated by *Banksia spinulosa, Exocarpus strictua* and *Eriostemon australasius*. The limited ground layer includes *Themeda australis* and *Lomandra cylindrica*.

These vegetation communities supported a range of faunal resources. The woodland areas would have been habitat for wallabies, while the sheltered forest would have been home to koalas, wombats and bandicoots, as well as birds such as cockatoos, falcons and owls. Mammals such as kangaroos and wallabies and arboreal mammals such as possums can be used for food and also for tool making. Aquatic species such as freshwater crayfish would have been easily accessible in large waterways like the Georges River (Rosen 1995). Aquatic vertebrates such as fish and eels would also have been present in the larger creeks such as Brennans Creek.

4.4 Resource Statement

Based on the background information provided from various source material, it is possible to speculate what resources would have been available for both Aboriginal and European exploitation.

Quartz is the main stone raw-material type suitable for Aboriginal tool manufacture that would be likely to occur in the vicinity of the study area in any abundance. This would be in the form of pebbles derived from the Hawkesbury sandstone. Elsewhere on the Woronora Plateau and Cumberland Lowlands the potential raw materials for stone artefact making include silcrete, chert, tuff, mudstone, quartz, quartzite and basalt (Smith 1989). Deposits of clays and ochres suitable for art, particularly stencil art, are locally available in the vicinity of the study area and its adjacent land systems. After careful consideration Sefton (1998) concluded that whilst there were potential ochre sources in the Brennans Creek Valley, these sources would have only been utilised on a casual basis by traditional Aboriginal populations, as they were small, poor quality sources with no archaeological evidence of exploitation.

The year-round water supply from Brennans Creek and the Georges River would have been a reliable source of water, while the diverse natural environment would have provided vast and plentiful flora and faunal resources.

Many of the plants found within the area were important to both Aboriginal people and early Europeans inhabiting the area and could be used for numerous purposes. Based on the known species that occur within the study area, the following table summarises how these would have be utilised by the Aboriginal people once inhabiting the area. These include using the wood to make implements; berries, leaves and tubers for food and medicines as well as bark for shelters (Table 1). For the purposes of identifying those traditional resource and plant uses, each identified plant community may contain the same species and thus are noted only once.

SPECIES	**TRADITIONAL USE*
Exposed Sandstone Scribbly Gum Woodland	
Eucalyptus sieberi (Silver Top Ash)	A fine grained hard wood used for tool handles, such as axes and oars
Corymbia gummifera (Red Bloodwood)	The nectar from flowers was sucked. The resinous sap was used to stop fibre fishing lines from fraying. The red resinous sap was also used to attract Cryptococcus insects which form sweet tasting galls. The exudate was also used internally and applied externally in powdered form to treat sores
Banksia ericifolia (Heath Banksia), *Banksia spinulosa* (Hair-pin Banksia), *Banksia serrata* (Old Man Banskia)	The nectar of the flowers was sucked or soaked to make a sweet beverage. The cones were used for retaining fire as they will remain alight for a considerable period
Leptiospermum trinervium (Paperbark Tea-tree)	The leaves are pungent and crushed for medicinal purposes
Acacia terminalis (Sunshine Wattle)	The trunk of this tree contains edible grub larvae
Acacia longifolia (Sydney Golden Wattle)	The seeds were ground for flour for 'seed cakes' and the leaves were used as a fish poison
Persoonia levis (Borad Leaf Geebung), *Persoonia. pinifolia* (Pine-leaf Geebung)	The fruits were eaten, although difficult to collect ripe as birds eat the unripened fruit. The bark of the Geebung was used to make a solution in which fishing lines were soaked for strength
Lomandra cylindricabn (Mat Rush)	Both the flowers and the bases of the leaves (pea like flavour) were edible
Patersoonia glabrata (Leafy Purple Flag)	The rhizomes of this plant were eaten raw or roasted
Xanthorrhoea media (Forest Grass Tree)	The flower stems produce significant nectar which can be eaten or placed in eater to sweeten drinks. The stalks were used for spear shafts and the resin as glue for tools and weapons. The resin was collected as a powder by beating the leaf bases. The resin could also be collected in the trunks of old, dead, burnt stumps
Sandstone Gully Peppermint Forest	
Eucalyptus agglomerata (Blue Leaved Stringybark)	Large slabs of bark were used for making canoe hulls and smaller pieces were rolled and used as torches for spear fishing at night
Eucalyptus piperita (Sydney Peppermint)	**First plant to be used medicinally by Europeans – the oil from the leaves was distilled**
Elaeocarpus reticulatus (Blueberry Ash)	The fruit is edible
Dodonaea triquetra (Common Hop Bush)	The leaves were chewed for toothache and used as a poultice for stonefish and stingray wounds. The liquid made from soaking the roots was used for open cuts and sores
Lomandra longifolia (Spiny headed Mat Rush)	The seeds were ground for flour. The flowers and the base of the leaves are edible. The tough leaves were also used to make baskets
Pteridium esculentum (Common Bracken Fern)	The rhizome of this plant was a staple food source – roasted first to destroy the toxins before being chewed/eaten
Upland Swamp	

Banksia paludosa (Heath Banksia)	The nectar of the flowers was sucked or soaked to make a sweet beverage. The cones were used for retaining fire as they will remain alight for a considerable period
Upper Georges River Sandstone Woodland	
Exocarpus strictua (Dwarf Currant)	The fruits and stalk are edible when ripe
Themeda australis (Kangaroo Grass)	The stems can be used to make fibre for baskets, mats and string for making bags and nets

Table 1: Traditional Aboriginal plant resources and use within the study area **

**** Sources: Robinson 1991; Sefton 1998**

The various fauna species present within the study area would have provided a range of resources for the Aboriginal peoples. Terrestrial and avian resources were not only used for food, but also provided a significant contribution to the social and ceremonial aspects of Aboriginal life. Mammals such as kangaroos and wallabies and arboreal mammals such as possums can be used as a food source and also for tool making. For example, tail sinews are known to have been used as a fastening cord, whilst 'bone points' which would have functioned as awls or piercers are an often abundant part of the archaeological record. Ethnographic observations of early European settlers coming in contact with Aboriginal people noted the use of a variety of animal parts; claws, talons, bone, skin, teeth, shell, fur and feathers were all used for a variety of tools and non-utilitarian functions. Aquatic species such as freshwater crayfish would have been easily accessible in larger waterways, such as the Georges River (Rosen 1995). Aquatic vertebrates such as fish and eels would also have been present in the larger creeks and waterways.

Previous archaeological investigation within the study area has identified sources of ochre on the Woronora Plateau (Sefton 1998:33). Cavernous weathering results in the disintegration of a sandstone surface, exposing coloured (yellow: geotite-rich or red: hematite-rich) sandstone. Often, the case-hardened surfaces present around these disintegrating areas are undercut (Sefton 1998:36). A source of ochre was identified within recorded site Brennans Creek 3, although considered to be a poor example of source material due to coarse nature of the sandstone (Sefton 1998:37).

5.0 ABORIGINAL HISTORY

5.1 Ethnohistory

It is generally accepted that people have inhabited the Australian landmass for at least 50,000 years (Allen and O'Connell 2003). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. Whilst there is some possible evidence for occupation of the region around 40,000 years ago, the earliest undisputed radiocarbon date from the region comes from a rock shelter site north of Penrith on the Nepean, known as Shaws Creek K2, which has been dated to 14,700 +/- 250 BP (Attenbrow 2002: 20). This site is over 50 km north from the study area along the Nepean River. To the south, along the coast just north of Shellharbour the site of Bass Point has been dated at 17,101 +/- 750 BP (Flood 1999). Closer to the study area on the Woronora Plateau the oldest date for Aboriginal occupation so far recorded is 2,200 +/- 70 BP at Mill Creek 11 (Sefton 1998). Such a 'young' date is more likely a reflection of conditions of archaeological site preservation and sporadic archaeological excavation, than actual evidence of the presence or absence of an Aboriginal hunter-gatherer population prior to this time.

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to European contact is mainly reliant on documents written by non-Aboriginal people. The inherent bias of the class and cultures of these authors necessarily affect such documents. They were also often describing a culture that they did not fully understand – a culture that was in a heightened state of disruption given the arrival of settlers and disease. Early written records can, however, be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community in order to gain a picture of Aboriginal life in the region.

A variety of studies of the language groupings that made up the greater Sydney region have been summarised by Attenbrow (2002). She suggests four main language groupings for the region. In the vicinity of the study area there were two (a coastal and a hinterland) Darug dialects: Dharawal and Gundungurra. It is suggested the hinterland Darug dialect covered the Cumberland Plain from Appin to the Hawkesbury River to the west of the Georges River, Parramatta, the Lane Cove River and Berowra Creek. The Gundungurra covered the area west of the Georges River on the southern rim of the Cumberland Plain, as well as the southern Blue Mountains (Attenbrow 2002: 34). These areas are considered to be indicative only, and would have changed through time, and possibly also changed depending on circumstances.

At the time of European settlement, the Georges River and its tributaries were occupied by the Tharawal (Tindale 1974). The Gandangarra were known to have inhabited much of the Wollondilly area in the 18th and 19th century according to early non-indigenous records (ERM 2002). The interface of these two groups seems to have been around Appin. Ethnographic evidence considered by Sefton (1988: 22-29) indicates population mobility on the Woronora Plateau with frequent contact with the neighbouring Gandangarra, Cobrakall (Liverpool and

Cabramatta) and Wodi Wodi (Illawarra). Interactions between different types of social groupings would have varied with seasons and resource availability. It has been noted that interactions between the groups inhabiting the many resource zones of the Sydney Basin (coastal and inland) would have varied but were continuous. This is reflected in the relatively homogenous observable cultural features such as art motifs, technology and resource use (McDonald 1992).

5.2 Contact History

The arrival of settlers in the region around Appin and new competition for resources began to restrict the freedom of movement of the Aboriginal hunter-gatherer inhabitants from around 1813 (McGill 1994). This was quickly followed by severe drought in 1814 and 1816. By 1814 large numbers of Aboriginal people had begun to congregate in the Appin area in search of food and other resources. These people were not only the original inhabitants of the area but also other Aboriginal people from elsewhere who had been pushed off their own lands. In May 1814 the militia killed an Aboriginal boy. When others of the group sought revenge they attacked three militia members before they had time to reload, killing one of them (McGill 1994). The trouble brewing between settlers and local inhabitants and the growing pressure on resources resulted in Governor Macquarie sending a punitive military expedition in 1816. The expedition ended in the 'Appin Massacre'. The militia found a deserted campsite on Broughton's property. The military claimed their intentions were to capture prisoners but as they found and pursued the group panic ensued. Fourteen Aboriginal men, women and children were driven over a cliff to their deaths. The exact site of the massacre is not known, but Broughton's original 1810 land grant was at Brooks Point.

5.3 The Archaeological Record – Regional Overview

A database search of the NSW Department of Environment and Climate Change (DECC) Aboriginal Heritage Information Management System (AHIMS) was conducted in March and April 2007. The search identified those sites within a 10 x 5 km search area, centred on the study area, and including the Georges and O'Hares catchments. A total of 433 previously recorded sites were identified within these catchments, including Brennans Creek (refer to Figure 4). Details of specific site locations are considered sensitive and have not been included in this report. It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area

Of the 433 recorded sites, the dominate site types in the area are Potential Archaeological Deposits (29%), followed by shelters with art (26.5%) and axe grinding grooves (25%). There is a significant difference between the frequencies of these site types compared with the following. Overall, few open camp sites (5%), shelters with deposits (4.8%) and shelters with art and deposits (3.8%) occur within the search area. A small number of scarred trees (2.5%)

have also been recorded. The remaining 5% of site types include axe grinding grooves with water holes/wells, axe grinding grooves with rock engravings, rock engravings, shelters with art and PAD, water hole/well and shelters with art, deposit and PAD.

These site frequencies across the Woronora Plateau provide an indication of site types that are likely to occur within the proposed Stage 3 Coal Wash Emplacement Area. A detailed discussion of the previous archaeological investigations and sites identified within the study area is presented below (see Section 5.4).

5.3.1 Regional Studies

All previously recorded Aboriginal archaeological sites have been identified through archaeological work in the region which began in the early 1960s, with the identification of a large shelter containing Aboriginal art and deposit (McCarthy 1961). Such site types have been the subject of academic investigations into regional variations of rock art and the prehistory of the Illawarra (Officer 1984; Sefton 1988; McDonald 1994). However, very little archaeological work has involved excavation of such sites in this region of the Sydney Basin. The majority of this work has focussed on coastal and estuarine regions. Those shelters that have been excavated within the inland plateau environment have yielded dates of 2220 $\pm$ 70 BP as evidence of the earliest occupation is at Mill Creek 11 (Koettig 1985).

Sefton (1989a) completed post graduate work that focussed on site and artefact patterns on the Woronora Plateau. The data used for this investigation has been collected over a number of years (between 1970 and 1998) by the Illawarra Prehistory Group. The study area comprises a 351km square area that stretches from the Illawarra Escarpment in the east, north as far as the Woronora River, west to Wallandoola River and the southern reaches of the Cataract Catchment (Sefton 1988:5).

The major associations considered included patterned relationships between sites, the cultural material they contain, the drainage basin on the Woronora Plateau in which they are located and their coastal or inland location. When using the data to determine spatial patterning, a number of factors should be considered, including survey technique, site or artefact destruction, survival or visibility, environmental variability or human socio-cultural behaviour. Ethonohistorical information and site patterning data will then be used to formulate a north/south territory boundary between the Tharawal and Wodi Wodi people.

One of the major limitations of Sefton's assessment for Aboriginal sites was that the survey technique was not designed to systematically identify surface stone artefact scatters, but rather focussed on sandstone overhangs, open sandstone outcrops or platforms, and grinding grooves (1988:13). The analysis of archaeological sites was solely focussed on grinding grooves, engravings, and shelter sites and the archaeological features that are associated with them. The results of field work completed over the last 20 years were used as the basis of analysis to identify patterns and determine the relationship between shelter distribution, archaeological content, and suitable environment, economic strategy and settlement patterns.

Many archaeologists argue against the use of site frequency to determine population density and land use patterns as it does not take into consideration behavioural change and archaeological site visibility that bias the interpretation of the archaeological record (Ross 1981; Vinnicombe 1980; Attenbrow 1987). However, Sefton argues that site density can be used as an indicator of spatial distribution or density of the Aboriginal population within the study area using multivariate analysis (Sefton 1988:62).

She concludes that the high density of grinding grooves located within the Georges River Basin indicated a higher population density in this basin than that in the Cataract River Basin (Sefton 1988:62). Despite a correlation between the presence of rock engravings and grinding grooves at the same location, rock engravings are generally restricted to the coastal regions rather than inland regions (Sefton 1988:69).

The overall distribution of shelters is markedly similar to the distribution of grinding grooves (Sefton 1989:120). Variations in distribution can be attributed to appropriate environmental requirements, ie. sandstone overhangs or sandstone platforms.

The density of charcoal drawings in shelter sites is also at higher densities in the Georges River Basin compared with the Cataract River Basin (Sefton 1988: 163).

The distribution of sites within the Woronora Plateau confirms variations in settlement patterns in the Georges/Cataract River drainage basins and the coastal/inland locations (Sefton 1988:124). The ethnographic observation of a coastal/inland subdivision of the population and the concept of a drainage basin base territorial division was reflected in the findings from this study.

McDonald (1994) completed a PhD thesis that focussed on prehistoric rock art within the Sydney region. The rock art that was examined included open sites comprising engravings or petroglyphs, and rock shelter sites, comprising rock art consisting of drawings, stencils, paintings and engravings. Information gathered from previous archaeological work throughout the Sydney Basin was used to define a model for cultural interaction that can describe this prehistoric art system, which was to be based on the information exchange theory.

In essence, the model proposed in this thesis is that because the shelter art has a greater visibility to a broader section of the community, it had potential to function in a different fashion to the engraved art of the region which is not associated with habitation debris (McDonald 1994:124).

Resource exploitation in the inland systems would have been focussed on the resources associated with the river systems, with specialisation in hunting macropods and fish/eels. This is reflected in the types of images depicted in shelter art .

A number of major differences were identified in site type frequency and site component variations. Shelters with art south of the Georges River had a much lower number associated

with deposits (25/365:31%), while to the north, almost one third (111/365) contained both art and deposit components (Mc Donald 1994:103). Further, almost one third (7/25: 28%) of shelter sites with deposits contained grinding grooves, whereas only 12 of 113 sites (10.6%) north of the river contained grinding grooves. It should be pointed out that it is highly probable that the number of shelters with art and deposits is much greater than recorded, due to observer bias, increasing the figures for pigment art and occupation deposit correlation.

This is also the trend when looking at the presence of rock engraving sites. North of the Georges, 155 of the 365 sites contain rock engravings, while south of the Georges, only 2 out of 181 sites contain rock engravings (McDonald 1994:115).

Shelter Art

An extremely large proportion of motifs (41%) recorded consist of unidentifiable motifs (McDonald 1994:104), which can be attributed to poor preservation from the great instability of the sandstone surfaces within the shelters. Of the identifiable motifs, hand stencils and hand variations predominate (49%). The other main depictable motifs include macropods (9%), anthropomorphs (7%) and other land animals (5.5%). The majority of this art is depictive (66.1%), followed by stencilling (32.6%) and engraving (1.3%) (McDonald 1994:106). Of these, most are created using dry pigments, such as charcoal. The remainder have been painted, and very few are a combination of both. Colours used in stencilling are dominated by red and white, with a small number of localised yellow and black stencils also recorded (Mc Donald 1994:113-114). Depictive motifs have been executed in outline and infill form (38%), although outline only forms are just as common.

Sub-surface excavation work undertaken by Attenbrow (1987) on a sample selection of sites, revealed that 90% of shelters identified as having PAD actually contained archaeological deposits, such as stone tools.

She noted that in comparing the two art forms, sheltered and open art sites, it could be said that there are two synchronous art forms in the Sydney Basin. The comparison revealed two underlying similarities between the art forms, firstly that they are both relatively recent and, secondly that they are roughly contemporaneous (McDonald 1994:115).

Motif Types

The site size and motif focus vary across the Sydney Basin region (McDonald 1994:215). General trends that were observed indicated higher proportions of land animals inland, compared to marine and fish depictions at coastal sites. Analysis of the Tharawal sites (n=52) reveals an assemblage which is markedly different to the northern language groups (McDonald 1994:229). A comparison between the two drainage basins within this language area suggests geographic influences created differences in its coastal and inland sub-groups.

Shelter Art Motif

The analyses indicate that hand stencils do not predominate the recognisable motifs, unlike all other regions within the Sydney Basin (Mc Donald 1994:282). Macropods dominate the depictive motifs, followed by other land animals, anthropomorphs and birds, demonstrating a less common focus on depicting marine animals, despite being located on the coast (McDonald 1994: 285). This finding contrasts markedly with the engraving component. The depiction of women and hero figures are also extremely rare. Results also identified an increase predominance of black pigment and concomitant scarcity of white pigment in this region. White pigments are the preferred medium in the north of the region.

There are significant variations in motif assemblages throughout the region. Motif classes that are present in the northern and southern areas are not present in the central area of the Sydney Basin (McDondald 1994:327). Similarities in Tharawal and southern Darug motifs, compared with northern Darug motifs, indicate that the proposed boundary between these two language groups was unimportant (McDonald 1994:327).

Colour usage in the different language areas reveals definite stylistic preferences across the region.

McDonalds' (1994) thesis concluded that there are major variations in rock art technique and motif type between southern areas on the Woronora Plateau and the central and northern areas of the Sydney basin.

Illawarra Prehistory Group completed detailed analysis of all data they have collected throughout the Illawarra, including the Woronora Plateau, since their commencement. It should be noted that this data reflects survey techniques devised to locate Aboriginal sites associated with sandstone shelters (art and deposit) and open sandstone platforms (axe grinding grooves), and did not include systematic survey for site types such as stone artefact scatters or isolated finds.

COMPARISON OF BRENNANS CREEK WITH ADJACENT VALLEYS

VALLEY	CATCHMENT	SITES RECORDED			
		GRINDING GROOVES	SHELTERS WITH ART OR DEPOSIT*	ROCK ENGRAVINGS	SURFACE ARTEFACTS
Brennans Creek	Georges River	2	13*	1	1
Georges River	Georges River	8	25	0	1
Four Mile Creek	Dharawal State Conservation Area	11	5	1	1
Stokes Creek west	Dharawal State Conservation Area	7	6	0	0
Stokes Creek centre	Dharawal State Conservation Area	4	4	0	3
Stokes Creek east	Dharawal State Conservation Area	25	9	1	5
Stokes Creek (1)	Dharawal State Conservation Area	6	29	0	0
Cobbong Creek	Dharawal State Conservation Area	3	11	0	0
O'Hares Creek west	Dharawal State Conservation Area	7	2	0	0
O'Hares Creek	Dharawal State Conservation Area	15	3	0	0
Ousedale Creek	Nepean River	0	2	0	0
Elladale Creek	Nepean River	0	2	0	0
Mallaty Creek	Nepean River	0	2	0	0
Cataract River (2)	Cataract River	0	2	0	0
Myrtle Gully	Cataract River	0	0	0	0
Back Gully	Cataract River	1	4	0	0

(1) Below the above major junctions

(2) Broughton's Pass to Nepean River (northern drainage)

* Does not include PADS

** This is biased towards additional shelters in Brennan Creek as it includes the two PADS excavated (Brennans Creek 8 and Brennans Creek 9).

Data for table above taken from Illawarra Prehistory Groups data searches for Biosis Research 2007

Table 2: Comparison of Brennans Creek to the adjacent creek valleys

The Illawarra Prehistory Group's survey findings indicate higher frequencies of the sitypes present in Brennan's Creek, such as grinding grooves and shelters with art and/or deposit, within the nearby Georges, Stokes and O'Hares Creek catchments (Table 2). The results presented in the table include those sites recorded during the current archaeological assessment. Brennans Creek valley contains a comparable number of shelter with art and/or

deposit sites with other creek valleys on the Woronora Plateau, especially considering that there is a significant survey bias toward Brennans Creek. Brennans Creek also contains one of the two previously identified rock engraving (groove channels) sites, which in this instance is associated with the axe grinding groove site, Brennans Creek 1. This site was excised from the Stage 1 and Stage 2 emplacements and has been preserved in situ.

5.4 The Archaeological Record of Brennans Creek

Of the 433 previously recorded sites identified in Section 5.3, nine are situated within the West Cliff Colliery site, along Brennans Creek. A number of these sites were situated within the West Cliff Colliery Stage 1 and Stage 2 Emplacement Areas (Figure 5). The current preservation status and details of each of these sites is indicated in Table 3 below.

AHIMS SITE NO.	*SITE NAME*	*SITE TYPE*	*PRESERVATION STATUS*	*RECORDED BY*
52-2-1367	Brennans Creek 1	Axe Grinding Groove; Rock Engraving	Retained	Haglund 1975, Sefton 1989
52-2-1369	Brennans Creek 3	Shelter with Art and Deposit	Emplaced	Sefton 1989
52-2-1370	Brennans Creek 4	Shelter with Deposit	Emplaced	Sefton 1989
52-2-1363	Brennans Creek 8 (PAD 1)	Shelter with Deposit	Emplaced	Sefton 1989
52-2-1364	Brennans Creek 9 (PAD 3)	Shelter with Deposit	Emplaced	Sefton 1989
-	PAD 2	Shelter with PAD	Emplaced	Sefton 1989

Table 3: Previously recorded Aboriginal archaeological sites and PADs situated within Stage 1 and Stage 2 Emplacement Areas

Table 4 below details the four registered sites and two identified PADs that are currently located within the proposed West Cliff Colliery Stage 3 Emplacement Area and by whom and when they were recorded (Figure 6).

AHIMS SITE NO.	SITE NAME	SITE TYPE	LANDFORM	RECORDED BY
52-2-1368	Brennans Creek 2	Shelter with art	Hawkesbury sandstone	Sefton 1989
52-2-1371	Brennans Creek 5	Axe grinding grooves	Hawkesbury sandstone	Sefton 1989
52-2-1372	Brennans Creek 6	Shelter with art	Hawkesbury sandstone	Sefton 1989
52-2-1373	Brennans Creek 7	Shelter with art; shelter with deposit	Hawkesbury sandstone	Sefton 1989
-	Brennans Creek 10	Shelter with deposit	Hawkesbury sandstone	Sefton 1998
-	BCPAD4	Potential Archaeological Deposit	Hawkesbury sandstone	Sefton 1989
-	BCPAD5	Potential Archaeological Deposit	Hawkesbury sandstone	Sefton 1989
-	D10	Potential Archaeological Deposit	Hawkesbury sandstone	Navin Officer 2000
-	D11	Potential Archaeological Deposit	Hawkesbury sandstone	Navin Officer 2000

Table 4: Aboriginal archaeological sites and PADs located within 500 metres of the Stage 3 Coal Wash Emplacement Area

A detailed discussion of the previous archaeological investigations of the study area is presented below.

5.4.1 Previous Studies

Archaeological work has been in the form of environmental impact assessment and survey in response to mining activities in the Appin region (Sefton 1980, 1981a, 1981b, 1988, 1989, 1990, 1998; Brayshaw 1983; Navin Officer 2000). Several surveys and investigations have been carried out within and immediately adjacent to the current study area. There have been large scale surveys of the O'Hares Catchment (the major tributary of the Georges River) by the Illawarra Prehistory Group (Sefton 1988). In their survey of 62 km^2 of the O'Hares Catchment, the group identified 120 shelters with art and/or archaeological deposits, 102 sites with grinding grooves, three rock engraving sites, 11 stone scatters of stone artefacts and 9 sites with engraved grooved channels. The numerous recorded Aboriginal sites have resulted in Aboriginal site densities of one site per 25-26 hectares. Site types recorded include art shelters, archaeological deposits in shelters, rock engravings, water channels, grinding grooves and surface campsites.

Haglund (1975) completed an archaeological assessment in the area that included the head of Brennans Creek, resulting in the identification of 4 sites, two of which fall within the Stage 1 Emplacement Area.

Sefton (1980a) completed an archaeological survey of two new shafts and associated buildings, water pipeline and dam site situated on a small tributary of O'Hares Creek. A number of previously recorded Aboriginal archaeological sites were noted to occur on O'Hares Creek. One previously identified site, an open campsite or surface scatter, is located on the western edge of the proposed water dam, which currently comprises a clay pit. Within

with 3 targeted survey areas, a total of 4 new Aboriginal archaeological sites were recorded, including 3 grinding groove sites and one shelter with deposit. The open campsite / surface scatter was not relocated after a thorough search of the north-western side of the existing clay pit (Sefton 1980: Figure 1). Sefton (1980:6) notes that the recorded axe grinding groove sites are a common site type found in the Woronora Catchment and these particular sites are not an impressive example of their type.

Sefton (1981a) undertook archaeological survey of eight proposed drill sites and associated access tracks in O'Hares Catchment. A number of shelters with art sites had been previously identified within this area; however, none of these sites would be impacted by the proposed locations. Changes to drill locations and access tracks were made to avoid impact to all Aboriginal archaeological sites.

Sefton (1981b) undertook archaeological survey for the proposed 66kV transmission line easement to connect the proposed West Cliff shafts 3 & 4. The easement runs from Wedderburn Road into the proposed site. The entire proposed transmission route was surveyed on foot, with particular attention paid to areas of disturbed soil and sandstone outcrops, overhangs and ledges (Sefton 1981:6). One previously identified shelter with art and rock engraving/grinding groove sites were relocated, and one previously unrecorded axe grinding groove site was identified. The five previously recorded campsites situated on the track on the eastern side of Stokes Creek were also re-examined and their authenticity confirmed. Although shelters with art sites are a common occurrence in the areas, the recorded site (52-2-0281), located 30 metres from the proposed transmission site, is an impressive and rare example of the shelter with art site type containing over 60 charcoal outline and infill motifs. Of the seven sites situated within or within close proximity to the proposed transmission line easement, only one is also considered to be of significance, comprising 27 grinding grooves and an engraving (52-2-0763). It is noted however, that even though the sites are representative they are all indicative of use and settlement patterns within the region (Sefton 1981:10). None of these sites fall within the current West Cliff Colliery study area.

Brayshaw (1983) undertook an archaeological assessment of the proposed dam site, haul road, washery and waste disposal areas for the West Cliff extended underground coal mine. The proposed mining associated infrastructure was proposed in O'Hares Creek. A number of previously recorded Aboriginal sites had been identified within the study area. The present study identified a further 5 sites and 12 potential occupation shelters (Brayshaw 1983:8). All recorded sites at this time comprised grinding grooves, shelters with art and shelter with art and deposit/or potential archaeological deposit (PAD), however, no engravings or scarred trees had been identified within O'Hares Creek. All but one of the identified Aboriginal sites was considered to be representative of the type and style of sites that occur within the wider region.

A large and comprehensive survey by **Sefton (1988)** involved a survey of 138 km^2 of the Georges River Basin, including the O'Hares Catchment which found 367 shelters with art

and/or archaeological deposits, 236 grinding sites, 17 rock engravings, 16 engraved groove channel sites and 25 sites with surface scatter of stone artefacts. This survey also showed that archaeological sites are differently distributed on the Woronora Plateau. Shelters are located beneath ridgelines most frequently on the upper valley slopes but a large proportion can also be located towards the valley bottom. Grinding sites are frequently located on flat sandstone outcrops at the head of a gully below an upland swamp and occasionally in creek beds or on ridge top sandstone adjacent to waterpans. Engraved groove channels and rock engravings are usually associated with grinding grooves. Surface scatters of stone artefacts are most frequently located near plateau level on the ridge side or associated with a grinding site or a swamp.

Sefton (1989b) undertook the archaeological survey of the proposed western reserves development option between West Cliff Mine and Coal Cliff Mine. The proposed assessment included the proposed coal wash emplacement area, water pipeline, realignment of Fire Trail 10B and coal conveyor route between West Cliff and Coal Cliff mines. All proposed works involved disturbance, however, the proposed coal wash emplacement would have involved filling a 3.5m^2 area at the head of Brennans Creek valley with coal wash. The archaeological assessment focussed on landforms known to contain Aboriginal archaeological sites. Targeted survey effort focussed on sandstone overhangs, horizontal outcrops in creek lines, drainage lines and on swamps, areas of minor disturbance and existing access tracks to identify shelter with art and/or deposit, axe grinding grooves and channels, rock engravings and surface scatters of stone artefacts. Within the West Cliff Colliery mining lease, the detailed archaeological survey resulted in the identification of 7 Aboriginal sites (including Brennans Creek 2, Brennans Creek 5, Brennans Creek 6 and Brennans Creek 7) and 5 shelters with potential archaeological deposit (PAD). The Aboriginal sites comprised five shelters with art and/or archaeological deposit and two axe grinding groove sites. Overall, these sites were considered to be representative of sites identified on similar creek lines within the region. One Aboriginal site (Brennans Creek 1) and three shelters with potential archaeological deposit (PAD), PAD 1 (Brennans Creek 8), PAD 2 and PAD3 (Brennans Creek 9) are located in the Stage 1 coal wash Emplacement Area.

Brennans Creek 1 axe grinding groove/engraved groove channels site is considered to be of high significance based on the frequency of grooves and presence of engraved groove channels. This site was to be avoided by the proposed Stage 1 emplacement area. However, PAD 1 (Brennans Creek 8), PAD 2 and PAD3 (Brennans Creek 9) was to be emplaced.

Subsequent to the approval of Stage 1 coal wash emplacement at the head of Brennans Creek, **Sefton (1990)** undertook recommended archaeological sub-surface investigation of the previously identified shelters with potential archaeological deposits (PAD), including PAD 1 (Brennans Creek 8), PAD 2 and PAD 3 (Brennans Creek 9). All excavated test pits were 50 x 50 cm in size, excavated in 5 cm spits until a sterile layer was reached, and all excavated material was dry sieved using 5 mm and 2 mm mesh sieves (Sefton 1990: Figure 1). The results of these excavations are discussed below.

PAD 1 (Brennans Creek 8): Of the three test pits completed at PAD 1 (Brennans Creek 8) both test pits 2 and 3 yielded archaeological material. Specifically, stone artefacts were recovered from Unit 4, which consisted of pale yellow brown unconsolidated loamy sand. The 24 recovered stone artefacts comprised quartz (58%), silcrete (29%) and chert (12%) cores, bipolar cores, flakes, bipolar flakes and flaked pieces (Sefton 1990:13, Figure 3). No tools were identified and no flakes exhibited retouch or use wear. A number of the quartz flakes exhibited pebble cortex.

PAD 2: One 50 x 50 cm test pit was excavated in the central section of this shelter. The test pit was excavated to a depth of 33 cm and contained no archaeological material. Some small fragments of charcoal were noted before the sterile clay layer was reached at the bottom of the test pit.

PAD3 (Brennans Creek 9): One 50 x 50cm test pit was excavated in the central section between the blockfall on the floor of the shelter. The test pit was excavated to a depth of 40 cm, at which the sterile clay layer was reached. Two stone artefacts were recovered from the top layers (between 0.5 and 11cm) of the test pit. These comprised one quartzite bipolar core and one quartz flake (Sefton 1990:19).

Overall, stone artefact density in PAD 1 and PAD 3 was relatively low. Both shelters have quite limited living areas suitable for occupation. Due to the lack of cultural material in PAD 2 this is no longer considered to be a potential archaeological site.

Sefton (1998) resurveyed Brennans Creek for the West Cliff Colliery Stage 2 coal wash Emplacement Area to re-assess the archaeological and cultural heritage values, with particular attention to archaeological, environmental, aesthetic and natural values. To address these research questions, research into plant and animal species once resourced by the local Aboriginal people was undertaken. These results were presented in separate data tables, identifying individual plant species and their use (Sefton 1998: Figure 10).

The report also highlighted a potential source of ochre in recorded site Brennans Creek 3. Chemical weathering of a large sandstone block located adjacent to the rear wall was found to exhibit yellow (goetite-rich) and red (hematite-rich) deposits caused by the weathering process (Sefton 1998:36). Due to the gritty, course nature of these deposits, the ochre source situated within Brennans Creek 3 was not considered to be one that would have been a preferable source, although it may have been used casually. There are a number of other known pigments sources on the Woronora Plateau, red and yellow sources being most common(Sefton 1998: 36,37).

The report's background review summarised and made comparison of site patterning in Brennans Creek with other adjacent creek valleys, along with discussions of regional patterning on the Woronora Plateau, Georges and O'Hares River Catchments.

Resurvey of the creek line located one new shelter with deposit (Brennans Creek 10). This site was also considered to contain a small potential ochre source, with unconsolidated orange

limonite rich deposits (Sefton 1998:42). Both Brennans Creek 3 and 4 sites were relocated and re-assessed. All three of these sites are situated within the proposed Stage 2 Emplacement. In total, Brennans Creek contains 8 shelters with art and/or deposit and two grinding groove sites.

Two Aboriginal sites (Brennans Creek 3 and 4), and one potential archaeological deposit site (PAD 10) are situated within the proposed Stage 2 coal wash Emplacement Area. Preservation measures were taken, including use the use of sand bagging and geo-textile fabric, to protect the art with shelter and/or deposit sites during emplacement.

Navin Officer (2000) completed a large scale cultural heritage assessment for the Dendrobium Coal Project, which included Dendrobium Area 3 longwalls 1-3, Nebo Colliery, Kemira Colliery and the proposed West Cliff Colliery Stage 3 emplacement study area. The survey of the West Cliff area included a large portion of Brennans Creek. The survey methodology aimed to re-assess previously recorded sites and identify new sites within impact zones. Field survey consisted of targeted surveys of two types, the first involving selected areas aimed at locating sandstone shelters ie. sandstone cliff lines and open sandstone platforms, and the second to focus on areas of exposure where the potential for detection of open campsites occurred ie. along existing tracks. Any large trees spotted during survey were also targeted and inspected for cultural scarring (Navin Officer 200: 12; see Figure 3).

Navin Officer (2000: 49-50) provide a good discussion on considerations of visibility and site obtrusiveness on the Woronora Plateau and Illawarra Escarpment. The obtrusiveness of sandstone rock shelter and overhang sites, even in heavily vegetated areas is always high, so these sites are likely to be detected and inspected during survey. In comparison the obtrusiveness of surface sites, such as axe grinding grooves, engraved channels and motifs on sandstone platforms, or stone artefact scatters, which occur virtually anywhere, is low to very low because of the limited ground surface visibility described above. At West Cliff it was noted that sandstone shelves suitable for axe grinding grooves and channels are more often than not covered in leaf litter from bushes that grow on trapped sediment. The concept of visibility is also applicable to the surface of shelter sites when considering archaeological potential or looking for artefacts exposed in drip lines (Navin Officer 2000: 49).

During the field survey of the West Cliff Colliery Stage 3 Emplacement Area, one new Aboriginal archaeological site was recorded (Dendrobium 11), and one shelter with PAD (Dendrobium 10). Previously recorded sites Brennans Creek 5, 6 and 7, along with PAD 4 and 5, were all relocated and an assessment of site condition undertaken. Re-assessment of site significance was also completed for all sites.

5.4.2 Summary

As detailed above, a number of previously completed archaeological assessments have occurred within the proposed Stage 3 Emplacement Area. Most relevant are those studies by Haglund (1975), Sefton (1989b, 1990, 1998) and Navin Officer (2000) (Figure 2). All of these studies identified Aboriginal archaeological sites within Brennans Creek valley (Table 3and

Table 4; Figure 5). Four of these sites, Brennans Creek 2, Brennans Creek 5, Brennans Creek 6 and Brennans Creek 7, are located within the Stage 3 Emplacement study area.

All of these sites are situated along sandstone outcrops or cliff lines on the mid to upper slopes of the creek valley. Three of the sites comprise shelters with art and deposit, and one site comprises a single axe grinding groove. In comparison to other axe grinding groove sites within Brennans Creek valley and across the Woronora Plateau, Brennans Creek 6 was considered by Sefton (1989) to be of low significance with limited research potential. The three shelters with art and deposit sites (Brennans Creek 2, 6 and 7) all contained the most common art technique (charcoal outline and infill drawings) used within the creek valley and across the Woronora Plateau. However, the condition of the art was a significant factor in Sefton's (1989) consideration of site values and research potential. Brennans Creek 7 was considered the only site in which the art was considered to be in good condition. Overall, the art technique and condition are considered to be well represented outside of the Brennans Creek valley. However, within the valley itself, both Brennans Creek 6 and 7 would be considered to contain higher local representational values (Sefton 1998). The deposit within Brennans Creek 6, D10 and D11 are those deposits considered to have moderate research potential (Navin officer 2000, Sefton 1989).

5.5 Discussion

Although the timing of occupation of is still uncertain, archaeological evidence suggests that coastal regions were inhabited at least 18,000 years ago, and sites inland along the Nepean were inhabited at least 14,500 years ago. Closer to the immediate study area, dates are much younger, being only 2,200 years ago (Mill Creek 11), although this is more likely related to site preservation (Koettig 1985).

Limited information is available on the Dharawal Aboriginal groups that once inhabited the present study area. Previously archaeological works suggests that the Georges River was a natural boundary between two of the Dharawal clans. Early European settlement resulted in the deaths of many of these traditional peoples, from displacement, disease and massacre.

Prior to European settlement however, the region would have been a resource rich area for the inhabitants of the Dharawal. The landscape provided suitable sandstone outcrops and overhangs for shelter. Various water sources were also available, from major rivers to more minor drainage lines and swamps. The evidence of resource use throughout the immediate study area can be identified from the rock art motif types depicted on the walls of shelters and the extensive grinding grooves sites situated along waterlines. A number of flora and fauna species have been identified within Brennans Creek valley that would have been utilised by the Aboriginal people. These resources are indicative of the environment across the Woronora Plateau. Brown, red and yellow limonite deposits occur within recorded sites Brennans Creek 3 and 10, and were identified as possible sources of ochre for use by Aboriginal people once inhabiting Brennans Creek valley (Sefton 1998:44). However, a number of higher quality and

substantial ochre sources occur throughout the Woronora Plateau, although many have not be formally recorded (Sefton 1998:44).

Recorded Aboriginal archaeological sites across the Woronora Plateau can be attributed to the sandstone environment and archaeological survey techniques. The site types that have been recorded include sandstone shelters with art and/or deposit, shelter with PAD, axe grinding grooves, engraved groove channels, rock engravings and open campsites or isolated artefact occurrences. The frequency and distribution of these site types is dependant on appropriate environmental requirements or cultural behaviours within an area. Overall, however, the available archaeological data can be used to identify general patterns of occupation and aid in determining the likelihood of those site types likely to occur within the present study area.

5.6 Predictive Model

The archaeological predictive model has been formulated based on the results of the location and type of Aboriginal sites that were recorded within the regional area, the results of the database searches and information about previous archaeological work. This information has been broken down into patterns that have been compared to the character of the study area to allow for an understanding of Aboriginal archaeological potential.

Based on this information, the following predictive model for the study area has been developed, indicating the most likely through to the least likely site types to occur within the present study area.

Rock shelters with art and / or deposits

Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground as characterised by the cliff lines bordering the escarpment along the Nepean and George's rivers, their tributaries and creek lines, such as Brennans Creek. These naturally formed features may contain rock art, stone artefacts or midden deposits. The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space occurs in areas where such geological features occur, ie. Hawksbury Sandstone. Such topographical features occur within the present study area.

The AHIMS database search revealed that rock shelters with art and/or deposit are the most frequently recorded site types within the study area and surrounding region. The four previously recorded shelters (Brennans Creek 2, 5, 6 and 7) with art sites situated within the Stage 3 Emplacement Area are indicative of this. Thus, rock shelters with art and/or deposit are the most likely site types.

Axe Grinding Grooves

Axe grinding grooves are often found on large, open and relatively flat areas of sandstone shelving and outcrops. Individual grooves are elongated, narrow depressions often found in sedimentary rock, such as sandstone, in association with water sources, including creeks and

swamps. Water was essential in the shaping and sharpening process in the manufacture of each axe. In the Woronora Plateau region engraved channels, often used to divert the run of water, are a feature associated with some axe grinding grooves.

Axe grinding grooves are second to sandstone shelter sites in being the most common site type found within the region. However, as such sites have not been maintained since European settlement; they will be difficult to locate beneath vegetation and debris. As Brennans Creek and its associated tributaries occur within the study area, there is a moderate to high likelihood that grinding grooves will occur in association with these.

Open campsites, artefact scatters and isolated finds

Sites can comprise high-density concentrations or sparse low-density 'background' scatters. These represent campsites of everyday activities, hunting and gathering and tool manufacture. Isolated stone artefact occurrences can be located anywhere in the landscape and most likely represent discard or loss during transitory movement.

The identification of these sites depends greatly on ground surface visibility, resulting in the boundaries of a site being defined by the visible extent of the artefacts on the surface. Thick vegetation occurs throughout the present study area and is likely to obscure stone artefact scatters or isolated occurrences. The infrequent occurrence of these throughout the region can be attributed to this lack of ground surface visibility rather than the absence of such sites.

Thus, there is a low likelihood of identifying such sites within the presents study area, unless areas of open ground surface are visible. Stone artefact sites that have been previously recorded have been located along ridgelines, on the plateau in associated with drainage lines and within close proximity to water sources.

Rock Engravings

Rock engravings are created by repeatedly scraping or hammering soft, sedimentary rock surfaces, such as sandstone. These sites can include outlined or filled motifs of animals, human figures, pathways or dreaming/ceremonial symbols. Such sites are situated where open areas of suitable sandstone are present.

Very few of these sites have been previously recorded throughout the region surrounding the study area, despite there being numerous exposures of sandstone. This can be attributed to cultural differences between groups within the Sydney basin. Most such sites are situated much further north of the study area. Thus, it is considered unlikely that these sites will occur within the study area.

Stone Arrangements

Stone arrangements can include circles, mounds, lines and various other patterns, most commonly associated with ceremonial sites, mythological or sacred sites, such as bora

grounds or rings. The vast majority of these sites are situated on ridgelines or higher elevations within the landscape where surface stone is available.

Very few stone arrangement sites have been previously recorded throughout the region surrounding the study area. Again, this can be attributed to cultural differences between groups within the Sydney basin. It is therefore unlikely that these will occur within the present study area.

Lithic / Pigment Sources

Stone quarry sites will only be located where exposures of suitable raw stone material occur, for use in stone artefact manufacture. Stone sources are located west of the study area, on the Cumberland Plain, and include silcrete, quartzite and petrified wood outcrops. Throughout the sandstone country, sources of raw material include pebbles and cobbles that have gradually weathered out of the sandstone over time. It is likely that stone artefacts manufactured from the above raw materials will be located within the study area, however, none would have originated from quarries in the immediate region.

Pigment sources will only be identified in areas where the geology dictates and the required processes have exposed such sources. A poor quality local source of ochre was previously identified within recorded site Brennans Creek 3 in the Stage 2 emplacement area (Sefton 1998:37). It is considered however to be a poor quality source and it is unlikely that any other sources of ochre will occur within other shelters within Brennans Creek.

Scarred Trees

Scarred trees exhibit scars caused by the removal of bark used in the manufacture of shields, canoes, containers or shelters. These generally occur on older trees or trees of size from which a suitably sized piece of bark can be removed. Early timber cutting within the region has removed some large trees. Limited potential for preservation of dead trees and high intensity periodic bush fires also reduce the likelihood of these sites being present.

Carved Trees

Carved trees were a common feature across the New South Wales landscape, noted in the early 1900s by Etheridge (1918). These trees bear markings that were used to mark ceremonial or symbolic sites, such as burials. Through land clearance and bush fires, many of these trees no longer exist. There is reference to a carved tree near Narellan, north-east of the study area. With a lack of mature timber remaining within the study area, it is highly unlikely that these sites will occur.

Burials

Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. In the wider region, burials have been limited to soft sediment deposits, which are confined to the coastline and estuaries, some distance east of the present study area. The

location of burials can be indicated by carved trees, or become exposed in eroding or shifting sand or soft sediment deposits.

Within the region there is reference to carved trees marking graves. Such sites are rare and none are known to still exist. There are few surviving large trees and no suitable soft sediments with which burials will be associated within the study area. It is therefore highly unlikely that these sites types will occur within the present study area.

Aboriginal Ceremony and Dreaming Sites

These types of highly significant sites include natural mythological sites, ceremonial sites, increase sites, and dreaming story sites or places that can comprise delineated (physical) sites/places and non-delineated sites/places (non-physical). These are places used for a formal act or series of acts prescribed by ritual, belief in a mythological manifestation, religious belief or observance, protocol or convention that is connected with the traditional cultural life of Aboriginal people past or present. For example, natural mythological sites can comprise spectacular hills or rock outcrops, waterholes or waterways, or unseen pathways which are part of dreaming stories. Physical aspects of ceremonial sites that have been identified within the Sydney Basin include earth rings, stone arrangements and pathways that were once associated with public gatherings, corroborees, or initiation rituals.

Given the topography of the study area and the nature of each river to Aboriginal culture, there is limited potential to identify unregistered ceremonial and dreaming places are within the present study area.

Aboriginal Places

Aboriginal *places* may not have any "archaeological" indicators of a site, but are nonetheless significant to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings. Often these places are significant in the living memory of a community. There is some potential that Aboriginal places of spiritual and cultural significance will be found in association with the Georges River and Brennans Creek. There are often difficulties in obtaining such information due to displacement of traditional Aboriginal communities in the region however.

6.0 HISTORICAL CONTEXT

Historical research has been undertaken to identify the historical context of the study area. This history incorporates an understanding of land-use, building patterns, areas of disturbance, as well as land owner histories. This research will lead to understanding and identifying the historical archaeological potential of the Stage 3 Emplacement Area, and the wider study area.

6.1 Regional Background

The history of Appin has been compiled and documented in several published and web-based sources, including sources from the State Library of NSW, NSW Lands and Title Office (Maps and Plans Division), Local Historical Societies or Groups. Primary research was also undertaken regarding the land-use history in the area and is presented in the following section.

6.1.1 Establishment of Appin

Establishment of a reliable food supply for the settlers of Sydney was one of the driving factors behind expansion of the infant settlement of Appin. Chronic food shortages in the Colony were to be addressed by the creation of farming centres on the Hawkesbury, Airds and Appin plains. Governor Macquarie established the five Macquarie towns in the Hawkesbury, while he designed Liverpool to be the capital of the south-west, with the townships of Campbelltown and Appin in the Airds and Appin parishes respectively (Jack and Jeans 1996:24).

Governor Macquarie named Appin in 1811 after a small coastal village in Argyleshire (Scotland) where his wife was born. Deputy Commissary General William Broughton received the first local land grant that year. He called his 1000 acres Lachlan Vale after the Governor (www.stonequarry.com.au/towns/appin.html).

The following year Macquarie gave 100 acres to Andrew Hume who had journeyed to NSW in 1789 as an instructor in agriculture. His sons were John and Hamilton, the latter becoming a noted explorer. With an Aboriginal guide the two Hume boys made their first exploratory trip south in 1814, crossing the Razorback range and examining the areas now occupied by Picton, Mittagong, Bowral, Berrima and Bong Bong. Two years later they travelled to the Goulburn Plains (www.stonequarry.com.au/towns/appin.html).

Hamilton Hume was granted 300 acres at Appin. The 1824 Hume and Hovell expedition to Port Phillip left from the Appin Road, at a point indicated by a monument erected in 1924 to mark the centenary of the expedition. The monument is made of stone taken from the Hume house (www.stonequarry.com.au/towns/appin.html).

Urban growth was slow, with most of the area held in large pastoral or agricultural holdings, with settlers tending to establish cattle and wheat properties. The Appin town site was formally surveyed in 1834 by Mitchell.

Other settlers followed and also established cattle and wheat properties. Produce from the farms was transported by horse and bullock drays to Sydney via the Appin Road. The Appin Road was an important communication and access corridor in the early stages, however, it declined in importance once the Hume and Princes highways were built.

6.1.2 Contact, massacre and continuation

By July 1813 Europeans had begun to encroach on traditional Aboriginal land, having established farms in the area. Traditional Aboriginal custodians were experiencing severe economic and social disruptions as a result of lack of access to traditional lands, the introduction of diseases and the settlement of displaced Aborigines from other areas. All these factors placed pressure on food supplies and increased tensions between Aboriginal and settler communities. Section 5.1 outlines the 'Appin massacre' which resulted from escalating hostilities between Aborigines and settlers.

Despite the massacre of 1816 there remained a continued Aboriginal presence within the area. Aboriginal people became increasingly involved with European settlement, working as stockmen and labourers on farms and as domestic help (JRC 1993:20). The establishment of two Aboriginal reserves in Burragorang (one at Pocket Creek, the other at Tonalli), reflects an Aboriginal population in the Wollondilly region. These reserves, however, were not the sole focus for Aboriginal activity in the area. Aboriginal people contributed, and continue to contribute, to the economic and social fabric of the region.

6.1.3 Pastoral Expansion

Agricultural pursuits in the area commenced with grazing. Initially unplanned, following the escape of cattle which prospered in the area (ever after known as Cow Pastures), more formal grazing pursuits commenced with establishment of the permanent settlement. Government stockyards were established and the landholders ran cattle. Later diversification saw dairying assume increasing importance to the community, although this was after the introduction of the railway and refrigeration (JRC Planning 1993:21). There are several examples of early dairy farms with byres and bails in the Appin area.

Wheat was another important early industry, with the area around Appin particularly suited to growing wheat. In response to this, several mills were established, where the grain was ground prior to dispatch. Severe outbreaks of rust in the 1870s largely destroyed the wheat industry in the area (JRC Planning 1993:22).

With the collapse of the wheat industry, diversification of agriculture occurred. Dairying and its related services remained an important regional industry until well into the twentieth century, declining in the 1960s. Orcharding was taken up in the areas surrounding Appin, reaching its peak in the 1950s. Grape growing for wine production enjoyed success in a few limited locations, while there was also a (commercially unsuccessful) brewery in operation at Blaxland's Crossing. Smaller, boutique industries such as Tang nuts and mushrooms have also contributed to the local economy.

The advent of the railway opened the produce of the Appin area to larger markets. The railway did not pass through Appin, going instead through Picton. As a result, the increase in development such as was seen at settlements graced with a railway station or siding, was not experienced at Appin.

6.1.4 Coal Mining Leases

Coal deposits in the Illawarra were first officially documented by George Bass in 1797 near Coalcliff (http://www.illawarracoal.com). A number of coal seams were subsequently discovered throughout the Illawarra over the next century, eventually becoming a major industry in the region. However, the first mining leases were not established in the Appin region until the early 20th century, following the proclamation of the State Coal Mine Reserve in November 1926 (Wedderburn Parish Map 1972). This Reserve encompasses the present West Cliff Colliery study area. Coal mining began at the West Cliff Colliery site in 1976. Initial exploration activities involved clearing of seismic lines to establish drill sites from which the depth of the coal seams could be determined.

6.2 Local History

A number of National and State statutory and non-statutory heritage registers, databases and planning documents were searched in regards to historical heritage places. This included the Register of the National Estate, NSW Heritage Office Register database, and the Local Environmental Plan for Wollondilly (1991). A search of these registers revealed no previously identified historical sites or places within the Stage 3 Emplacement Area or the wider West Cliff Colliery study area (see Section 3).

Two places are however listed on the Register of the National Estate that are situated within the nearby Stokes Creek Valley, however as discussed above these are Aboriginal archaeological sites, also listed on the AHIMS.

6.2.1 Regional and Localised Heritage Surveys/Studies

Other than the large-scale review and study completed of the Wollondilly Local Environmental Plan (1991), no other heritage study or localised heritage survey or assessments have been undertaken that are relevant to the West Cliff area.

It should be noted that generally, when localised archaeological assessments are undertaken within a study area, survey methods for both Aboriginal and historical sites occurs concurrently, unless otherwise specified.

6.2.2 Parish Map / Land Title Chronology

The West Cliff study area is situated on the western boundary of the Parish of Wedderburn. Historical Parish maps for the Wedderburn Parish and Appin Parish were investigated using the NSW Department of Lands Parish and Historic Maps internet portal (http://www.lands.nsw.gov.au/survey_mapping/parish_maps). The maps showed that the

Brennans Creek area has never been subject to land development prior to the construction of mine facilities in the 1970s. The maps also indicate that the subject land has never been privately owned and that the general region was declared part of the NSW Mine Lease Area as early as 1906. Interestingly, to the north of the present West Cliff Colliery, an area was set aside as early as 1888 as the Appin Agricultural Lease.

6.2.3 Air Photo Chronology

Air photos for the study area were inspected to construct a chronology of land use and landscape impacts. Air photos were available from 1947 through to the present. Table 5 below summarises the air photos and notes relevant observations for each.

Air Photo Date	*Observations*
1947, January 6	Appin and Wedderburn Road present, small tracks and cleared areas on plateau
1961	Small tracks and cleared areas on plateau
1969, 29 June	Small tracks and cleared areas on plateau
1975, 2 April	Pit top infrastructure present
	Hard stand and stockpile areas present
	Brennans Creek Dam in construction phase
	Internal mine lease roads constructed
	Electricity Easement constructed
	Many seismic lines and additional vehicle tracks criss-cross Brennans Creek and plateau
1979, 23 February	West Cliff Mine operational
1984, 24 October	Additional seismic lines in northern section of lease
1990, 25 September	Water diversions for emplacement
	Stage 1 emplacement operational
1994, 4 January	Stage 1 emplacement progressed
2005, 20 December	Stage 2 emplacement operational
	Gas and water easement

Table 5: Air photo chronology for West Cliff

The air photos revealed that the wider West Cliff Colliery study area has, overall, been subject to minimal land development. The development that has occurred includes that directly associated with the existing West Cliff Colliery, including the coal preparation plant, associated road, pipelines and Stage 1 and 2 Emplacements Areas. Most of the site is still covered with vegetation observed in the earliest air photos. Some small access tracks and seismic lines however do dissect small tracts throughout these areas. Apart from the development of the colliery, there are no other obvious indicators of land-use within this area.

A summary of impacts sustained at the proposed Stage 3 emplacement area are discussed in Section 10 below.

6.2.4 Social History of Brennans Creek

The Land Title history and aerial photography reviewed above demonstrate that Brennans Creek was reserved for pasture from at least the mid-1800s, and was not subject to non-indigenous occupation or development prior to West Cliff mine operations. However the

proximity of the Brennans Creek area / West Cliff mining lease to Appin suggests that this area was very accessible to the community, either via the Georges River / Kings Falls Bridge area, or Appin Road which runs along the south-western boundary of the lease area. The well known community swimming location at Marhneys Hole is also close to the north-western margin of the West Cliff mine lease, and Georges River can be crossed near here as well. The presence of historical graffiti, recent camp fires and artefacts suggests transient use of the Brennans Creek valley since European arrival. For example there was a stone wall in the Aboriginal archaeological site BC3, and Aboriginal archaeological sites BC7 (graffiti includes a date of '1933') and D11 (graffiti is a date of '1954') contain historical graffiti.

The Appin Historical Society identified the following uses for the area around Brennans Creek during discussions: timber getting, sandstone quarrying and charcoal making. Brennans Creek itself is named after an early land grantee in the area, M. Brennan, who held two lots immediately to the south of the Appin township. Apparently Brennan was something of an explorer of the local Appin area, and his name has transferred to the creek. The feature is named 'Brennans Creek' on both Wedderburn and Appin parish maps that date to the 1880s.

According to the Appin Historical Society a Russian family lived on Lysaghts Road, on what is now the eastern boundary of the mining lease, just after the Second World War (c1940s-1950s). This family lived in a shack at the top of the plateau on the north-eastern side of Brennans Creek, and timber cutting is remembered as their occupation.

6.3 Discussion and site prediction model

As the present study area has always remained un-surveyed land up until mining leases began in the early 1900s, it is unlikely that any historic sites will be identified. The study area has never been intensively cleared of vegetation or used for agricultural purposes, although timber has probably been removed by timber getters and possibly charcoal makers. The proximity and accessibility of the study area to the town of Appin suggest it would have been visited by people, probably for both recreation and for work such as timber cutting. This is evidenced by graffiti and stone wall construction in some of the recorded Aboriginal archaeological sites. A family lived on the north eastern side of Brennans Creek after the Second World War, apparently subsisting as timber cutters. 'Residential' style occupation of sandstone shelters in this region is evidenced in the historical record; generally the shelters appear to have been used by 'swaggies' and people down on their luck in hard times, such as the Depression (Vincent 2001: 59). Transient use of the sandstone shelters by charcoal makers or timber getters is also likely, as indicated by the local Appin Historical Society.

A number of small mining leases were taken up throughout the Appin region, including the study area. There is some potential that access tracks and other historic remains of exploration of these leases may occur within the study area, though these will date to the late 1960s at the earliest. Such features are regionally and locally very common. The main development and activity within the study area has been the establishment and growth of the West Cliff mine and associated infrastructure including pit top facilities, the coal wash plant for Appin and

West Cliff mines, the Brennans Creek Dam, hardstand and stock pile areas, and services easements.

Despite the lack of archaeological survey work or previously identified historic sites, information gathered from maps and primary sources has contributed to the development of the following predictive model for the study area. It indicates the most likely through to the least likely site types to occur within the present study area.

Occupation of sandstone shelters/general area

The topography of the study are comprises moderate to steep sandstone cliff lines and overhangs. Based on previously identified historical use of a number of such sandstone overhangs in the region and within Brennans Creek valley, it is considered highly likely that any further sandstone overhangs within the study area will exhibit evidence of historic use, including graffiti and refuse. Possibly this type of transient or ephemeral occupation will also produce transient camp areas and other scattered artefacts throughout the study area.

Minerals Exploration

Landscape impacts associated with minerals exploration such as vegetation clearing, excavations and other refuse (discarded equipment or rubbish) will be likely to occur throughout the mine lease.

Charcoal Making/Timber Cutting

Information gathered from the Appin Historical Society indicated the use of the general area for charcoal making and timber cutting. The physical remains of such activities will be limited to surviving tree stumps, tracks, temporary structures and refuse associated with individuals inhabiting the area. Unfortunately, recent bush fires would have impacted on such remains, therefore it is considered unlikely that any physical evidence of these activities will remain.

7.0 SURVEY

7.1 Survey Methods

Survey methods for Aboriginal cultural heritage sites have been designed in consultation with the local Aboriginal community. They have also been designed to locate cultural heritage or archaeological sites within the study area with reference to the following information:

- Previously recorded sites within the study area;
- Areas of potential as identified by the background research predictive model (regional site patterns as compared to the physical environment of the study area, or items identified in historic plans); and
- Areas of high archaeological potential within the wider West Cliff Colliery (including Brennans Creek).
- Potential impacts related to the proposed West Cliff Area 3 Emplacement Area.

The majority of the study area had been previously surveyed in detail by Sefton (1989, 1998) and Navin Officer (2000). Both surveys used targeted survey techniques. In both cases the targeted surveys involved two approaches: focussing on archaeologically sensitive landforms within the study area considered most likely to contain Aboriginal archaeological sites; and focusing on areas of disturbance associated with other infrastructure (roads for example). The identification of historic heritage places was limited to targeted survey that focussed on structures associated with previous mining activities (Navin Officer 2000:8).

The most sensitive landforms associated with Aboriginal archaeological sites are generally those associated with the Hawkesbury soil landscape, as described in Section 4.1. These landforms comprise drainage features which produce deeply incised gullies and valleys suitable for sandstone overhangs and shelters. Previous survey of the most sensitive landforms was conducted by Sefton (1989, 1998) and Navin Officer (2000) by conducting contour surveys, walking transects parallel to drainage features and inspecting the slopes and scarps for sandstone overhangs or shelves. Survey of other areas of potential impact involved inspection of areas of previous disturbance and potential disturbance. Generally these targeted surveys provide an opportunity to examine less sensitive landforms (the plateau for example), and also provide the opportunity to discover open artefact sites, which are not ordinarily located in the rugged valleys and gullies. Figure 2 shows transects previously surveyed at West Cliff by Sefton (1989, 1998) and Navin Officer (2000).

The methodology for the present archaeological survey was finalised in September 2006 (Biosis Research 2006). The methodology implemented was the same as that proposed and agreed upon by registered stakeholders. The survey was therefore conducted as follows:

Block Survey of Stage 3 Emplacement Area

As the proposed emplacement area was both relatively accessible and the main area of impact, a block survey aiming to systematically survey the entire emplacement area was conducted. The block survey involved the walking of regularly spaced transects by the survey team. Each survey team member was assigned an area of 20 m width to survey, meaning the survey transects were approximately 60 m in width when a three member survey team was present, and 80 m when a four member team was present (Figure 3).

Transects were planned by uploading waypoints identifying the approximate boundary of the emplacement area into a hand-held GPS, and navigating to each waypoint, thus establishing the first transect. Two hand-held GPS units were used to navigate and record each transect, with one GPS at either side of the transect, and team members walking between the GPS. Adjacent transects were navigated along using the track function in the GPS, allowing the subsequent transects to be systematically off-set, and team members spaced appropriately. The block survey provided thorough and systematic survey coverage of the emplacement area.

Sample Survey of Wider Brennans Creek Area

Sample surveys of the wider Brennans Creek area were conducted in the same way as previous targeted surveys by Sefton (1989, 1998) and Navin Officer (2000). Namely, sensitive landforms were targeted and sample transects walked along these landforms; in addition areas of high exposure were opportunistically targeted and surveyed. These transects were also recorded using hand-held GPS units.

Identification and Recording of previously recorded archaeological sites

All previously recorded or newly recorded Aboriginal archaeological sites and PADs will be relocated during the survey. New co-ordinates for each site were taken, along with photographs and updated information about each sites' condition.

Identification and Recording of Historic Features

During the surveys for Aboriginal archaeological sites, the survey team concurrently assessed these areas for any evidence of historic land use or occupation. In particular, historic use of sandstone overhangs as part of the block survey, land use along the creek channel and any associated points of access or tracks in the wider study area. All newly recorded historic sites were recorded, photographed and co-ordinates taken.

Identification and Recording of Traditional Resources

During the archaeological surveys the identification and recording of any traditional resources within the study area was conducted in close consultation with the relevant local Aboriginal community. No previously unidentified traditional resources had been identified within the Stage 3 Emplacement Area.

7.1.1 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to how detectable archaeological sites were in the study area were visibility and exposure (see below); in rugged situations such as those at West Cliff occupational health and safety requirements can also constrain the effectiveness of archaeological survey. A brief discussion of these factors is presented below.

Visibility

In most archaeological reports and guidelines visibility refers to *ground surface visibility*, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (NSW NPWS 1997: Appendix 4). The primary factor that affects visibility is vegetation cover; however other things such as introduced fill will also significantly hamper visibility and surface site detection. At the West Cliff study area the major contributing factor that restricts visibility is leaf litter. The majority of the study area is covered by dense woodland vegetation, obscuring much of the ground surface, and providing very poor surface visibility. Despite recent drought conditions, ground surface visibility remained low, apart from those areas that have been subject to recent ground disturbance works (see discussion on *exposure* below).

Navin Officer (2000: 49-50) provide a good discussion on considerations of visibility and site obtrusiveness on the Woronora Plateau and Illawarra Escarpment. The obtrusiveness of sandstone rock shelter and overhang sites, even in heavily vegetated areas is always high, so these sites are likely to be detected and inspected during survey. In comparison the obtrusiveness of surface sites, such as axe grinding grooves, engraved channels and motifs on sandstone platforms, or stone artefact scatters, which occur virtually anywhere, is low to very low because of the limited ground surface visibility described above. At West Cliff it was noted that sandstone shelves suitable for axe grinding grooves and channels are more often than not covered in leaf litter from bushes that grow on trapped sediment. The concept of visibility is also applicable to the surface of shelter sites when considering archaeological potential or looking for artefacts exposed in drip lines (Navin Officer 2000: 49).

Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke and Smith 2004: 79, NSW NPWS 1997: Appendix 4). Factors that affect archaeological exposure include the natural geomorphic process acting on a landscape—whether it is aggrading, stable or eroding—and the level of previous disturbance which will expose or potentially bury archaeological sites. The majority of the study area is a colluvial landscape, with the remainder being a residual landscape. Neither of these landscapes is

particularly likely to reveal buried artefacts, although residual landscapes are likely to accumulate archaeological material over long periods. Disturbance in the study area is associated with natural and human agencies. Natural agents generally effect small areas and include the burrowing and scratching in soil by animals such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scalding. Disturbance associated with recent human action is prevalent in the study area, and covers large sections of the land surface. The agents include mining exploration activities (tracks and seismic lines), other vehicle tracks, hard stand areas and associated infrastructure pads. Overall, the study area displays moderate evidence of disturbance; however areas of better ground surface visibility are still limited. Physical ground disturbance that occurs within the study area has been noted and is clearly visible on all mapping.

Safety

In general, the weather conditions did not hinder the survey effort, although recent heavy rains resulted in precautionary measures where wet or slippery surfaces might be encountered. There are many high cliffs and scarps in the study area, and the edges of these were not approached closer than 2 m by the survey team. In some areas, though not common, the vegetation is impenetrably thick, posing a risk of eye injury, falls and cuts or abrasions. The transect survey methodology was varied to ensure the safety of the survey team, sometimes resulting in uneven survey transects due to avoiding the edges of steep cliff lines or walking around impenetrably thick vegetation. This is not considered to be a significant constraint to the systematic block survey or the targeted contour survey given the uncommon occurrence of impenetrable vegetation, whilst all cliff lines and scarps were inspected from below as well as above, which is where any archaeological material would occur in these cases.

7.1.2 Measures of survey effectiveness

When estimating the effectiveness of our surveys we follow Navin Officer (2000) in providing appropriate and informative estimates of effectiveness of the different types of survey techniques employed. For the block survey and targeted contour survey—which focused on sandstone exposure sites such as shelters and axe grinding grooves—we do not provide estimates of ground surface visibility and exposure as these are not particularly informative regarding the obtrusiveness and likely incidence of discovery of the site types (sandstone shelters) likely to occur in the gorge environment. Rather, following Navin Officer (2000: 49) ‘qualitative judgements in regard to the incidence of rock exposures and their potential to host archaeological sites’ were recorded and are provided below.

For those survey transects where estimates of ground surface exposure and visibility are appropriate—transects located on vehicle tracks or seismic lines—then the standard definitions of exposure and visibility were recorded and are provided, along with the standard assessment of survey effectiveness (Burke and Smith 2004: 80, NSW NPWS 1997: Appendix 4):

- Visibility – a percentage estimate of the total visible ground surface of a transect.
- Exposure – a percentage estimate of the transect area that has been exposed through natural or human agency to potentially reveal (buried) archaeological material.

7.1.3 Survey team summary

The West Cliff survey was conducted over two weeks in mid February 2007, resulting in a total survey effort of approximately 24 person days, with the survey team changing on a day to day basis due to team member availability (Table 6). Representatives from the Tharawal Local Aboriginal Land Council and/or the Cubbitch Barta Native Title Claimants Aboriginal Corporation were present on all days of survey for Aboriginal archaeological and cultural heritage sites. The weather conditions for the survey were fine, hot and muggy for the duration of the survey period.

DATE	*SURVEY TEAM*	*PERSON DAYS*
14 February 2007	Glenda Chalker (Cubbitch Barta) Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research)	3
15 February 2007	Leanne Hestelou (Tharawal LALC) Chris McEvoy (Cardno Forbes Rigby)* Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	3
16 February 2007	Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	3
19 February 2007	Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	3
20 February 2007	Rebecca Chalker (Cubbitch Barta) Wendy Lewis (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	4
21 February 2007	Rebecca Chalker (Cubbitch Barta) Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	4
22 February 2007	Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	3
2 March 2007**	Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	1
3 May 2007	Leanne Hestelou (Tharawal LALC) Melanie Thomson (Biosis Research) Jamie Reeves (Biosis Research)	3
* Participated as observer – not included in estimate of survey effort ** Inspection of historical feature – half day		Total survey effort: 24 person days

Table 6: Survey Team Effort Summary

7.2 Survey Results

7.2.1 Existing Condition of the Study Area

Historically the West Cliff Colliery lease area has been subject to various levels of disturbance, including minerals exploration, mine infrastructure, and alterations to the flow and alignment of Brennans Creek associated with coal wash emplacement Areas 1 and 2. The upper reaches of Brennans Creek have been emplaced with coal wash over the past 15 years.

The proposed coal wash emplacement Area 3, downstream and to the north-west of the existing infrastructure, has been subject to minerals exploration activities, including a number of seismic lines and boreholes. There are a number of well formed access tracks that occur on both sides of the creek line in this area, as well as a built-up road and hard stand area, which is situated near another piece of infrastructure in this part of the mining lease – the Brennans Creek dam (Figure 3). Elsewhere there are built up areas associated with the West Cliff mine pit top and coal wash plant, such as stockpile and hard stand areas.

This north-western section of the Brennans Creek valley is dissected by: a service easement that includes a vehicle track, a buried gas pipe line and surface water pipe line, and an electricity transmission line and easement that includes a wide area cleared of vegetation with a vehicle track (Figure 3). The gas/water easement consists of a corridor of disturbance that crosses the entire gorge, including the very steep approaches to the creek itself, whilst the electricity transmission easement has not been cleared and is not maintained in the steepest sections of the gorge as the transmission lines span very high above the creek and its steep approaches.

Other than these areas of disturbance the study area is characteristic rocky woodland with Sandstone Gully Peppermint Forest on drainage lines, Sandstone Scribbly Gum Woodland on the plateau and Upper Georges River Sandstone Woodland near the confluence of Brennans Creek and the Georges River. Sandstone outcrops as scarps, boulders and ledges exist throughout the entire study area, with the incidence of outcrops being much more frequent in the drainage lines. Upstream on Brennans Creek (the eastern part of the study area) the valley is broad and relatively shallow. As it progresses downstream (west) the creek incises more deeply, resulting in steeper valley sides and a generally wider creek channel. At the western end of the proposed emplacement area the gorge is quite narrow. At West Cliff the Hawkesbury sandstone strikes approximately north-west, and has a low dip angle. The result of this bedding arrangement is that weathered sandstone features suitable for shelter formation are much more common on the northern side of Brennans Creek than on the southern side. Generally, the northern side of Brennans Creek is steeper, contains more abundant sandstone block outcrops (which also chemically weather into cavernous formations), and has some long, high cliff lines. The southern side of the creek, where the dip of the strata inclines with the creek's incision, consists of benches, talus slopes and occasional block fall and chemically weathered cavernous features. Generally this side of the creek is steep, but less rugged (Plate 1 and Plate 2).

Plate 1: Example of emplacement area landform on southern side of Brennans Creek

Plate 2: Example of emplacement area landform on northern side of Brennans Creek

The plateau areas are flat or only slightly inclined, and have a laterite surface as is common for the Hawkesbury sandstone (Sefton 1998: 34). The plateau is well vegetated and contains occasional upland swamps. On the south side of the creek the plateau transitions into the steeper creek sides via a series of shallow scarps, whilst on the north side the transition occurs as a series of higher, more blocky scarps and isolated boulders, before becoming a series of very steep and high cliffs and scarps.

As described above the West Cliff study area has been subject to various historical activities that have left their mark and discarded cultural material on the landscape. Previous minerals exploration has left tracks, seismic lines and cleared drill pads in places. Particularly on the southern side of Brennans Creek there is an eclectic and sparse distribution of detritus. Glass, tin, unidentifiable metal objects and occasional sawn trees were all noted to occur in this area. The south-western areas of the lease along Appin Road have been the location of ongoing rubbish dumping for what appears to be some time. Car bodies, white goods and other domestic rubbish were frequently observed both in and on the outside boundary of the lease in this area. At the time of survey rubbish was being actively dumped in this area outside the lease. Also along the margin of the lease boundary inside the lease is a vehicle service track and a buried optical fibre cable.

7.2.2 Survey Coverage

Due to the nature of the landforms and environment of the study area, survey methods were adopted that allowed for the most effective survey of the study area. This included the two approaches, as outlined in the Section 7.1, which included systematic block survey and sample survey. The results of effective survey coverage for each approach were analysed using different summary methods. Both approaches however are assessed using the same three landforms located within the entire study area.

Sample Survey

The effective survey coverage estimates from the sample survey have been calculated using the methods described by the NSW National Parks and Wildlife Service Standards and Guidelines Kit (NSW NPWS 1997). Table 7, outlines the total area surveyed and the effective survey coverage. Section 7.1.1 talks about levels of visibility within the study area and how these impact on the calculation of effective survey coverage.

LANDSYSTEM SAMPLE	*LANDFORM UNIT*	*SURVEY UNIT TYPE*	*EXPOSURE (%)*	*VISIBILITY (%)*	*TOTAL AREA SURVEYED (M)*	*EFFECTIVE SURVEY COVERAGE (M/%)*	*RECORDED ABORIGINAL SITES*
Plateau Top	Undulating plateau with occasional bench/boulder outcrops, swamps and open sandstone platforms. Includes shallow drainage lines	Access track, electricity easement & water pipeline	90%	80%	6,286.10	4,526 (73%)	1 Aboriginal site
Steep scarps and gorges	Steep and precipitous sandstone outcrops, detached blocks and cliffs or gorges. Well incised steep drainage line, often with drop-offs	Electricity easement & water pipeline	80%	60%	2,608.90	1,252 (48%)	NIL
Hill Slopes	Moderate hill slopes with cobble, boulder and shelf outcrops and low rounded scarps. Moderately incised drainage features	Electricity easement & water pipeline	80%	60%	2,855.10	1,345 (48.5%)	NIL

Table 7: Survey coverage for 'sample survey' results within the wider West Cliff Colliery study area

Overall, the effective coverage of the sample survey area was high due to excellent ground surface visibility. In particular, exposures associated with open tracks and pipelines across the Plateau Top land system provided 73% effective survey coverage. The effective survey coverage of the other two land systems was also quite high (48%) as a result of ground surface exposure (Table 7). Only minor vegetation regrowth obscured ground surface in some sample survey areas. The high coverage and ground surface visibility resulted in the identification of one stone artefact scatter site (WC5). Such site types within the Hawkesbury Sandstone landscape are uncommon. It should be noted however that these areas were targeted as part of the sample survey as it was known that the ground surface visibility would be high and thus effective survey coverage could be calculated and be informative.

Block Survey

The results of the block survey were analysed using the approach taken by Navin Officer (2000). This provides useful and informative results on the obtrusiveness and likely incidence of discovery of the archaeological site types associated within the sandstone valley and gorge environments of the Woronora Plateau region. Table 8 below summarises the incidence of suitable rock exposures (archaeological potential) that are most likely to contain archaeological sites within the 3 identified land systems within the block survey area.

LANDSYSTEM SAMPLE	*LANDFORM UNIT*	*SANDSTONE OUTCROP TYPE*	*TOTAL AREA SURVEYED (M)*	*ARCHAEOLOGICAL POTENTIAL*	*RECORDED ABORIGINAL SITES*
Plateau Top	Undulating plateau with occasional bench/boulder outcrops, swamps and open sandstone platforms. Includes shallow drainage lines	Limited areas of rock outcrop, vehicle tracks and easements	15,714.80	Low	NIL
Steep scarps and gorges	Steep and precipitous sandstone outcrops, detached blocks and cliffs or gorges. Well incised steep drainage line, often with drop-offs	Erosion scour, rock outcrops (floor of sandstone outcrops), moderate to steep cliff lines and drop-offs	34,003.10	Moderate to High	11 Aboriginal sites (including PADs)
Hill Slopes	Moderate hill slopes with cobble, boulder and shelf outcrops and low rounded scarps. Moderately incised drainage features	Erosion scour, rock outcrop/ and open sandstone platforms	15,642.50	Moderate	1 Aboriginal site (including PADs)

Table 8: Survey coverage of block survey and targeted landform survey

The analysis used for the block survey is qualitative rather than quantitative, as ground surface visibility is generally poor and all sites are associated with the occurrence of sandstone overhangs within this environment. Therefore, the results are based on the observable and suitable sandstone overhangs that have archaeological site potential. The survey revealed that the most suitable sandstone overhangs occur within the steep scarps and gorges land system associated with Brennans Creek valley (Table 8), which is reflected in the high number of Aboriginal sites recorded within these landforms. Despite the rugged terrain of the study area, sandstone shelters/overhangs will always be highly visible compared with site types not associated with sandstone shelters, such open campsites.

7.2.3 Aboriginal Sites

All Aboriginal archaeological sites, including sandstone shelters with potential archaeological deposit (PAD), that were previously identified by Sefton (1998) and Navin Officer (2001) were relocated during the field survey. Each site was photographed and re-assessed for changes since the original site recordings, and new, more accurate site position was recorded using a hand held GPS. The following section is an overview of each previously recorded site, summarising site features, contents and changes observed during this project (Table 9; Figure 5 and 6).

The newly recorded sites are described in detail, including site location, aspect, features, contents, condition and conservation concerns. A detailed plan and profile were drawn, along with a series of photographs detailing site features. An accurate site position was recorded using a hand held GPS (Table 9; Figure 5 and 6).

SITE NUMBER	SITE NAME	SITE TYPE	PREVIOUSLY / NEWLY RECORDED
Recorded Aboriginal archaeological sites			
52-2-1368	Brennans Creek 2	Shelter with art and deposit	Previously recorded site
BC 5 (52-2-1371)	Brennans Creek 5	Axe Grinding Groove	Previously recorded site
BC 6 (52-2-1372)	Brennans Creek 6	Shelter with art and deposit	Previously recorded site
BC 7 (52-2-1373)	Brennans Creek 7	Shelter with art and deposit	Previously recorded site
-	Dendrobium 10		Previously recorded site
-	Dendrobium 11		Previously recorded site
-	West Cliff 1		Newly recorded site
-	West Cliff 2		Newly recorded site
-	West Cliff 4		Newly recorded site
-	West Cliff 5		Newly recorded site
Shelters with Potential Archaeological Deposit			
N/A	Brennans Creek PAD 4	Shelter with potential archaeological deposit	Previously recorded site
N/A	Brennans Creek PAD 5		Previously recorded site
-	West Cliff 3		Newly recorded site

Table 9: Aboriginal archaeological sites and PADs within 500m of Stage 3 Emplacement Area

7.2.3.1 Previously Recorded Aboriginal Archaeological Sites

Brennans Creek 2

The site was originally recorded by Caryll Sefton in 1989 during an archaeological survey of the proposed Western Reserves Development Option; including the proposed Brennans Creek Coal Wash Emplacement Area. The site was re-recorded during Dendrobium Coal Project Assessment (Navin Officer 2000). The original plans and profile of the shelter are accurate, and are shown in Plan 1 below.

This site is a shelter with art, situated on the north-eastern side of a small drainage line that flows south-west into Brennans Creek. It is located in the lowest cliff line on Brennans Creek Valley, less than 50 m from the creek channel. The sandstone overhang is relatively small, measuring approximately 8 x 2.5 x 2.5 m in size (Plan 1). It is located on a small discontinuous sandstone outcrop that contains horizontal bedding planes along the bottom and top of the shelter wall (Plate 3). The weathering process that originally formed this shelter site is stable.

The art within the shelter was originally described as 4 charcoal outline and infill indeterminate motifs and 1 outline and infill macropod. The art is situated approximately 1.1 metres above the floor of the shelter on the central back wall between the roof and a minor bedding plane. The original photographs and drawings show much clearer depictions of the

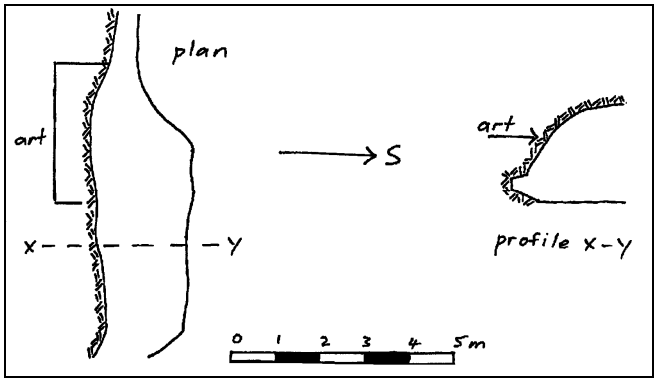
art than those taken during the current survey. All art work is now indistinguishable and in poor condition. The charcoal is significantly faded and damaged by mould and lichen growth (Plate 4).

The floor of the shelter consists of grey loamy sand that is between 20 to 30 cm deep, most of which has been deposited by slope wash down the adjacent gully and deposition via creek flooding (Plate 3). No stone artefacts were identified and it is unlikely that any will be present because the deposit is allochthonous. The liveable area is limited to an 8 m^2 area.

Plate 3: Shelter with art site 52-2-1368, situated at the southern end of the coal wash emplacement area

Plate 4: Poorly preserved charcoal motifs on 52-2-1368 shelter surface

At the time of the survey, shelter conditions were quite dry, however, due to the location of the shelter on the lower valley floor, it would most likely be damp during wetter months. If the creek flooded, the floor of the shelter would be inundated. The height of the art on the back wall of the shelter is unlikely to be have affected by inundation. Overall, the condition of the archaeological features at this site is poor condition.



Plan 1: Original floor plan and cross-section of shelter with art site, Brennans Creek 2 (Sefton 1989)

Brennans Creek 5

The site was originally recorded by Caryll Sefton in 1989 during an archaeological survey of the proposed Western Reserves Development Option; including the proposed Brennans Creek Coal Wash Emplacement Area. The site could not be located during the Dendrobium Coal Project Assessment (Navin Officer 2000).

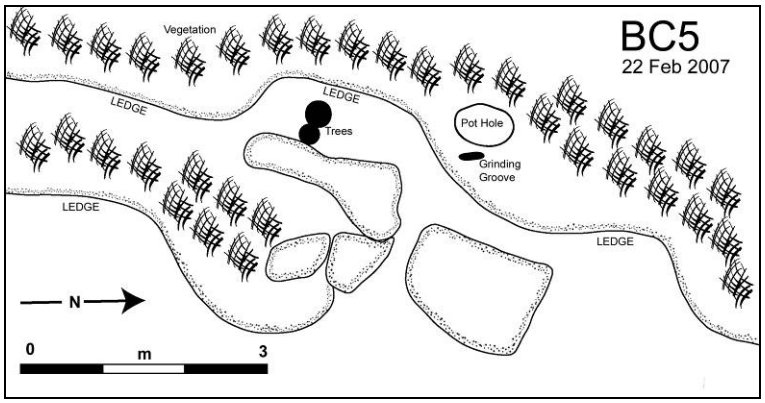
This site is a single axe grinding groove situated on the edge of a sandstone outcrop that has some shallow groundwater inflow from the surrounding landscape, on the southern side of Brennans Creek. The sandstone outcrop is approximately 4.0 x 2.5+ m in size, as much of it was obscured by moist vegetation (Plan 2; Plate 5). No cracking or bedding planes are evident on the open sandstone platform near the axe grinding groove.

The grinding groove is situated on the edge of the sandstone platform drop off and adjacent to a small pothole. The single grinding groove is 28 cm in length and 7 cm wide (Plate 6). At the time of the current survey, recent rain meant water was seeping from the adjacent vegetation across the site. The bottom edge of the vegetation is clearly defined by a significant sandstone platform that eventually turns into a cliff line to the north-west. Water was trickling off the edge of the entire length of this platform into nearby Brennans Creek.

Plate 5: Grinding groove situated on the edge of sandstone platform, on edge of hanging swamp

Plate 6: Single grinding groove located on edge of sandstone platform, between medium pot hole and drop off

The site was extremely difficult to relocate due to more recent sediment deposition and vegetation growth. Most of the pot hole has been filled with sandy sediment and low vegetation. It is likely that other such grooves might be situated across the platform that has since been obscured by vegetation growth. Although vegetation growth now obscures the site, the axe grinding groove itself is still good condition.



Plan 2: Axe grinding groove site 52-2-1371, situated at the southern end of the coal wash emplacement area, facing north-west along length of shelter

This recent plan of the site shows the vegetation and the grinding groove situated on the very edge of the sandstone platform drop off (Plan 2). The vegetation was not as close to the edge of the sandstone platform when the site was originally recorded.

Brennans Creek 6

The site was originally recorded by Caryll Sefton in 1989 during an archaeological survey of the proposed Western Reserves Development Option; including the proposed Brennans Creek Coal Wash Emplacement Area. The site was re-recorded during Dendrobium Coal Project Assessment (Navin Officer 2000). The original plans and profile of the shelter are accurate, and are shown in Plan 3 below.

This site is a shelter with art, situated on the mid slope ridgeline, on the south-western side of Brennans Creek. This section of the continuous cliff line that contains the art is approximately 17.5 x 2.5 x 1.6 m in size (Plate 7). The shelter faces north-east across the creek line. The sandstone shelter has horizontal bedding plane where the roof meets the top of the back wall, and along the base of the back wall where weathering process are still active. The low block fall formed sandstone cliff line however is considered to be stable.

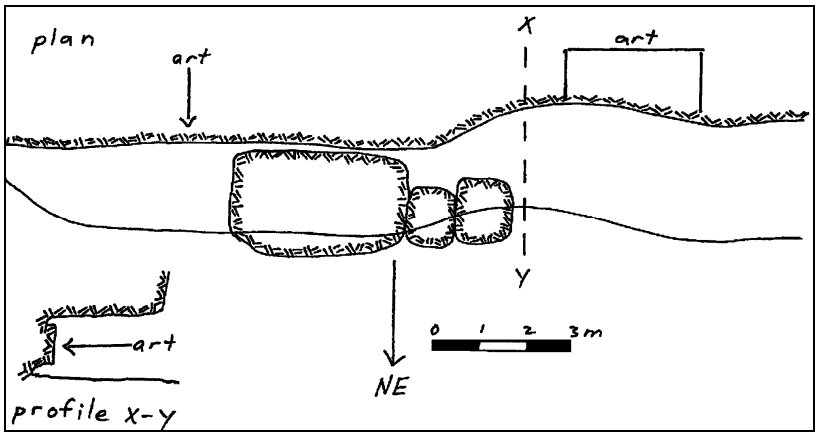
The recorded art comprises charcoal outline and infill motifs that originally included 9 charcoal outline and indeterminate motifs, and 3 charcoal outline and infill kangaroos (see Plate 8). Two additional partial macropods were identified on a small panel that were not originally noted. All of these charcoal motifs were re-assessed during the recent survey and are considered to be in fair to poor condition and unchanged since their original recording.

The floor of the shelter comprises orange sandy loam that is approximately 30-40 cm deep. At the time of the original site recording, one dark grey silcrete flake was recorded in the drip line; however during the recent survey only one complete quartz flake was located (Plan 3). It is highly likely that the deposit (PAD) within this shelter will contain further cultural material. The liveable area is estimated to be 18 m^2 area.

Plate 7: Shelter with art and deposit site BC6 situated at the southern end of the coal wash emplacement area, facing north-west along length of shelter

Plate 8: One of the art panels located at BC6 comprising one of the charcoal infill kangaroo motifs

During the current survey, the overall conditions in the shelter were noted to in fair to poor condition. The surface of the art panels exhibit significant surface water seepage, micro-organism growth and mineralisation. The roof of the shelter is entirely covered in micro-organism growth and mineralisation, aided by the significant water seepage. Ferns and other vegetation are growing along the base of section of the back wall, flourishing from continual water seepage.



Plan 3: Original floor plan and cross-section of shelter with art site, Brennans Creek 6 (Sefton 1989)

Overall the art is in moderate to poo condition while the archaeological deposit is considered to be undisturbed.

Brennans Creek 7

The site was originally recorded by Caryll Sefton in 1989 during an archaeological survey of the proposed Western Reserves Development Option; including the proposed Brennans Creek Coal Wash Emplacement Area. The site was re-recorded during Dendrobium Coal Project

Assessment (Navin Officer 2000). The original plans and profile of the shelter are accurate, and are shown in Plan 4 below.

This shelter with art is situated on a large sandstone overhang, located on the south-eastern face of a prominent spur, at a major bend on Brennans Creek. The floor of the shelter ends abruptly with a steep 7 m drop off that ends at the creek bed below. This sandstone overhang is approximately 17.0 x 8.2 x 2.3 m in size, with a large, open, flat sandstone surface (Plate 9). The shelter overlooks the creek line to the south-east, with a vantage over a long stretch of the creek line and valley. The overhang contains two main horizontal bedding planes where the roof meets the back wall and where the back wall meets the sandstone shelter floor.

The art recorded in the shelter comprises charcoal outline and infill motifs, including one infill frontal human figure, one charcoal outline, one infill kangaroo and one charcoal outline and infill indeterminate (Plate 10). The yellow arrows in Plate 10 below indicate the location of the charcoal motifs, while the red arrows indicate European graffiti.

Although no deposit was originally recorded, a single stone artefact was identified during the present survey. It is a broken flake manufactured from a fine grained volcanic material. The deposit on the shelter floor comprised medium yellow brown loose sand, which is unlikely to contain well preserved archaeological deposits as it is almost non-existent across much of the shelter. Any cultural material present is likely to visible on the open sandstone floor (Plan 4).

Plate 9: Shelter with art site BC7 situated at very northern end of the coal wash emplacement area

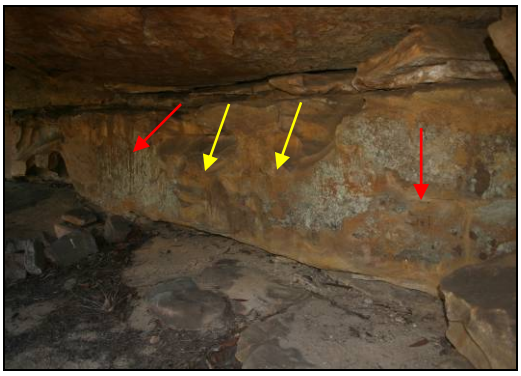


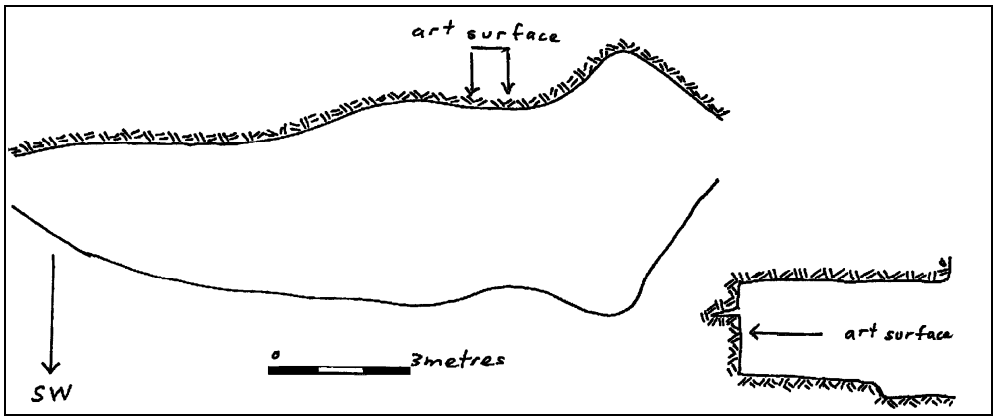
Plate 10: Arrows indicate location of charcoal motifs (yellow) and graffiti (red) on main art panel at shelter with art site BC7

Other art work at the site is considered to be graffiti as it overlies a weathered section of the shelter wall and green mould/lichen (Sefton 1998). These comprise one red human foot and two red ochre adult hand stencils (Plate 11). There are also a small number of charcoal images that appear to be historic, including the numbers and lettering ‘S.I’ or ‘S.T’. Other evidence that the shelter site was used by Europeans include a large circular ‘fireplace’, glass and ceramic fragments on the floor of the shelter and a steel axe head situated on a sandstone shelf at the back of the shelter (Plate 12).

Plate 11: Red ochre hand stencil that appears to be on top of green lichen that covers much of this section of the shelter wall surface

Plate 12: Historic fire place located on the floor of the shelter, surrounded by various fragments of glass and ceramic

The positioning of this shelter captures views east along Brennans Creek, gives it a strong sense of place. At the time of the survey, the shelter was dry, which can be attributed to the position of the shelter on the upper ridge line. However, two large sections of green lichen on the wall of the shelter indicate that conditions in the shelter were damp for this to occur. It is highly likely that additional art is present below these areas of growth (Plate 10).



Plan 4: Original floor plan and cross-section of shelter with art site, Brennans Creek 7 (Sefton 1989)

The sandstone overhang and conditions within the shelter are considered to be stable and the art appears to be unchanged from when it was originally recorded.

Dendrobium 11

This site was originally identified during the survey for the Dendrobium Coal Project in 2000 by Navin Officer.

This shelter with deposit is situated on the bottom sandstone outcrop opposite a prominent bend in Brennans Creek that directly overlooks the creek line to the south. The site measures

26 m long x 6.2 m high x 7.5 m wide (Plate 13). The walls of the sandstone overhang are significantly weathered and have been subject to continuous water seepage and mineralisation. No cracking was noted; however two major horizontal bedding planes run the entire length of the shelter. Significant seepage and weathering has occurred across much of the shelter walls.

No Aboriginal art could be identified on the walls of the shelter. However, the graffiti previously identified was re-recorded, consisting of an 'F' and an 'S' and the date '1954' drawn in charcoal on the wall at the eastern end of the shelter (Plate 14).

Plate 13: Significant sandstone overhang at Dendrobium 11

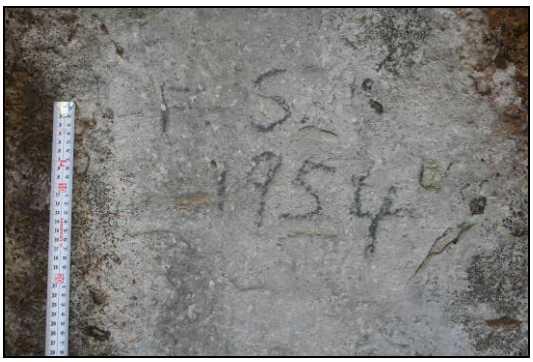


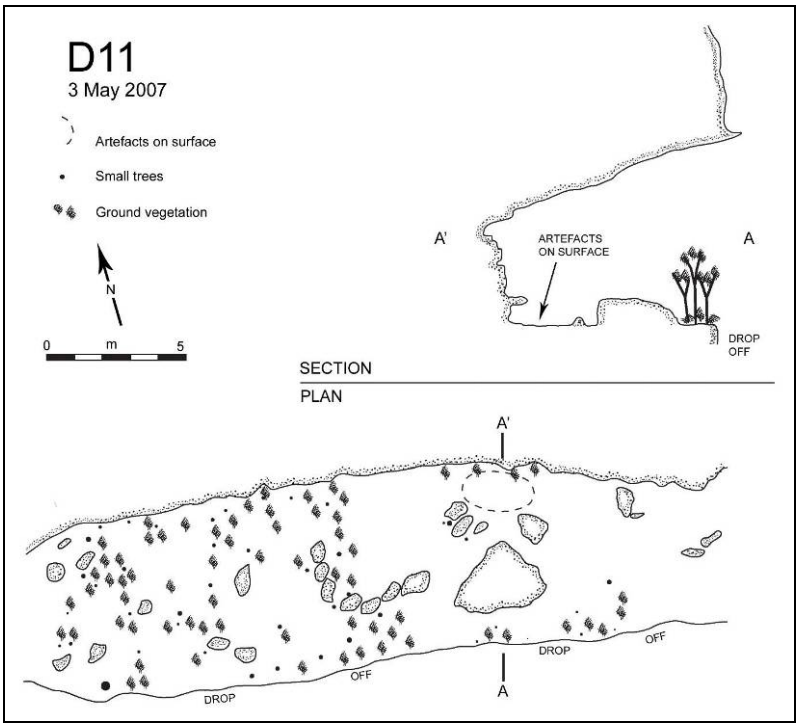
Plate 14: European graffiti situated at the eastern end of the shelter wall

The floor of the shelter consists of medium yellow grey brown loamy sand that varies in depth between 10 and 20 centimetres across the living floor (Plate 16). A number of stone artefacts were relocated on the floor of the shelter within the identified living area in the centre of the overhang (Plate 17; Plan 5). The living floor in the shelter is significant, comprises a 40 m^2 area. The stone artefacts were manufactured from chalcedony, chert and quartz and comprised cores, flakes, broken flakes and one broken tool. Some artefacts originally recorded were not relocated, although a number of other pieces were recorded. It is highly likely that the deposit (PAD) within this shelter will contain further cultural material.

Plate 15: Large open floor/living area located at the eastern and central sections of the shelter

Plate 16: Number of stone artefacts identified across living floor at Dendrobium 11

The shelter is relatively dry although evidence on the wall of the shelter indicates seepage on some wall panels. Thick vegetation occurs at the western end of the shelter and a number of trees are located on the outer edge of the shelter. No cracking was noted; however two major horizontal bedding planes run the entire length of the shelter. Significant lichen growth and weathering has occurred across the shelter walls.



Plan 5: Revised plan and section of Dendrobium 11, showing location of stone artefacts

The deposit within the shelter remains undisturbed and appears to be in the same condition as it was when originally recorded.

7.2.3.2 Newly Recorded Aboriginal Archaeological Sites

West Cliff 1

This new shelter with art and deposit is situated on the south-western bank of the existing Brennans Creek Dam. The area would once have been the mid cliff line and overlooked the original Brennans Creek to the west. The sandstone overhang is quite large and low and measures 16 x 4 x 1-1.5 m (Plan 6). The roof of the shelter is only 1 m high, except for its very south-eastern end where the shelter opens to a height of 1.8 m (Plate 17). Two major horizontal planes occur at the back of the shelter where the floor meets the wall, and where the roof meets the wall. It is evident that some collapse has already occurred at the back of the shelter, with small sections of sandstone now lying on the floor (see Plate 19).

The art within the shelter comprises 3 indeterminate charcoal outline motifs (Plate 18). These charcoal motifs have been obscured by a thin layer of dust that has been deposited as a result of the extensive animal movement in the shelter. The motifs are so poorly preserved that the motif images are indistinguishable.

Plate 17: Shelter with art site West Cliff 1, situated at near the existing dirty water dam

Plate 18: One of the poorly preserved charcoal motif site West Cliff 1

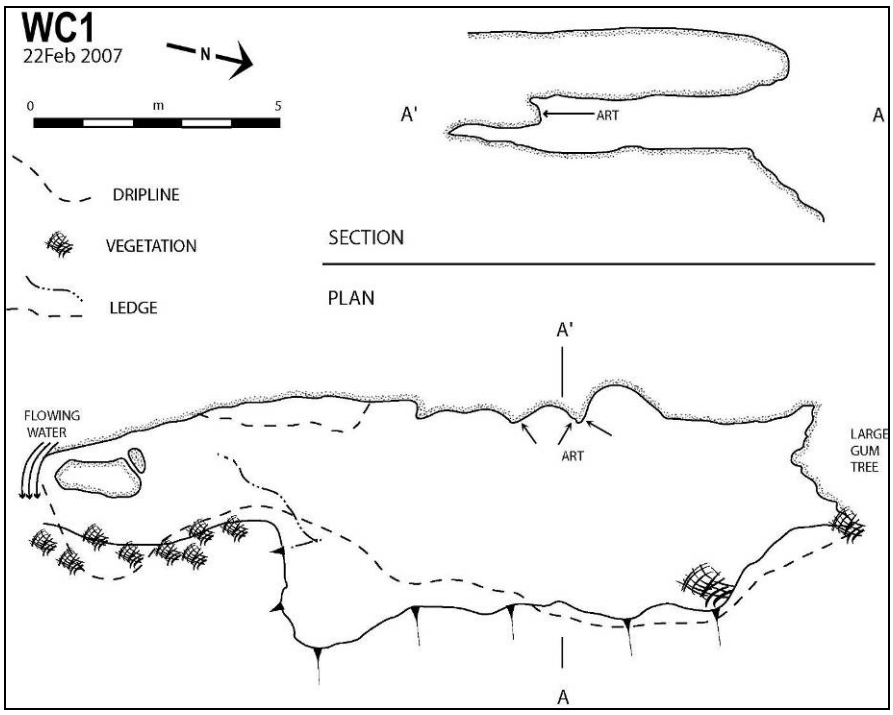
In the low section of the shelter, very dark grey brown powdery silt occurs to a depth of approximately 15 cm (Plate 19). The surface of this deposit is very loose and partially disturbed from animal movement, and it is unlikely to contain well preserved archaeological deposits. The open, southern section of the shelter consists of yellow sand with a depth of 10 cm. A number of stone artefacts of varying raw materials were identified in the dark grey brown silt on the floor of the shelter (Plate 20). Artefact types included broken and complete flakes, one broken tool and a flake from what was once an axe. It is highly likely that the deposit (PAD) within this shelter will contain further cultural material. Despite the low roof level, the liveable area is estimated to cover a 42 m^2 area.

Plate 19: Dark grey black sand deposit situated across low section of shelter, facing south-west

Plate 20: Stone artefacts identified in the dark grey black sand deposit on the floor of the shelter

The floor plan and profile of the shelter are shown in Plan 6 below. The drip line of the shelter is situated underneath the lip of the overhang, due primarily to the slow flow of water that runs down from the swamp and over the lip of the shelter. If water flows are increased, the

actual lip of the overhang would have also created a second drip line. During the assessment, recent rain had caused water seepage at the very northern and southern ends of the shelter. No seepage was occurring in the centre of the overhang where the art is situated.



Plan 6: Floor plan and cross-section of shelter with art site, West Cliff 1

Overall, the sandstone overhang is stable despite the evidence of collapse and the size of the roof. The charcoal art is considered to be in a poor state of preservation, and despite some surface disturbance, the majority of the deposit within the shelter is considered to be in good condition with significant research potential.

West Cliff 2

This shelter with art and potential archaeological deposit is situated on a small drainage line, beneath the existing overhead power lines. It is located beneath a large sandstone platform at the head of the drainage, at the bottom edge of a small swamp. Water flow and weathering has created an overhang on this platform, and following recent rains, a significant amount of water flows over the lip into the drainage (Plate 23). The overhang is long and narrow, measuring 24 x 1.5-2 x 3 m. The height and depth of the shelter are similar along its narrow length (Plan 7). From Brennans Creek the shelter cannot be seen; however the shelter is clearly visible from the creek valley along the drainage. A number of horizontal bedding planes occur along the length of this shelter, along with extensive exfoliation of very large sections of the shelter surface. No vertical weaknesses were noted.

The art within the shelter comprises 3 art panels; Panel A contains one partial charcoal fish infill motif (Plate 21), and 3-4 indeterminate charcoal outline motifs (Plate 22). Panel B contains 2 indeterminate charcoal motifs, and Panel C contains a charcoal outline and infill kangaroo. The charcoal motifs on Panel A are deteriorated, from both water seepage and high levels of mineralisation and micro-organism growth. All motifs except the partial fish and partial kangaroo were indistinguishable. The sections of motifs that are preserved contain a silica skin and have not been subject to continuous water seepage.

Plate 21: Partially preserved charcoal motif of a fish at newly recorded on Panel A at site West Cliff 2

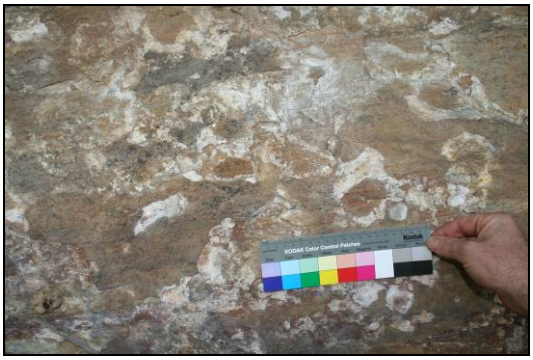


Plate 22: Poorly preserved charcoal indeterminate motifs on Panel A from mineralisation seepage

Along its central and north-western sections the shelter contains undisturbed, medium yellow grey sandy deposit, estimated to be between 5-15 cm deep (Plate 24). No cultural material could be identified on the floor of the shelter; however the deposits are relatively undisturbed and may contain buried archaeological material (PAD). The weathering process on sandstone outcrop has created a narrow, continuous liveable area, approximately 17 m^2.

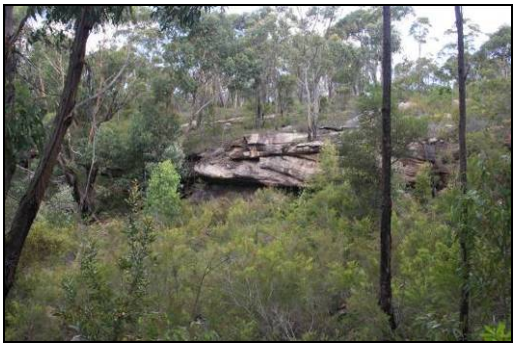
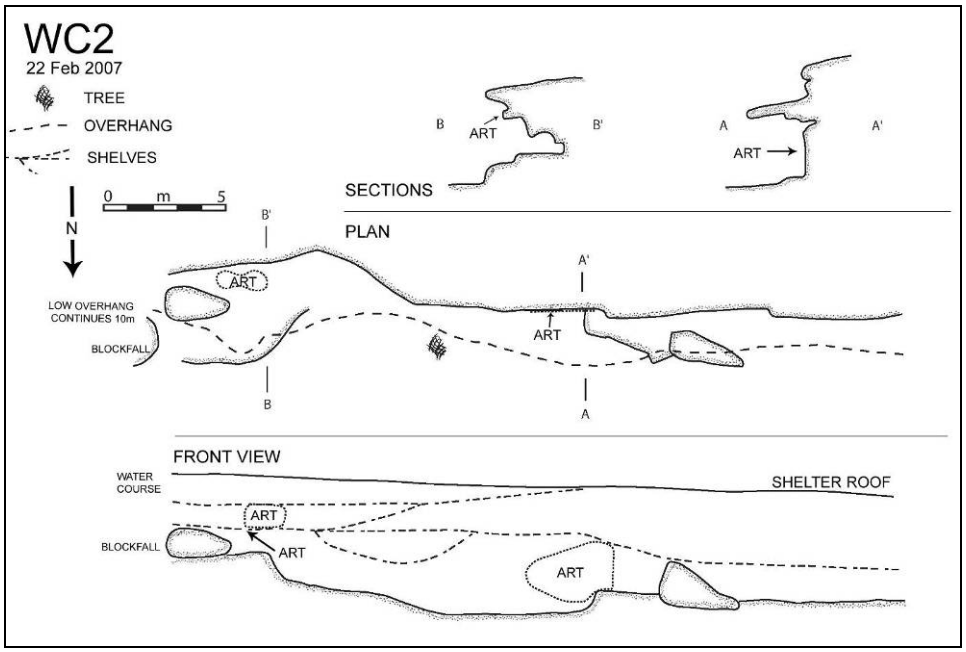


Plate 23: Shelter with art site West Cliff 2, situated on a small drainage line beneath the power line

Plate 24: Medium yellow sand across the long, narrow living floor area at WC 1

During the assessment, recent rain had caused water seepage over the south eastern section of the shelter. No seepage was occurring in the centre of the overhang where the art is situated; however, it was evident that previous water seepage has occurred through the horizontal bedding planes situated above Panel A. No seepage had impacted Panel B or C. Some small

areas of cavernous weathering were noted across Panel C, while Panel B contained some micro-organism growth from exposure.



Plan 7: Floor plan and cross-section of shelter with art site, West Cliff 2

Overall, the condition of the overhang is stable. Despite some sections of the art are in good condition, water seepage, exfoliation and mineralisation has significantly impacted on other sections of the art Panels.

West Cliff 4

This shelter with art is situated on the upper ledge of a large scarp on the second to bottom sandstone cliff line above Brennans Creek. The site is difficult to access from the creek valley due to the steep slope but is easily accessible from above. The shelter has been formed by blockfall and subsequent weathering. A number of horizontal and vertical bedding planes around all of the art panels, with a significant bedding plane occurring where the roof meets the top of the back wall. The small shelter measures 6 x 3.7 x 1.3 m (Plate 25). It is quite low and difficult to move around in as the front of the shelter is situated on the edge of a significant drop-off (Plan 8). This prominent setting provides a clear vista east and west along Brennans Creek.

The floor of the shelter does not contain any deposit, consisting of relatively flat, open sandstone. If any cultural material was present it would have been clearly visible.

The shelter contains at least 5 separate art panels, including one on the roof of the shelter, and four on the back wall that contain a number of indeterminate outline and infill charcoal motifs (Plate 26).

Plate 25: Small overhang of WC 4 on upper ledge of second cliff line

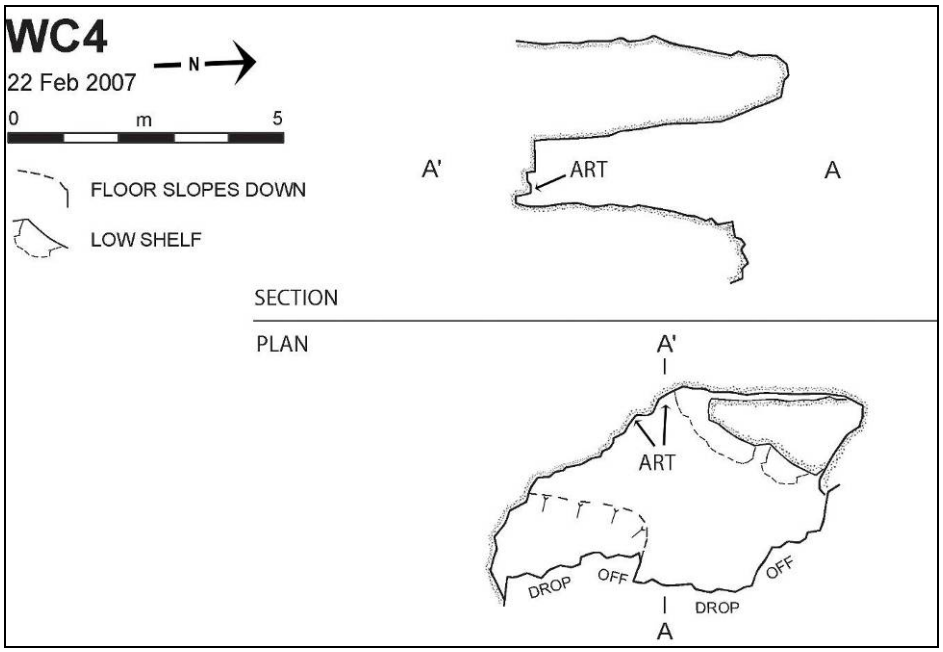
Plate 26: Original indigenous charcoal motifs located on back wall of shelter

However, it also contains the remains of recent historical use, evidenced by camp fire remains and extensive graffiti on the art panels (Plate 27 and Plate 28). Of the 6-7 indeterminate charcoal motifs, only two appear to be non-historic motifs.

Plate 27: Evidence of historical use of the shelter – cut timber and former fire place on floor of shelter

Plate 28: White painted historical graffiti situated across back walls of shelter over charcoal motifs

Three of the four Panels situated on the back wall contain charcoal motifs obscured by graffiti, consisting of white painted lettering. Apart from this historical graffiti, the walls of the shelter are unaffected by micro-organisms, water seepage or exfoliation. The floor of the shelter is bare rock, with loose leaves and silt in some places, there is no potential for archaeological deposit. No seepage occurs across the back wall, although it is likely during heavy rainfall that it runs into the shelter and across the floor from the north-western end at the access point. The roof of the shelter contains water staining and micro-organism growth from gradual water seepage.



Plan 8: Floor plan and cross-section of shelter with art site, West Cliff 4

The floor plan and profile of the shelter are shown in the Plan 8 above. The small weathered sandstone shelter is in good condition, exhibiting no seepage or detrimental weathering; although a small section of cavernous weathering was evident in the north-west corner of shelter.

West Cliff 5

This small open artefact scatter site was identified on the access track beneath the 66KV transmission line that runs east-west across West Cliff Colliery (Plate 29). At this point, the access track is situated on the upper slopes of the plateau, with large open sections of sandstone exposed to the north and south of the track. The artefacts were sitting on the surface of coarse sandy gravel (Plate 30).

Plate 29: Location of West Cliff 5, in middle of access track beneath transmission line, facing west

Plate 30: Area of exposure on track where stone artefact were exposed from recent rainfall wash

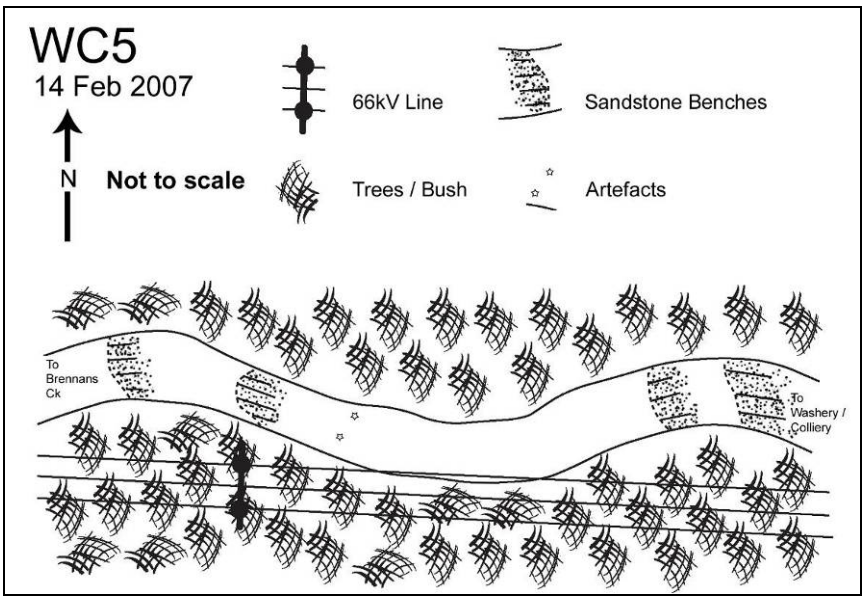
The track is well used, providing excellent visibility, which was also increased by run off from the adjacent sandstone platforms and down the slope of the track during the survey.

The site comprised two stone artefacts including one banded silcrete flake with edge damage measuring 36 x 18 x 12 mm, and one brown silcrete broken flake measuring 26 x 17 x 8 mm (Plate 31 and Plate 32).

Plate 31: Two silcrete artefacts identified at West Cliff 5

Plate 32: The banded silcrete artefact exhibits edge damage

No further cultural material could be identified, however it is possible that further material might occur, particularly in association with the adjacent open sandstone platforms, as it is most likely that material has been washed down onto the access track (Plan 9).



Plan 9: Plan showing access track beneath transmission line where site was located

The well used, recently washed access track provided high ground surface visibility, increasing the likelihood of identifying a stone artefact site.

Dendrobium 10

This shelter was originally recorded as having potential archaeological deposit (PAD) by Navin Officer (2000). During the current assessment, a single stone artefact was identified as a result of recent water flow across the surface of the shelter floor. The shelter is situated on the mid slope on the western side of Brennans Creek, overlooking a small drainage line to the south (Plate 33). The sandstone overhang is relatively small and quite low, measuring 10.5 x 2.6 x 1.0 m in size. The overhang is located on a small discontinuous sandstone outcrop that has been formed by blockfall and weathering (Plate 34). Apart from the horizontal bedding where the roof meets the top of the back wall, no other bedding planes or weaknesses were identified within the shelter.

Plate 33: Small sandstone outcrop with Dendrobium 10 shelter from front, facing north-west

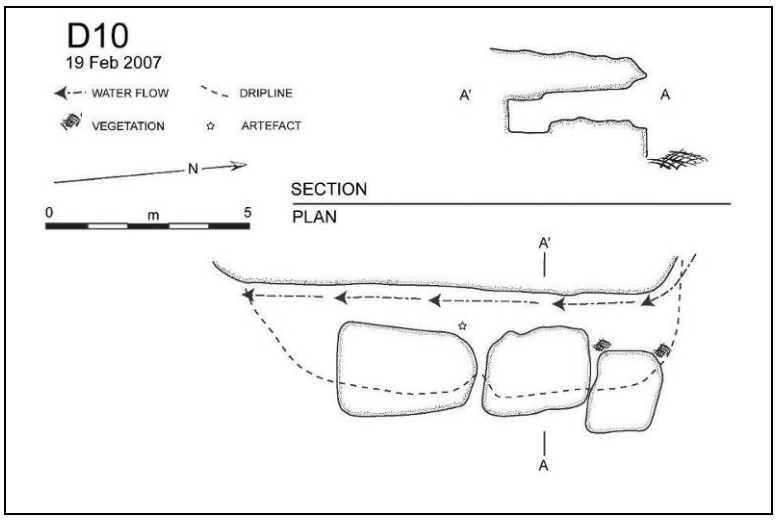
Plate 34: East end of sandstone outcrop showing the low narrow nature of the shelter, facing west

The floor of the shelter consists of grey loamy sand that is no deeper than 10 cm (Plate 35). The deposit has been trapped and formed by three large sections of sandstone blockfall, creating a small narrow living floor of only 5 m^2. Recent rain has washed the surface of floor of the shelter exposing a single quartzite flake (Plate 36).

Plate 35: Sandy floor of shelter at western end, facing east

Plate 36: Single quartzite artefact situated on recently washed floor of shelter

The back wall of the shelter has been heavily affected by lichen and micro-organism growth, and appears to have been subject to significant water seepage through the horizontal bedding plane at some stage.



Plan 10: Floor plan and cross-section of shelter with deposit site, Dendrobium 10

Although the shelter is low and narrow, it is likely to contain further archaeological deposit, particularly at the western end where the space is enlarged (Plan 10). The site will be changed from a PAD and formally recorded as a shelter with deposit.

Potential Archaeological Deposit (PAD) sites

Two previously identified shelters containing Potential Archaeological Deposit have been recorded within the proposed Area 3 emplacement and wider West Cliff Colliery. One new PAD was also identified during the current survey (see Figure 6).

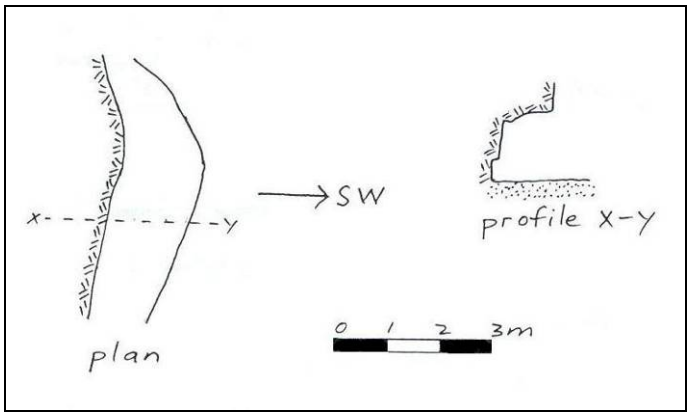
7.2.3.3 Previously Recorded Shelters with Potential Archaeological Deposit (PAD)

PAD 4

This site comprises a small sandstone overhang on a discontinuous sandstone outcrop, on the steep mid slope of the creek valley, 60 m north-east of the original Brennans Creek line. The creek line has been diverted to accommodate the Stage 2 Emplacement Area. The shelter has a south-westerly aspect and measures approximately 5.7 x 1.5 x 1.4 m high (Plate 37; Plan 11). The small shelter has been formed by blockfall and cavernous weathering, which can be clearly seen by the fresh sandstone surfaces in Plate 37 below.

Plate 37: PAD 4 sandstone overhang on small discontinuous outcrop

The floor of the shelter consists of shallow grey loamy sand that is estimated to be 10-15 cm deep. The living space within the shelter is limited to a small 9 m^2 area and no archaeological material could be identified during the assessment. The outcrop is also well exposed to the elements. It is therefore considered, on the basis of re-appraisal, that this site has a low likelihood of containing archaeological deposits.



Plan 11: Original floor plan and cross-section of shelter with PAD 4 (Sefton 1989)

PAD 5

This previously identified shelter with PAD comprises a high, open sandstone shelter, situated on the discontinuous sandstone outcrop, on the second cliff line from the creek valley. The shelter is located on the eastern side of Brennans Creek and has a westerly aspect across the creek valley (Plate 38). The shelter has been formed by blockfall and subsequent weathering. The shelter is quite large and measures approximately 11.5 x 2.5 x 4.3 m (Plan 12).

The living floor is small and limited to the north-west end that would be 3 m^2 area due to significant blockfall (Plate 39). The deposit consists of medium yellow brown sand to a depth of between 15-20 centimetres. No cultural material could be identified in the drip line.

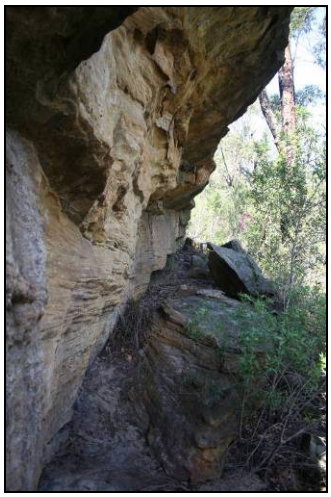
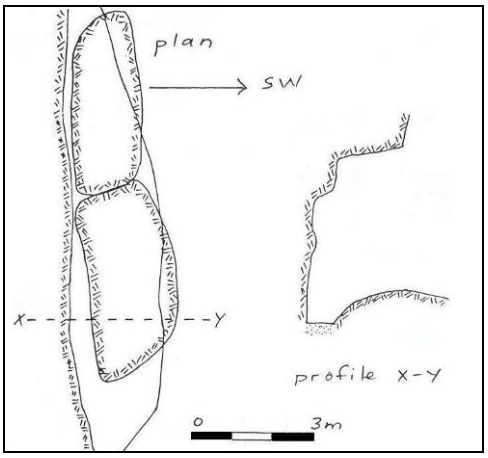


Plate 38: Limited living floor within large sandstone overhang at PAD 5 site

Plate 39: Limited living floor within large sandstone overhang at PAD 5 site

Some water seepage was evident at either end of the shelter. No major bedding planes or cracks we identified, although the upper walls of the shelter are subject to continual cavernous weathering, directly impacting on the potential for art (Plate 38). This shelter with PAD remains in the same condition as when it was originally recorded.



Plan 12: Original floor plan and cross-section of PAD 5 (Sefton 1989)

7.2.3.4 Newly Recorded Shelters with Potential Archaeological Deposit (PAD)

West Cliff 3

This site is a potential archaeological deposit, or PAD. It is located on a small drainage line below a large open swamp. This drainage line is the first break in the steep sheer cliffs along

this stretch of Brennans Creek, at which point the creek valley is accessible. The sandstone shelter is quite large, measuring 12 x 2.8 x 3.2 m (Plate 40). The shelter has a large potential useable floor area, and an intact yellow brown sandy deposit (Plate 41).

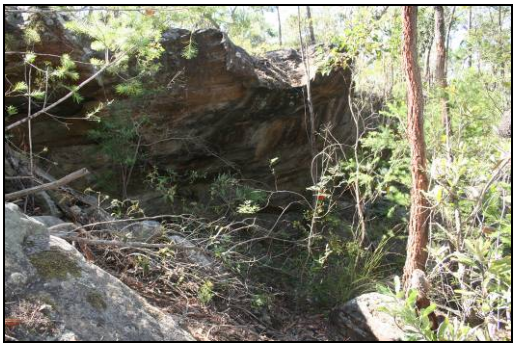
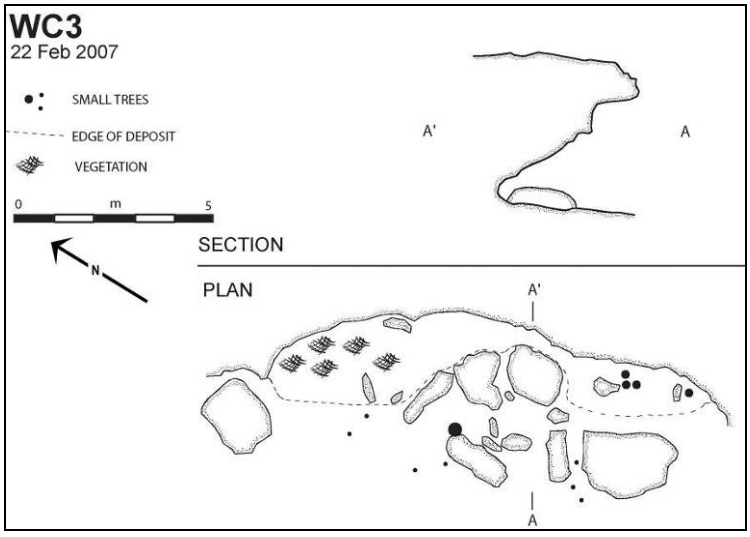


Plate 40: Shelter with PAD at top of drainage line, facing east

Plate 41: Area containing potential archaeological deposit (PAD)

At the time of the survey shelter conditions were dry, however water was seeping over the north western lip due to recent rainfall. Evidence of this was clearly visible at the western end, by significant water staining and associated micro-organism growth across the surface of the sandstone. In the centre of the shelter, significant lichen growth was present obscuring the sandstone surface, resulting in the unlikelihood of art being present.



Plan 13: Floor plan and cross-section of shelter with PAD site, West Cliff 3

Some minor blockfall has occurred in front of the shelter although not recently (Plan 13). A small number of horizontal bedding planes occur at this site, as well as large areas that have been affected by cavernous weathering. The shelter appears to be stable however.

7.2.4 Historical Sites

Europeans pushed into the Appin area in the early 19th Century; however the West Cliff study area was not occupied or developed until the construction of the pit top mine infrastructure and coal wash emplacement area of the West Cliff Colliery in the early 1970s. Generally the use of the West Cliff area prior to, and in some respects continuing concurrently with, the mining appears to have been recreational and vocational transient use, probably by the Appin community. The lease area to the south-west of Brennans Creek contains an incoherent assemblage of rubbish, indicative of the area being used as a convenient and discrete locality to dump domestic rubbish, including car bodies. This activity probably dates to the mid-20th Century. The area has also been subject to some minerals exploration activities, evidenced by cleared seismic lines and drill sites (c1970 and after). Like all the other drainage lines in the Appin area there are signs of further ephemeral occupation in the form of graffiti and recent camp fires in some sandstone shelters.

Within this assemblage of sparse artefacts two distinct sites were identified during the survey, and these are described in detail below.

SITE NUMBER	*SITE NAME*	*SITE TYPE*	*PREVIOUSLY / NEWLY RECORDED*
N/A	West Cliff Historic Site 1	Structure - wall	Newly Recorded
N/A	West Cliff Historic Site 2	Occupation site	Newly Recorded

Table 10: Historical features within the West Cliff Colliery study area

West Cliff Historical Site 1

Retaining wall track feature

This item is a pathway, or track (part of which forms a retaining wall), that runs from just below the top of the plateau, down a talus slope to Brennans Creek. Near the top of the plateau the track is situated on gently sloping ground. Here the form of the track is of a 1.0 – 1.5 m wide pathway, with a single row of sandstone cobbles on either side used to form the edges of the pathway. The sandstone cobbles appear to have been collected from the immediate area where weathered cobbles are frequent on the ground surface. The pathway, whilst easily recognisable is discontinuous, presumably as a result of differential preservation. The pathway continues in this manner and narrows to skirt the edge of a large scarp and overhang above a steep talus slope, where the form of the track changes to be a discontinuous retaining wall that wends it way down the slope to Brennans Creek (Plate 42 and Plate 43).

Plate 42: Sandstone retaining wall / track skirting the large scarp above talus slope

Plate 43: Sandstone retaining wall and track

On the talus slope the track appears to be opportunistically located, taking advantage of large boulders or flatter areas of slope in some places.

The other feature of the tracks construction is the retaining wall built of unmodified sandstone cobbles and boulders from the talus; it does not contain any other fabric.

A sparse collection of artefacts was also present in the vicinity of the sandstone retaining wall-track site. The artefacts included broken transparent glass (AGM 1934-1948; Cottee's transfer logo), unidentified metal/tin objects, a chair or wheelchair frame, and a large coil spring like that from a car. Nearby to the track, situated in the scarp that the track runs above and skirts around, was a shelter that contained Aboriginal charcoal art, as well as white paint and charcoal graffiti, the remains of a camp fire and sawn wooden beams for hanging pots or kettles over the fire.

The sandstone retaining wall track appears to be associated with the ephemeral occupation of the Brennans Creek area discussed above. Aside from being a track built to help access Brennans Creek, there is no information regarding the tracks' date of or purpose of construction. The feature itself cannot be dated, however artefacts associated with the track date to the mid-20th Century, as does nearby graffiti. When considered with other historical evidence, such as the Depression, and known occupation of the area after the Second World War, it seems likely that the feature dates to a similar time.

West Cliff Historical Site 2

Transient occupation / work site

This site is located on the southern side of Brennans Creek, on the plateau, immediately next to one of the artificial drainage lines that have been excavated around Emplacement Area Stages 1 and 2. The site consists of a clear area of 10 x 10 m. Within this clearing are several corrugated iron sheets and corrugated fibro sheets; a tin wash bowl / basin; a tin milk can; broken brown bottle glass from circular based (beer?)(AGM 1953), and square based (sauce?) bottles; also present were unidentifiable rusted metal objects (Plate 44).

Plate 44: West Cliff Historical Site 2

This site includes minimal vegetation clearing and artefacts that date to the mid-20th Century. When considered with other historical evidence, such as the Depression, and known occupation of the area after the Second World War, it seems likely that the feature dates to a similar time, and represents a short term occupation, either residential 'humpy' style occupation or a camp site for workers (charcoal makers or timber cutters).

7.3 Discussion

7.3.1 Aboriginal cultural heritage sites and PADs

Regional Trends

The study area is situated on the central Woronora Plateau, dominated by Hawkesbury Sandstone. Formation processes in this environment, such as block fall and cavernous weathering, create ledges and overhangs along the cliff lines, like those found throughout the study area. Other formations include open areas of flat, sandstone outcrops, primarily adjacent to water lines and swamps. These features of the Hawkesbury Sandstone exhibit evidence of habitation, art, and functional use by the Aboriginal groups that once inhabited the area. Within sandstone overhangs such occupation is evident from archaeological deposit recorded and excavated over the past 40 years by archaeologists. Deep deposits are limited due to the nature and formation of soils associated with the Hawkesbury Sandstone.

The study area would have provided a range of natural resources for the local Aboriginal inhabitants to exploit. Ethnographic information regarding the study area indicates that these inhabitants belonged to the *Tharawal* speaking people. Within this group a number of sub-groups, or clans, would have existed, and inhabited various areas within the language groups' boundary. The division of these 'clans' within the region is said to have followed natural boundaries, such as the Illawarra escarpment, dividing those that inhabited the coast from those that inhabited the hinterland.

Previous archaeological work and the analysis of Aboriginal sites throughout the wider Sydney Basin region demonstrate this division. The limited archaeological excavation in the

hinterland region close to the study area revealed occupation of sandstone shelters (Mill Creek 11) up to 2,500 years ago (Koettig 1985). Occupation sites further north have yielded dates older than this, of up to 5,000 bp (McDonald 1994). This type of extended occupation or shelter use within the study area is limited due to the size of shelters and nature of shallow deposits situated within most sites. However, preliminary monitoring works at similar archaeological sites, such as 'Whale Cave', have indicated a depth of up to 90cm that might potentially contain dateable deposits.

The analysis undertaken by Sefton has indicated a pattern between shelters, shelter attributes and drainage basins (1998). Such patterns can be on a regional or localised scale (Officer 1984; McDonald 1994). Based on these findings, it was likely that shelter sites with art and/or deposit and grinding grooves would to be present. The shelter sites would exhibit a high percentage of charcoal motifs comprising primarily terrestrial animals and human motifs.

Survey Methodology

Based on all previous archaeological work on a regional and localised level, the survey methodology devised for the current study involved targeted sample survey to capture site types such as stone artefacts scatters and open campsites. The identification of these sites has been somewhat neglected due to previous survey techniques, with a focus on surveying sandstone overhangs. However, the overall lack of ground surface visibility within the Hawkesbury Sandstone environment can also be attributed to the lack of stone artefact/open camps sites.

The survey results of these areas of high ground surface visibility yielded one stone artefact scatter site on the top of a ridge line. The more systematic block survey focussed on inspecting all suitable sandstone overhangs and rock platforms within Brennans Creek valley. This survey did not just focus on the obvious contour features but attempted to intensively survey all features of sandstone outcrops, ridgelines and platforms within the block survey area. In total, 9 Aboriginal sites have been recorded within the creek valley, 4 of which were identified during the current survey.

The findings of both survey techniques are reflective of the predicative modelling. The survey findings also maintain that if other areas exhibited higher ground surface visibility it is highly likely that further stone artefacts scatters or camp sites would have been present, although probably in low numbers and with restricted contents. As the sample survey technique covered all areas of ground surface visibility, it is unlikely that any other survey techniques could have been employed to further identify such sites within the study area. The same can be said for identifying further axe grinding groove sites. Thick vegetation obscured a number of rock platforms along the lower creek valley; however it is unlikely that other survey techniques could have been adopted to identify these sites, assuming they do exist.

Archaeological Sites

In total, the West Cliff Colliery study area around Brennans Creek contains 10 archaeological sites and 3 sandstone shelters with PAD (potential archaeological deposit). Four archaeological sites and one PAD were identified during the current study. I

Overall the sites recorded within the study area exhibit a high percentage of charcoal infill and outline motifs, with a smaller percentage of red ochre hand stencils. This ratio of technique and motif type is typical within this region, further highlighting localised patterns, and wider patterns following catchment areas as boundaries between clans of the *Tharawal*. The range of site types, and the observation that the valley would have contained a range of traditional resources, shows that the *Tharawal* people used the Brennans Creek valley for a range of activities. This includes utilitarian activities such as stone axe maintenance and stone artefact discard, the latter being a by-product of day to day activities, rather than an activity specific to the locality. By inference we can also suggest that at least some resource gathering would also have taken place in the Brennans Creek valley. In addition to this people occupied the sandstone shelters and overhangs in the valley, although the antiquity, continuity, frequency and duration of these occupations are not known. In part this is due to a lack of previous excavation work here, and in part also due to poor sediment accumulation and preservat6ion in the shelters. As well as camping or generally utilising the shelters the Tharawal people also used the shelters to express themselves through art. Art can have both a utilitarian (for example marking a boundary) and cosmological or religious purpose. Unfortunately we do not know the purpose or meanings of art in the region, however the motifs at West Cliff present a small sample that is typical of the region.

Based on the evidence of the present study, and on the evidence from the high number of previous studies undertaken in Brennans Creek valley it can be concluded that Brennans Creek is a typical example of a smaller tributary in this region of the Woronora Plateau. It contains a typical and expected assemblage of sites, and these contain a regionally well represented set of features.

7.3.2 Historical archaeological sites

Prior to the development of the West Cliff Mine and its associated infrastructure the study area was not subject to significant occupation or development. Before being reserved as a mining lease the area was reserved as pasturage for the township of Appin, from at least the mid-19th Century. A sparse collection of artefacts, features and graffiti suggest/confirms, in accordance with the site prediction model developed for the study, that the study area was the subject of ephemeral occupation and recreational and vocational use, especially during the mid-20th Century (c1930s and later). Certainly occupation of sandstone shelters and similar environments is documented in the region. It is remembered in the Appin community that a Russian family lived on Lysaght's Road, subsequent to the Second World War, and subsisted as timber cutters. The study area's proximity to the township of Appin has resulted in the mining lease, particularly the area next to Appin Road, being used to dump an assortment of

domestic rubbish. The other main historical feature of the study area is that it has been the subject of minerals exploration (c1970 and after), resulting in cleared seismic lines, tracks and drill pads.

Two historical sites were identified within the study area: a sandstone retaining wall track; and a transient occupation or work site. Based on artefacts associated with both these sites they appear to date to the mid-20th Century, and are characteristic of the ephemeral occupation expected to occur in the sandstone gorge country of the region.

8.0 COMMUNITY CONSULTATION

8.1 Aboriginal Community Consultation

In accordance with the DECC's *Part 6 Approvals – Interim Community Consultation Requirements for Applicants*, Biosis Research notified the following bodies regarding the West Cliff Stage 3 Emplacement Area Project:

- Tharawal Local Aboriginal Land Council;
- The Registrar of Aboriginal Owners;
- Native Title Services;
- The Wollondilly Shire Council; and
- The NSW Department of Environment and Conservation.

In addition to the written notifications, advertisements were placed in the following local print media on 27 June 2006:

- *The Macarthur Chronicle*
- *The Wollondilly Advertiser*

A register for interested parties was opened on 27 June 2006 and registrations were received by Biosis Research until 12 July 2006.

The following bodies responded to the above calls for registrations. These bodies are referred to as 'the registered stakeholders'.

- Cubbitch Barta Native Title Claimants (Glenda Chalker);
- Northern Illawarra Aboriginal Collective Inc. (Chris Illert);
- Office of the Registrar Aboriginal Land Rights Act 1983 (NSW) (Megan Mebberson); and
- Wollondilly Shire Council (Ally Dench).

Two Aboriginal stakeholders responded to these notifications, the Northern Illawarra Aboriginal Collective (NIAC) and Cubbitch Barta Native Title Claimants. Other respondents included the Department of Environment and Conservation (now DECC) and Office of the Registrar, ALR Act 1983 (NSW).

All respondents received a proposed methodology for ongoing community consultation and field survey for comment. None of the respondents provided comments on the methodology for the project.

Subsequently, correspondence was forwarded to the Tharawal Local Aboriginal Land Council, Cubbitch Barta Native Title Claimants and NIAC requesting their presence for preliminary consultation meetings to discuss the project.

Both the Tharawal LALC and Cubbitch Barta Native Tile Claimants agreed to meet to discuss the project and identify their experience working in the area and share cultural knowledge which they hold. Correspondence was forwarded to and received from NIAC in an attempt to organise attendance at a preliminary consultation meeting, however no response was received.

Subsequently, representatives from the Tharawal Local Aboriginal Land Council and Cubbitch Barta Native Tile Claimants participated in the archaeological field survey as both groups identified themselves as having relevant experience and cultural knowledge of the Appin region. All the representatives were familiar with the West Cliff Colliery workings as they were originally involved in the assessment of Emplacement Area Stages 1 and 2. This included being involved in original site recording and site salvage during Stage 1 and 2 emplacements. This previous involvement in the assessment and management programs for the Stage 1 and 2 coal wash emplacement provides a continuity of experience for the Aboriginal community with regard to the overall development of Brennans Creek.

All site recordings and assessments were made in close consultation with the Aboriginal community, and specific consultation was sought regarding site significance, cultural knowledge of the study area and development of management recommendations, as outlines in the methodology outlines in Section 2.2;

- Aboriginal people are the primary determinants of the significance of their heritage;
- Input from those Aboriginal people with a cultural association to the land is an essential part of assessing the significance of Aboriginal heritage objects and values that could be impacted by an activity;
- Aboriginal heritage can have both cultural and scientific/archaeological significance and both should be the subject of assessment;
- Aboriginal community involvement needs to take place early in the assessment process to ensure that their values and concerns are fully taken into account, and so that their own decision-making structures are able to function adequately; and
- Consideration should be given to measures that could be implemented to avoid, mitigate or offset likely impacts.

Consultation has continued subsequent to the field work component, in parallel with the development of this assessment report. Meetings between the Tharawal LALC, Cubbitch Barta Native Title Claimants, Biosis Research and BHP Billiton have discussed impacts to individual sites from the proposed emplacement and the impact on intangible aspects of cultural heritage from the proposal. During these meetings the development of a *Community*

Enhancement Program as a way of mitigating intangible cultural heritage impacts has been ongoing.

8.1.1 Local Community Consultation

The Appin Historical Society was contacted regarding non-indigenous cultural heritage sites and values that may be associated with Brennans Creek. The Appin Historical Society recommended local contacts with knowledge about the history of Brennans Creek. Relevant information gathered during this meeting has been included in the history provided in Section 6 of this report.

9.0 SIGNIFICANCE ASSESSMENT

9.1 Introduction to the Assessment Process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia ICOMOS Burra Charter (Australia ICOMOS 1999). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values include:

- **historical** significance (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

- **aesthetic** significance (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.

- **social** significance (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.

- **scientific** significance (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The significance of Aboriginal and historic sites and places will be assessed on the basis of the significance values outlined above. As well as the ICOMOS Burra Charter significance

values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the NSW Department of Environment and Climate Change (DECC), the NSW Heritage Office and the Commonwealth Department of Environment and Heritage (DEH). The relevant sections of these guidelines are presented below.

9.2 Aboriginal Sites – Assessment of Significance

The following Aboriginal significance assessment is based on Part 1 of the *DECC Guidelines for Aboriginal Heritage Impact Assessment* (2006). These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the ICOMOS Burra Charter significance values outlined above in reference to Aboriginal heritage. Reference to each of the values will be made when evaluating Aboriginal significance for sites and places.

In addition to the previously outlined heritage values, the *DECC Guidelines* also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

The two principal values that are likely to be addressed in a consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and the archaeological or scientific significance to archaeologists, although other values – such as educational or tourism values – may be considered. The former is discussed in greater depth below, as it is more comprehensively addressed in the Guidelines for Aboriginal Impact Assessment. However we note here that it is best practice for archaeologists when undertaking significance assessments to keep in mind that scientific assessments are part of a larger picture.

The determinations of Aboriginal significance for sites and places are expressed as *statements of significance* that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category are also be proposed and presented in a summary table.

9.2.1 Aboriginal community or cultural values

The NSW DECC recognises that 'Aboriginal community are the primary determinants of the significance of their heritage' (NSW DEC 2004). Biosis Research recognises that our role in the cultural heritage assessment process is to provide specialist skills, particularly in regard to archaeological and heritage management expertise. These specialist skills can be articulated and enhanced through consultation with the Aboriginal community, with the aim of providing a comprehensive assessment of cultural heritage significance.

The heritage assessment criteria outlined above that relate to community or cultural values include social, historic and aesthetic value. Social and aesthetic values are often closely related. Social value refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day Aboriginal community. Aesthetic values related to Aboriginal sites and places that may contain particular sensory, scenic, architectural and creative values and meaning to Aboriginal people. Historic value refers to the associations of a place with a person, event, phase or activity of importance to the history of an Aboriginal community. Gaining a sufficient understanding of this aspect of significance will often require the collection of oral histories and archival or documentary research, as well as field documentation. Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage, and the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives.

These aspects of heritage significance can only be determined through consultative processes with one or more Aboriginal communities. In terms of Aboriginal communities, heritage places – including those that are otherwise defined as 'archaeological sites' – will always attract differing values. These may include custodianship obligations, education, family or ancestral links, identity, and symbolic representation. History and traditions are important: this generation has an obligation to future generations to retain certain things as they are currently seen and understood. This includes retaining alternative understandings to those that come through scientific assessments. Heritage places are often more complex than is identified through the scientific determination of value. Cultural and social values can be complex and rich - the past is a vital component of cultural identity. Feelings of belonging and identity are reinforced by knowledge of the existence of a past, and this is further reinforced and maintained in the protection of cultural heritage.

Statement of Cultural (Social) Significance

Aboriginal community comments

All Aboriginal cultural heritage sites located in the study area are considered to be of cultural significance to the Tharawal Local Aboriginal Land Council and the Cubbitch Barta Native Title Claimants Aboriginal Corporation, and it is important that comment on the area is provided directly by members of these Aboriginal communities. The sites are evidence of past Aboriginal occupation and use of the area, and are the main source of information about the

Aboriginal past. In addition, any recorded (and unrecorded) pre-contact sites are of cultural significance because they are rare or, at least, uncommon site-types. In particular, many sites in the greater Sydney region have been destroyed as a result of land clearance and land-use practices in the historic period.

9.2.2 Archaeological (Scientific) Significance

Archaeological significance (also called scientific significance) refers to the value of archaeological objects or sites as they relate to research questions that are of importance to the archaeological community, including indigenous communities, heritage managers and academic archaeologists. Generally the value of this type of significance will be determined on the basis of the potential for sites and objects to provide information regarding the past life-ways of people (Burke and Smith 2004: 249, NPWS 1997). For this reason, the NSW NPWS summarises the situation as 'while various criteria for archaeological significance assessment have been advanced over the years, most of them fall under the heading of archaeological research potential' (NPWS 1997: 26). The NPWS criteria for archaeological significance assessment are based largely on the Register of the National Estate Criteria, and under the heading of 'research potential' include the following aspects and definitions (NPWS 1997):

General site considerations, including factors such as:

- *Site intactness or integrity:* This includes the state of preservation of archaeological objects, as well as the stratigraphic integrity of the site, the taphonomic processes acting on the site, the impact of past artefact collections made at the site.

- *The connectedness* of the site to other sites – when considered as part of a larger assemblage or landscape the site may have greater research potential than if it was simply considered in isolation.

- *Chronological potential* refers to the potential of a site to provide a dateable framework extending back into the past. The potential antiquity of a site is also an important consideration, as older sites are relatively less common than younger sites. In many cases stratified, dateable artefact bearing deposits are sufficiently rare to be a very valuable resource.

Representativeness

- *Representativeness* refers to the ability of a site or object to serve as a representative example of sites in the same class. This aspect of value is only meaningful when considered in conjunction with a conservation goal, and must be determined against the archaeological record at various scales of consideration - local, regional and continental for example. It takes into account site and object variability, connectedness and a consideration of what is already, and likely to be, conserved. Burke and Smith (2004: 247) define representativeness as 'an assessment of whether

or not a place is a good example of its type, illustrating clearly the attributes of its significance.'

Rarity

- *Rarity* is, of course, closely related to representativeness (if a site is rare, it is likely to have high representative value), and will include a consideration of those issues discussed under general site considerations. In many ways, the determination of rarity is a summation of exceptional research potential, or a representative of a small class of sites or objects. Burke and Smith (2004: 247) further describe rarity as 'an assessment of whether the place represents a rare, endangered or unusual aspect of our history or cultural environment that has few parallels elsewhere.'

In addition to the research potential related value factors, the NSW NPWS (1997: 32) also discuss *Educational Potential* and *Aesthetic Significance*, as items that may be included in scientific significance. The NPWS general advice is that archaeologists should give careful consideration prior to attempting to determine educational and aesthetic values (NPWS 1997: 32). We make no attempt to determine educational potential of sites under scientific assessment, but do consider educational value as a contributing factor that may be included in an assessment of social significance by the Aboriginal community.

Aesthetic values

- There is a diverse yet accessible literature regarding identifying aesthetic values and determining aesthetic significance (Burke and Smith 2004: 248-9, Kerr 1996: 15-16, Pearson and Sullivan 1999: 134-8). It is generally agreed that aesthetic values are an important part of cultural heritage significance, however they are dependent on an individual's sensory response, which means determining aesthetic value is fraught with difficulty, and should be applied on a case-by-case basis as it is not always a value applicable to archaeological sites (Burke and Smith 2004: 248). However, when dealing with shelter and rock art sites aesthetic values and landscape context are an important consideration. The question 'does the place have a relationship between its parts and the setting which reinforces the quality of both', while originally proposed in an architectural context (Kerr 1996: 15), is relevant also for rock art and shelter sites in a bushland setting where there is often an important relationship between the cultural site and natural environment.

9.2.2.1 Statement of Archaeological Significance

The following section provides statements of significance for all Aboriginal archaeological sites situated within 500 metres of the proposed Stage 3 Emplacement Area. The significance of each site follows the assessment process outlined in Section 2.3.3. This includes a statement of significance based on the categories defined in the Burra Charter. These categories include social, historic, scientific, aesthetic and cultural landscape values. Nomination of the level of value—high, moderate, low or not applicable—for each relevant

category will also be proposed. The determination of cultural landscape value will be applied to both individual sites and places (to explore their associations) and also, to the study area as a whole. The nomination levels for the scientific significance and cultural significance of each site will be summarised below.

Brennans Creek 2 (52-2-1368)

This site is a shelter with art, situated on the lowest cliff line on the north east side of the junction of a small drainage line and Brennans Creek. The narrow sandstone overhang contains 4 charcoal outline and infill indeterminate motifs and 1 outline and infill macropod motif. The art is a poorly preserved example of the most common art technique in the region, meaning the site has low rarity and representational values. There are no historical values associated with this site and due to the limited living floor of the shelter, has very limited research potential. The site is situated along the sheltered, hidden lower cliff line giving it little or no aesthetic values.

Significance: **LOW**

Brennans Creek 5 (52-2-1371)

This single axe grinding groove is situated on the edge of a sandstone outcrop on the lower lip of a small swamp south of Brennans Creek. This axe grinding groove site is not a rare occurrence, meaning the site has low rarity and representational values. The site is obscured by vegetation and sediment that is seeping down slope and across the sandstone outcrops, giving the site low aesthetic value. The site has a low number of grooves and no other features.

Significance: **LOW**

Brennans Creek 6 (52-2-1372)

This shelter with art and deposit site is situated on the mid slope continuous cliff line on the west side of Brennans Creek. The recorded art comprises charcoal outline and infill motifs that originally included 9 charcoal outline and indeterminate motifs, and 3 charcoal outline and infill kangaroos. All of these charcoal motifs are in good condition. The high number of motifs located at this site is uncommon within Brennans Creek, however the art technique used is the most common in the region, meaning the site has low rarity and moderate representational values. The relatively undisturbed deposit at the shelter indicates research potential for further archaeological material and the open aspect along and across Brennans Creek gives the site moderate aesthetic values. The site has no identified historical values.

Significance: **MODERATE**

Brennans Creek 7 (52-2-1373)

This site comprises a large open sandstone overhang, situated on the upper ledge of a large sandstone outcrop on a spur of Brennans Creek. The significant overhang has a large open sandstone floor containing little or no deposit. The shelter overlooks the creek line to the south-east, with a vantage over a long stretch of the creek line and valley, giving the site high aesthetic values. The art comprises a small panel of charcoal outline and infill motifs, including one infill frontal human figure, one charcoal outline, one infill kangaroo and one charcoal outline and infill indeterminate. The shelter has also been used in recent history, as evidenced by camp fire remains and graffiti in the shape of red hand stencils present in the overhang. The art is a well preserved example of the most common art technique in the region, meaning the site has low rarity and high local representational value. The site has no identified historical values.

Significance: **MODERATE**

West Cliff 1

This site is a sandstone shelter with art, stone artefacts and archaeological deposit. The art comprises charcoal outline motifs. Five flaked stone artefacts were located on the shelter floor, which has a dark grey deposit. The site has no identified historical values. The art is a poorly preserved example of the most common art technique in the region; shelters with surface artefacts and deposit are also common, meaning the site has low rarity and representational value. The deposit is disturbed in the upper layers but probably intact below this, and there are a relatively high number of surface artefacts for this type of site, giving it moderate research potential value. Now situated immediately above Brennan's Creek Dam the site has low aesthetic value.

Significance: **MODERATE**

West Cliff 2

This site is a sandstone shelter with art and potential archaeological deposit. The art comprises charcoal outline and infill motifs on three separate art panels. The art assemblage is, for the most part, comprised of poorly preserved indeterminate motifs, however there is a well preserved partial fish motif on the main panel. The number of charcoal motifs is high for the Brennans Creek area, and the presence of a fish this far west and north on the Woronora plateau is unique, giving the site high rarity and moderate representative values. The potential archaeological deposit is undisturbed, contributing slightly to these values. The site has no identified historical values. This overhang is situated in the head of a tributary gully that feeds into Brennans Creek, and is an impressively long (50 m) shelter. The site is visible from the break of slope into the main Brennans Creek valley, and from this viewpoint the shelter forms a major feature of the vista looking north along the tributary. Construction of the access track and tree felling under the electricity transmission line have left the vegetation noticeably impacted, meaning the site has moderate aesthetic value.

Significance: **HIGH**

West Cliff 3

This site is a potential archaeological deposit, or PAD. The site is located on the top scarp of the upper slopes above Brennans Creek, next to a drainage feature that provides good access to the main Brennans Creek valley. The site has no identified historical values. The shelter has a large potential useable floor area, and an intact sandy deposit which provides moderate research potential. The site has no notable aesthetic qualities.

Significance: **LOW (subject to further determination)**

West Cliff 4

This site is a shelter with art, situated in an upper ledge of a large scarp on the second to bottom break in slope above Brennans Creek. The shelter contains indeterminate outline and infill charcoal motifs. The shelter has been used in recent history, as evidenced by camp fire remains and extensive graffiti which is also present on the art panels. The art is a poorly preserved example of the most common art technique in the region, meaning the site has low rarity and representational value. The site has no identified historical values. The shelter is located in a dramatic setting that provides a clear vista east and west along Brennans Creek, giving it moderate aesthetic value.

Significance: **LOW**

West Cliff 5

This site is a stone artefact scatter located on the vehicle track that runs beneath the electricity transmission line. The site contains two silcrete flakes. Surface stone artefact scatters are a relatively rare site type, however the site is in poor condition, contains only two artefacts, and archaeological deposits are not likely to occur, meaning the site has low rarity and representative values. The site has no identified historical values, and is in a highly disturbed area, affording it no aesthetic value.

Significance: **LOW**

9.2.3 Cultural landscape values / significance

The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape' (NSW NPWS n.d.: 5-6). This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of a wider context of features with cultural and social value. Hence the site or place will possibly have values derived from its association with other sites and places, and its context within the physical landscape. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places (NSW NPWS n.d.: 5).

During the assessment of the West Cliff Stage 2 coal wash emplacement the NSW NPWS urged Caryll Sefton to provide consideration of the sites at West Cliff as a 'site complex' (Sefton 1998: Appendices), which is a similar concept (though more strictly archaeological—rather than cultural—in nature) to consideration of cultural landscape values. In considering Brennans Creek as a site complex Sefton pointed out that the spatial relationship of sites (eg. sites in the same valley) may not necessarily mean the sites are related in a meaningful way, especially in the rugged environment of the Woronora Plateau (1998: 30). Additionally, without direct archaeological evidence (such as refitting artefacts) or ethnographic testimony it is risky to assume either that: spatially related archaeological sites were occupied at the same time; have a functional, economic or cosmological relationship to each other; or indeed that individual artefacts in the sites themselves were deposited in behavioural episodes that are readily interpretable to provide 'common sense' understandings of past societies, and the actions of individuals within them (Dunnell 1992).

Bearing this in mind, we approach the assessment of the cultural landscape values by considering the value of the assemblage of sites within Brennans Creek as just that – an assemblage of sites in a wider context of other sites (cf. Sefton 1998: 30-31). It is also important to recognise that the value of the cultural landscape as a social phenomenon does not have to rely on robust archaeological interpretation; but rather is a contemporary expression of value to the Aboriginal community, archaeologists, and the community at large. We believe this is in-line with current approaches and policy directions for the NSW DEC (NSW NPWS n.d., Byrne, Brayshaw and Ireland 2001).

The study area is situated within the Georges River catchment, an area considered to be archaeologically significant, containing high numbers of shelters with art and or deposit. No cultural values or stories were identified by any Aboriginal stakeholders during the field survey or subsequent consultation meetings.

The archaeological sites and the native bushland landscape in the Brennans Creek valley provide an example of archaeological sites in a natural environment that has seen relatively little impact. Such a setting and the relationship between art sites in particular and the wider landscape create a 'sense of place'. Aspects of a cultural landscape are well represented in drainage lines and valleys in the local and wider region. Whilst there will be an impact to the cultural landscape, the impact is confined to Brennans Creek, and in this respect the impact to the cultural landscape is considered to be minimal, in terms of regional context.

9.2.4 Aboriginal Sites – Significance Summary

The determination of Aboriginal significance relies on a comprehensive approach to cultural heritage assessments and to the values that are attached to heritage places. Aboriginal heritage significance can be considered to be the importance of a place, site or object arising from the combination of values attributed to it. These values determine the 'what' and 'how' of conservation and direct management decisions.

The following table summarises the determinations of significance presented in Section 9.2.2.

SITE NAME AND NUMBER	*COMMUNITY OR CUTLRUAL SIGNIFICANCE*	*ARCHAEOLOGICAL OR SCIENTIFICIC*
BC 2 (52-2-1368)	High	Low
BC 5 (52-2-1371)	High	Low
BC 6 (52-2-1372)	High	Moderate
BC 7 (52-2-1373)	High	Moderate
WEST CLIFF 1	High	Moderate
WEST CLIFF 2	High	High
WEST CLIFF 4	High	Low
WEST CLIFF 5	High	Low
Sites with Potential Archaeological Deposit		
BCPAD4	PAD	PAD
BCPAD5	PAD	PAD
WEST CLIFF 3	PAD	PAD

Table 11: Summary of significance for sites at West Cliff

9.2.5 Heritage Assessment Criteria

The State Heritage Register, which was established by the amendments to the NSW *Heritage Act* in 1999, has a separate set of significance assessment criteria broadly based on those of the Australia ICOMOS Burra Charter (1999).

To be assessed for listing on the State Heritage Register an item will need to meet one or more of the following criteria:

CRITERION	*DESCRIPTION*	*CATEGORY*
A	An item is important in the course, or pattern, of NSW's cultural or natural history;	Nature of
B	An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;	Nature of
C	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;	Nature of
D	An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;	Nature of
E	An item has the potential to yield information that will contribute to an understanding of NSW's cultural and natural history;	Nature of
F	An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history;	Comparative
G	An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments.	Comparative

Table 12: Criteria for the assessment of historic cultural heritage

Amendments to the *Heritage Act* clarify and strengthen responsibility for the management of heritage items at the Local and State level. Consequently, items can be assessed as having **Local** or **State** level significance. Items should also be assigned a grading, in order to better explain its place within a cultural landscape. Criteria for grading an item or place are discussed in Section 8.3.2. (Table 12).

An item cannot be excluded from listing on the State Heritage Register on the basis that items with similar characteristics have already been listed. These criteria can be applied to items of State and Local significance.

These assessment criteria are useful in considering a wide range of heritage items, and may be applied to sites with items of standing heritage as well as areas with the potential to contain archaeological deposits.

9.2.6 Grading of significance

The heritage guidelines on assessing significance also include a set of gradings of significance. These are used to identify if loss of integrity or condition diminishes significance.

GRADING	*JUSTIFICATION*	*STATUS*
Exceptional	Rare or outstanding element directly contributing to an item's local and State significance.	Fulfils criteria for local or State listing.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from the significance.	Fulfils criteria for local or State listing.
Moderate	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.	Fulfils criteria for local or State listing.
Little	Alterations may detract from the overall significance but its role, function, design or fabric can still be interpreted.	Does not fulfil criteria for local or State listing.
Intrusive / Nil	Damaging to the item's heritage significance. Difficult to interpret.	Does not fulfil criteria for local or State listing.

Table 13: NSW Heritage Office grading of heritage significance

An assessment of significance is based on the attributed value of an item or place, while the grading also considers the current condition. The grading system works both ways. An item may be inherently significant at a State level, yet modifications and alterations have detracted from the significance, resulting in an assessment of Low State significance. Conversely, an item that is highly significant at the Local level may not fill the criteria for State significance. The context of items may affect the grading as well. Several items with Low Local significance at individual levels, when considered as a group, may be assessed as of Moderate or High Local significance (Table 13).

The basis for these assessments is determined on a case-by-case scenario and is outlined in the following significance assessments.

9.2.7 Historic sites – assessment of significance

West Cliff Historical Site 1

Terraced track feature

CRITERION	*DESCRIPTION*
A (Historic)	*The item has no identified values associated with this criterion*
B (Associative)	*The item has no identified values associated with this criterion*
C (Aesthetic / Technical)	*The opportunistic use of sandstone talus boulders and rocks is noted; however the item has no fabric or design aspects that show a noteworthy degree of aesthetic or technical achievement.*
D (Social / Cultural)	*The lack of detailed historical information regarding the item's construction, function and use mean values against this criterion cannot be identified or assessed.*
E (Research Value)	*The item has some value because it is a unique feature; however the value is compromised by the item's poor preservation. The item has little potential to retain additional information to elucidate the origin and function of the item.*
F (Rarity)	*The use of sandstone rubble to build a wall in a shelter has been recorded elsewhere in Brennans Creek. There are no other known examples of this type of pathway / track construction locally, giving it some rarity value.*
G (Representativeness)	*The item is a poorly preserved example of an ad hoc construction of unknown function – it has no identified representative values.*

Table 14: Assessment of criteria for West Cliff Historical Site 1

Statement of significance

The terraced track feature is an ad hoc and poorly constructed pathway of unknown origin, function and duration of use. The item displays no notable characteristics against the assessment criteria; however it does have some novel value as a local feature that has been previously unknown. Unfortunately the lack of historical information means the item cannot be interpreted with any confidence.

Assessed level of significance

Local Significance

West Cliff Historical Site 2

Transient occupation / work site

CRITERION	DESCRIPTION
A (Historic)	*The item has no identified values associated with this criterion*
B (Associative)	*The item has no identified values associated with this criterion*
C (Aesthetic / Technical)	*The item has no identified values associated with this criterion*
D (Social / Cultural)	*The origin, function and use of the site is unknown meaning values against this criterion can not be identified.*
E (Research Value)	*The item contains a limited assemblage of artefacts, and has low research value.*
F (Rarity)	*Transient camp sites are not rare; the item has no value against this criterion.*
G (Representativeness)	*The item does not provide a noteworthy example of transient camp sites, and does not have representative value.*

Table 15: Assessment of criteria for West Cliff Historical Site 2

Statement of significance

The item is a transient camp site of unknown origin, function, period and duration of use. It contains a sparse suite of artefacts with low research potential. There is no specific historical information available at the level of detail required to inform us further regarding the site and its potential values.

Assessed level of significance

Local Significance

10.0 IMPACT ASSESSMENT

10.1 Potential Impacts

As discussed above, the proposed development will create a high level of disturbance within the study area. Prior to emplacement of coal wash all existing land surface features are removed via excavation, a process that will destroy archaeological sites present within the impacted area (see Section 1.2.1). This disturbance may **directly impact** the physical remains and significance of archaeological sites located within the proposed emplacement area, or in areas coincident with related infrastructure such as access roads. Those sites not situated in the emplacement area or in a location coincident with other infrastructure may potentially be **indirectly impacted** – either through secondary physical means such as dust generation and dispersal (this applies only to rack art sites), or by having their landscape context altered. We do not consider indirect impacts to constitute the type of impact for which statutory approval is required.

The engineering design and impact footprint of the West Cliff Stage 3 coal wash emplacement was developed at the same time as the cultural heritage assessment was taking place. This has allowed cultural heritage information and results to be fed directly back into the design process, meaning the emplacement and associated infrastructure were designed to avoid impact on cultural heritage values in cases where this was feasible. Examples of cases where redesign to avoid impacts was feasible included: contraction of emplacement area edge boundaries to avoid direct impact to BC7 and D11; redesign and relocation of coal wash haul and construction roads to avoid direct and indirect impacts to WC2, WC5 and WC1. Unfortunately it is not possible to avoid sites situated in the lower parts of Brennans Creek valley and still have an economically feasible emplacement area.

Based on current proposed works within the Stage 3 coal wash emplacement along Brennans Creek, a number of Aboriginal archaeological sites will potentially be impacted. These impacts include the emplacement of coal wash along Brennans Creek line, burying recorded sites, and the construction of associated infrastructure such as water retention ponds and construction / haulage roads that will impact and potentially indirectly impact the heritage values of some sites and PADs (Figure 6).

10.2 Impact summary

Table 16 summarises the archaeological significance of each Aboriginal site and PAD, each historical site and the potential impact that can be expected. This table shows that the majority of archaeological sites and PADs that will be directly impacted have been determined to have low archaeological significance, whilst one site that will be directly impacted had moderate archaeological significance. Other sites of moderate and high significance will not be subject to direct impacts from the Stage 3 emplacement.

Site	Significance (Archaeological)	Impact
BC2 (Shelter with Art)	Low	Emplacement landform
BC5 (Axe Gr. Groove)	Low	Emplacement landform
BC6 (Shelter with Art)	Moderate	Emplacement landform
WC4 (Shelter with Art)	Low	Emplacement landform
BCPAD4	PAD	Emplacement landform
BCPAD5	PAD	Emplacement landform
BC7 (Shelter with Art)	Moderate	Indirect via Landscape context
D11 (Shelter with Artefacts)	Moderate	Indirect via Landscape Context
WC2 (Shelter with Art)	High	Indirect via potential dust
WC3 (PAD)	PAD	Indirect via Landscape Context
D10 (Shelter with Artefacts)	Low	None
WC1 (Shelter with Art)	Moderate	None
WC5 (Stone Artefacts)	Low	None
WCHS1	Local	Emplacement landform
WCHS2	Local	Emplacement landform

Table 16: Summary of impact to sites in Brennans Creek

10.2.1 Direct Impact

Aboriginal Archaeological Cultural Heritage Sites

BC2

Brennans Creek 2 is a shelter with poorly preserved art and potential archaeological deposit. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

BC5

Brennans Creek 5 is a single axe grinding groove. The site will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

BC6

Brennans Creek 6 is a shelter with well preserved art, surface stone artefacts and archaeological deposit. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

WC4

West Cliff 4 is a shelter with poorly preserved art. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

Potential Archaeological Deposit Sites (PADs)

BCPAD4

Brennans Creek PAD 4 is a shelter that has been identified as containing Potential Archaeological Deposit. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

BCPAD5

Brennans Creek PAD 5 is a shelter that has been identified as containing Potential Archaeological Deposit. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash, resulting in the site being buried beneath the emplacement landform.

Historical Cultural Heritage Sites

WCHS1

West Cliff Historical Site 1 comprises a track or pathway, with a section of sandstone talus retaining wall that runs from the top of the valley down to Brennans Creek channel. The site is in a location where it will be subject to direct impact from land clearing and then emplacement of coal wash.

WCHS2

West Cliff Historical Site 2 is a transient occupation or work site situated on the top of the ridge, adjacent to one of the artificial drainage lines near Stage 1 and 2. The site is in a location where it will be subject to direct impact from land clearing and emplacement of coal wash.

10.2.2 Indirect Impact

Aboriginal Archaeological Cultural Heritage Sites

BC7

Brennans Creek 7 is a shelter with well preserved art, surface stone artefacts and archaeological deposit. The site is in a location where it will be subject to indirect impact from close proximity to the emplacement landform and dust generation. The emplacement landform will abut the scarp in which BC7 is situated, altering the landscape context of the site.

D11

Dendrobium 11 is a shelter with surface stone artefacts and archaeological deposit. The site is in a location where it will be subject to indirect impact from close proximity to the emplacement landform. Indirect impacts that may potentially affect the site include: vibration and erosion. The emplacement landform will abut the base of the cliff in which D11 is situated, altering the landscape context of the site.

WC2

West Cliff 2 is a shelter with well preserved art, and potential archaeological deposit. The site is situated such that it may potentially be subject to indirect impact from dust dispersal.

Potential Archaeological Deposit Sites (PADs)

WC3

West Cliff 3 is a shelter with potential archaeological deposit (PAD). The site is located such that it will be subject to indirect impact from close proximity to the emplacement landform. The emplacement landform will be located immediately in front of the site, altering the landscape context of the site.

10.2.3 No Impact

Aboriginal Archaeological Cultural Heritage Sites

WC1

West Cliff 1 is a shelter with art, artefacts and archaeological deposit. The site is located next to the existing Brennans Creek dam. West Cliff 1 is situated approximately 500 m from any proposed construction associated with the Stage 3 emplacement landform, and there are no foreseeable potential impacts to this site from the construction and operation of the emplacement.

WC5

West Cliff 5 consists of two stone artefacts located on the access track beneath the electricity transmission line. The artefacts are located approximately 150 m from the nearest approach of the emplacement landform/haul road, and will not be impacted by the construction or operation of the proposed emplacement.

D10

Dendrobium 10 is a sandstone shelter with a surface stone artefact, and archaeological deposit. This site is located approximately 200 m from the proposed emplacement, and approximately 50m from any potential infrastructure, meaning the values of the site will not be impacted by the construction or operation of the proposed emplacement.

10.2.4 Cumulative Impact on Aboriginal sites and PADs

Brennans Creek has been heavily impacted previously by coal wash emplacement in the upper reaches of the valley. Whilst several sites have been lost, the sites do not represent the loss of either a significant number or representative sample of sites from this region of the Woronora Plateau. Brennans Creek is probably the most thoroughly archaeologically surveyed drainage line in the region, so we can be confident that the quantification of impacts is accurate. Overall Brennans Creek contains a low number and diversity of sites, especially when we consider that, compared to other drainage features in the region, there is significant survey bias toward Brennans Creek and hence there is potential for many as yet unrecorded Aboriginal sites to be present in the adjacent valleys. Table 17 summarises the type and frequency of sites in four major drainage features of the Appin region of the Woronora Plateau, and shows that Brennans Creek accounts for only a small part of the Georges River catchment assemblage of archaeological sites, and a very small portion of the overall regional assemblage.

SITE NUMBERS AND TYPE		OPEN*		CLOSED**		TOTAL			
CATCHMENT	DRAINAGE	*n*	%	*n*	%	n	%	n	%
Cataract	Appin Falls	3	1	12	3	15	2		
	Breakfast Creek	20	9	32	8	52	8		
	Bulli Mine Shaft	10	4	22	6	32	5		
	Gillbird	9	4	55	14	64	10		
	Lizard Creek	6	3	23	6	29	5		
	Loddon	33	14	17	4	50	8	*Cataract*	
	Wallandoola	10	4	30	8	40	6	282	46
Georges River	Brennans Creek	2	1	13	3	15	2		
	Georges River	0	0	7	2	7	1		
	Sawpit Gully	5	2	10	3	15	2	*Georges*	
	Upper Georges River	6	3	9	2	15	2	52	8
Nepean	Brooks Point	0	0	9	2	9	1		
	Ousedale Creek	0	0	4	1	4	1	*Nepean*	
	Nepean River	1	0	7	2	8	1	21	3
O'Hares	Dahlia Creek	16	7	21	5	37	6		
	Four Mile Creek	12	5	5	1	17	3		
	O'Hares Creek	49	21	50	13	99	16		
	O'Hares Creek HB	0	0	5	1	5	1		
	Stokes Creek	46	20	47	12	93	15		
	Stokes Quarry	6	3	0	0	6	1	*O'Hares*	
	Wedderburn	0	0	4	1	4	1	261	42
Total		234		382		616	100	616	

* 'Open' sites include stone artifact scatters, axe grinding grooves, scarred trees and stone arrangement

** 'Closed' sites include rock shelter sites with art and/or deposit

Table 17: Comparison of site frequency in major catchments of the Appin area

The proposed emplacement of Stage 3 at West Cliff will result in the loss of one open site (one of 234 present in the region) and four closed sites (four of 382 present in the region). While the impacts are moderately high for the small assemblage of Brennans Creek, on a broader scale they are less significant. In the case of both open and closed sites it is apparent that the impacts, whilst they can never be described as negligible, are very low and do not have a significant impact on the regional archaeological record.

Table 18 summarises the previous impacts and management strategies for the Stage 1 and Stage 2 emplacements at West Cliff. The potential impacts from Stage 3 are also included for comparison, so an appreciation of cumulative impact in the valley can be gained.

NPWS AHIMS SITE NO.	SITE NAME	SITE TYPE	EMPLACEMENT STAGE	MANAGEMENT
52-2-1363	(PAD 1) Brennans Creek 8	Potential archaeological deposit (PAD)	Stage 1	• PAD excavated, stone artefacts recovered • Emplaced
52-2-1373	PAD 2	Shelter with PAD	Stage 1	• PAD excavated, no cultural material • Emplaced
52-2-1364	Brennans Creek 9 (PAD 3)	Shelter with PAD	Stage 1	• PAD excavated, stone artefacts recovered • Emplaced
52-2-1367	Brennans Creek 1	Axe grinding grooves; Engraved groove channels	Stage 1	• Protected and retained
52-2-1369	Brennans Creek 3	Shelter with art, deposit and PAD	Stage 2	• Detailed recording of art and shelter • Emplaced with conservation measures
52-2-1370	Brennans Creek 4	Shelter with deposit and PAD	Stage 2	• Detailed recording of art and shelter • Emplaced with conservation measures
52-2-2051	Brennans Creek 10	Shelter with deposit	Stage 2	• To be emplaced • Excavated and recorded prior to emplacement
52-2-1368	Brennans Creek 2	Shelter with art and deposit	Stage 3	• To be emplaced • Excavated and recorded prior to emplacement
52-2-1371	Brennans Creek 5	Axe grinding groove	Stage 3	• To be emplaced • Recorded in full prior to emplacement
52-2-1372	Brennans Creek 6	Shelter with art, deposit and PAD	Stage 3	• To be emplaced • Recorded in full prior to emplacement
52-2-1373	Brennans Creek 7	Shelter with art	Stage 3	• To be retained • Recorded in full prior to emplacement
	PAD 4	Shelter with PAD	Stage 3	• To be emplaced • Excavated and recorded prior to emplacement
	PAD 5	Shelter with PAD	Stage 3	• To be emplaced • Excavated and recorded prior to emplacement
52-2-2229	Dendrobium 10	Shelter with PAD	Stage 3	• No impact
	Dendrobium 11	Shelter with deposit	Stage 3	• Protected and retained
	West Cliff 1	Shelter with art and deposit	Stage 3	• No impact
	West Cliff 2	Shelter with art and PAD	Stage 3	• Protected and retained
	West Cliff 3	Shelter with PAD	Stage 3	• Protected and retained
	West Cliff 4	Shelter with art	Stage 3	• To be emplaced • Art recorded prior to emplacement
	West Cliff 5	Isolated artefact occurrence	Stage 3	• No impact

Table 18: Sites recorded within Brennans Creek valley at West Cliff Colliery

The cumulative impact of the proposal for the Brennans Creek valley is relatively high, with an additional four sites being lost to the emplacement. The cumulative impact is tempered by the fact that some sites will be protected and retained (including sites of high significance and representational value), and also by the low impact at a regional scale.

10.2.5 Cultural Landscape Impact

There will be a moderate impact to the cultural landscape from the proposal. The impact is derived from three related aspects that all affect the cultural heritage value of the landscape:

- Fragmentation of connections between archaeological sites;
- Removal of native vegetation and
- Alteration to the natural landform.

The impact to the cultural landscape goes beyond the impact to archaeological sites and objects. The connectedness of the archaeological sites and the native bushland landscape in the Brennans Creek valley provides an example of an environment not impacted by pastoral activities. Such a setting, and the relationship between art sites in particular and the wider landscape, provides a powerful 'sense of place' that is not always associated with Aboriginal archaeological sites in a management context (such as stone artefact sites in a paddock, for example). The Brennans Creek valley will be changed significantly by the Stage 3 emplacement, and the values described above will not be lost, but will be significantly altered by the proposal.

The notion of the cultural landscape is that the landscape is a storied landscape, and in the case of Brennans Creek these stories are represented by the archaeological sites present within the valley. The sites describe the story of past occupation by Aboriginal hunter-gatherers, and in one small valley demonstrate various aspects of Aboriginal occupation – cosmological and artistic expression in art sites, discard of utilitarian stone tools at the stone artefact scatter, and maintenance of important utilitarian tools such as axes at the grinding grooves. The activities represented by the archaeological sites provide entrance points for stories of the broader lives of people in the past, at Brennans Creek and elsewhere on the Woronora Plateau. Importantly, all these aspects of a cultural landscape are well represented in drainage lines and valleys in the local and wider region. Therefore, whilst there will be a physical impact to the cultural landscape, the impact will be confined to Brennans Creek valley, and in this respect, the impact to the cultural landscape is considered to be moderate.

11.0 MANAGEMENT ISSUES

11.1 Management Principles

Ideally heritage management involves conservation of sites through the preservation and conservation of fabric and context. In cases where conservation is not possible or practical, several options for management are available. For archaeological sites management often involves mitigation through the salvage of features or artefacts and retrieval of information through excavation or collection, and interpretation. At West Cliff three basic levels of management options are available for the Aboriginal archaeological sites that will be impacted. In order of preference these are:

- Conservation through avoidance, and preservation through ongoing management;
- Destruction mitigated by salvage and interpretation (under Section 90 or 87 of *the National Parks and Wildlife Act 1974*); and
- Unmitigated destruction (under Section 90 of the *National Parks and Wildlife Act 1974*).

From the outset the footprint of the proposed emplacement was designed to avoid direct impact to sites BC7 and D11 by contracting the edges of the proposed emplacement area, despite the obvious economic cost of this for the operational emplacement. Haul and construction roads have also been designed and relocated from what might be economically or engineering 'ideals' to avoid impact to archaeological sites. For example the construction road near site WC2 has also been redesigned to minimise any potential impact to this site, by moving the road as far from the site as possible. However, the nature of the proposal provides only limited scope for design alterations to avoid or minimise impact to archaeological sites located within the Brennans Creek drainage line. Hence a set of management options are provided below for directly impacted sites, indirectly impacted sites, and sites that are not impacted, as well as site specific and general recommendations.

11.2 Management of Directly Impacted Sites

The following sites will be directly impacted by the proposed Stage 3 Emplacement: BC2, BC5, BC6 and WC4, BCPAD4 and BCPAD5, WCHS1 or WCHS2. All suggested management options have been developed in discussions with the Tharawal LALC and Cubbitch Barta Native Title Claimants.

BC2 is a shelter with art and deposit. The art is in very poor condition, and artefacts have not been recorded on the surface of the shelter. Therefore the art and shelter should be recorded in detail using scale photography, and the deposit should be subject to test excavation to determine the presence or absence of Aboriginal objects.

BC5 is a single axe grinding groove. If possible the site should be relocated to a location agreed by the Aboriginal stakeholders and BHP Billiton. The relocation site should include appropriate interpretation.

BC6 is a shelter with art and deposit. The art and deposit are both in good condition. Therefore the art and shelter should be recorded in detail using scale photography, and the deposit should be subject to test excavation to determine the extent and significance of Aboriginal objects.

WC4 is a shelter with art. The art is in poor condition and is highly disturbed by graffiti. The art and shelter should be recorded in detail using scale photography.

BCPAD4 is a potential archaeological deposit. The deposit should be excavated to determine the presence or absence of Aboriginal objects.

BCPAD5 is a potential archaeological deposit. The deposit should be excavated to determine the presence or absence of Aboriginal objects.

WCHS1 is a stone retaining wall structure that forms a pathway from the plateau top down a talus slope to Brennans Creek. The site includes sparse scatter of artefacts. This site should be mapped and photographed prior to impact.

WCHS2 is a transient occupation site. The site should be mapped and photographed prior to impact.

11.3 Management of Indirectly Impacted Sites

BC7 is a shelter with art and archaeological deposit. The emplacement landform will be constructed in close proximity to the site. The site should be sign-posted and marked on plans to protect it from impact during construction. The art and shelter should be photographed in detail prior to emplacement. The site should be monitored regularly whilst emplacement is being constructed and operated nearby to ensure that impacts from dust, vibrations etc do not enhance natural degradation of the site.

D11 is a shelter with archaeological deposit, and a high number of surface artefacts. The emplacement landform will be constructed in close proximity to the site. The site should be sign-posted and marked on plans to protect it from impact during construction. The site should be monitored regularly whilst emplacement is being constructed and operated nearby to ensure that impacts from dust, vibrations etc do not enhance natural degradation of the site.

WC2 is a shelter with art. The shelter is in proximity to a construction road, which has some potential to impact the local area and conditions in the vicinity of the site. The site should be sign-posted and marked off during the construction and operation of the construction road. In addition to this the site should be monitored to monitor potential impacts from dust to the art throughout the emplacement operation.

WC3 is a shelter with potential archaeological deposit. The emplacement landform will be constructed in close proximity to the site. The site should be sign-posted and marked on plans to protect it from impact during construction.

11.4 Sites that will not be impacted

D10, WC1 and WC5 will not be impacted by the proposal. However as they are located on the West Cliff mine lease their locations should be noted in all future management or development of the lease.

12.0 RECOMMENDATIONS

12.1 Site Specific Recommendations

12.1.1 Statutory Requirements

- **BC2** – BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **BC5 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **BC6 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy with Salvage for this site. The consent must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **WC4 -** BHP Billiton should apply to DECC for a Section 90 Consent to Destroy for this site.

- **BCPAD4** - BHP Billiton should apply to DECC for a Section 87 Preliminary Research Permit to test the Potential Archaeological Deposit at this site. The permit must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent.

- **BCPAD5 -** BHP Billiton should apply to DECC for a Section 87 Preliminary Research Permit to test the Potential Archaeological Deposit at this site. The permit must include a Care Agreement for any Aboriginal objects recovered during the execution of the consent

12.1.2 Other Management Requirements

- **BC7 -** The site should be sign-posted and marked on plans to protect it from impact during construction. The site should be monitored regularly whilst the emplacement is being constructed and operated nearby to ensure that impacts from dust, vibrations etc do not enhance natural degradation of the site.

- **D11 -** The site should be sign-posted and marked on plans to protect it from impact during construction. The site should be monitored regularly whilst emplacement is being constructed and operated nearby to ensure that impacts from dust, vibrations etc do not enhance natural degradation of the site.

- **WC2** - The site should be sign-posted and marked off during the construction and operation of the construction road. In addition to this the site should be monitored to

monitor potential impacts from dust and vibration to the art throughout the emplacement operation

- **WC3** - The site should be sign-posted and marked on plans to protect it from impact during construction
- **WCHS1** - This site should be mapped and photographed prior to impact
- **WCHS2** - This site should be mapped and photographed prior to impact

12.2 General Recommendations

- In consultation with the relevant Aboriginal communities BHP Billiton should develop a Cultural Heritage Management Plan that includes specific details, monitoring requirements and chronology regarding management requirements for all sites identified in this report.
- The Cultural Heritage Management Plan should be incorporated into the relevant Operational Management Plan for the Stage 3 emplacement project

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FIGURES

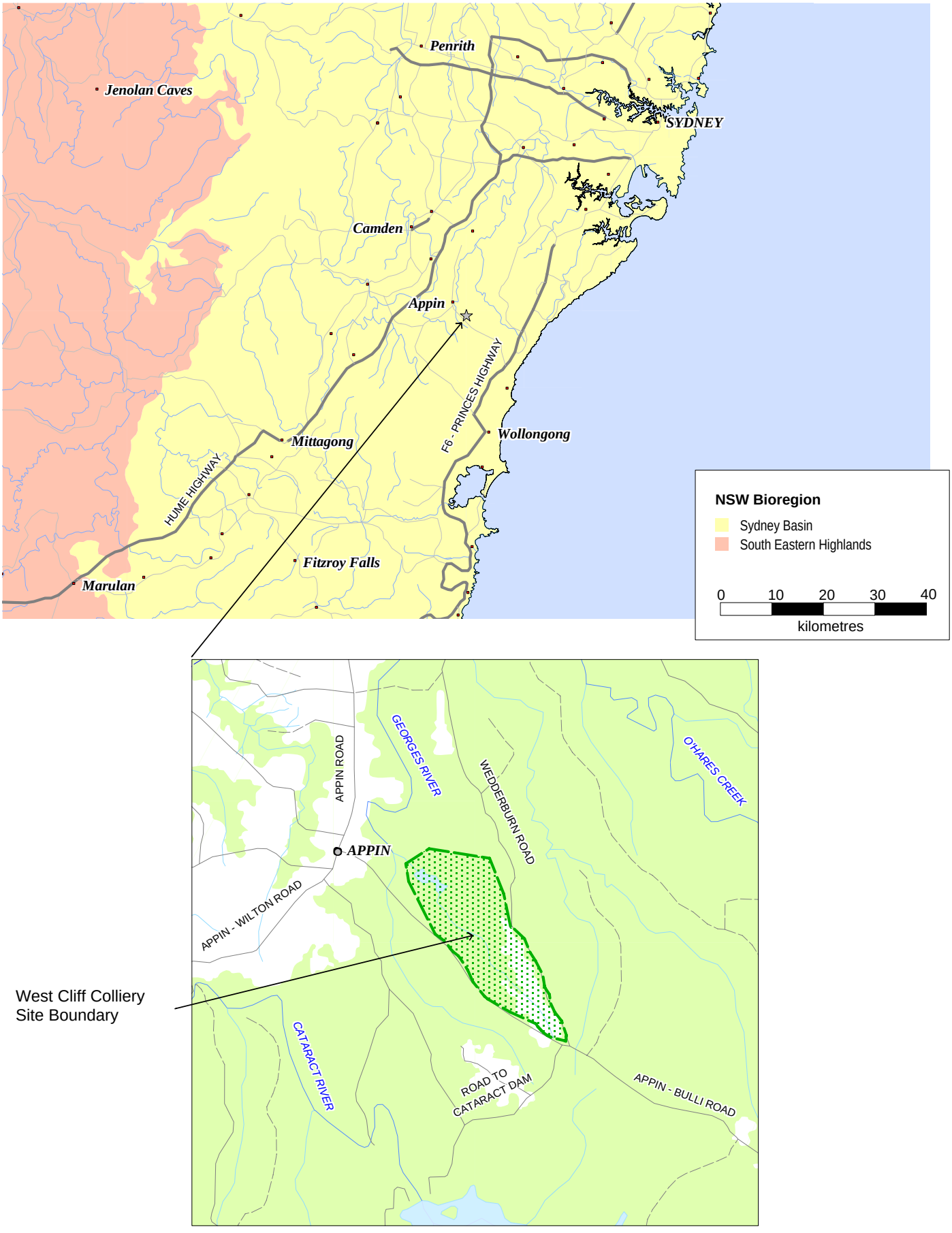

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Figure 1: Location of West Cliff Colliery in a regional context

DATE: 25 May 07 | Checked by: JR | File: S4200

Location:-...4000\4200s\4200\SIS\SIS figures
\S4200 cults_F1 locality.WOR

Scale: 0 1 2 3 4 kilometres

N W E S

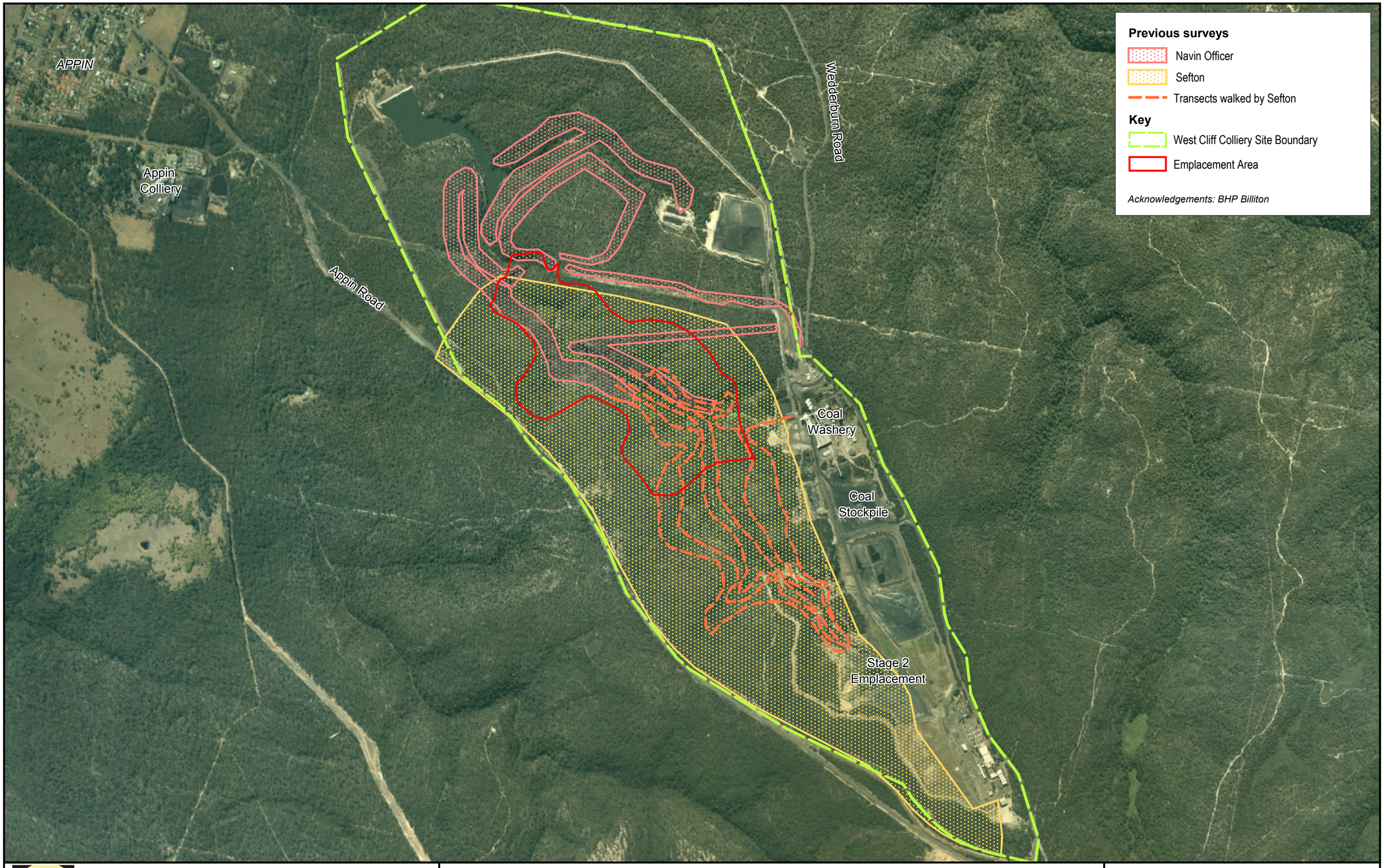

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Figure 2: Previously surveyed areas within West Cliff Colliery.

DATE: 1 June 2007

Checked by: JR | File number: S4200

Location:-..4000\4200s\4200\SIS\SIS figures\S4200 cults_F2 surveys.WOR

Scale: 0 150 300 450 600 750 metres

Figure 2: Previously surveyed areas within West Cliff Colliery.

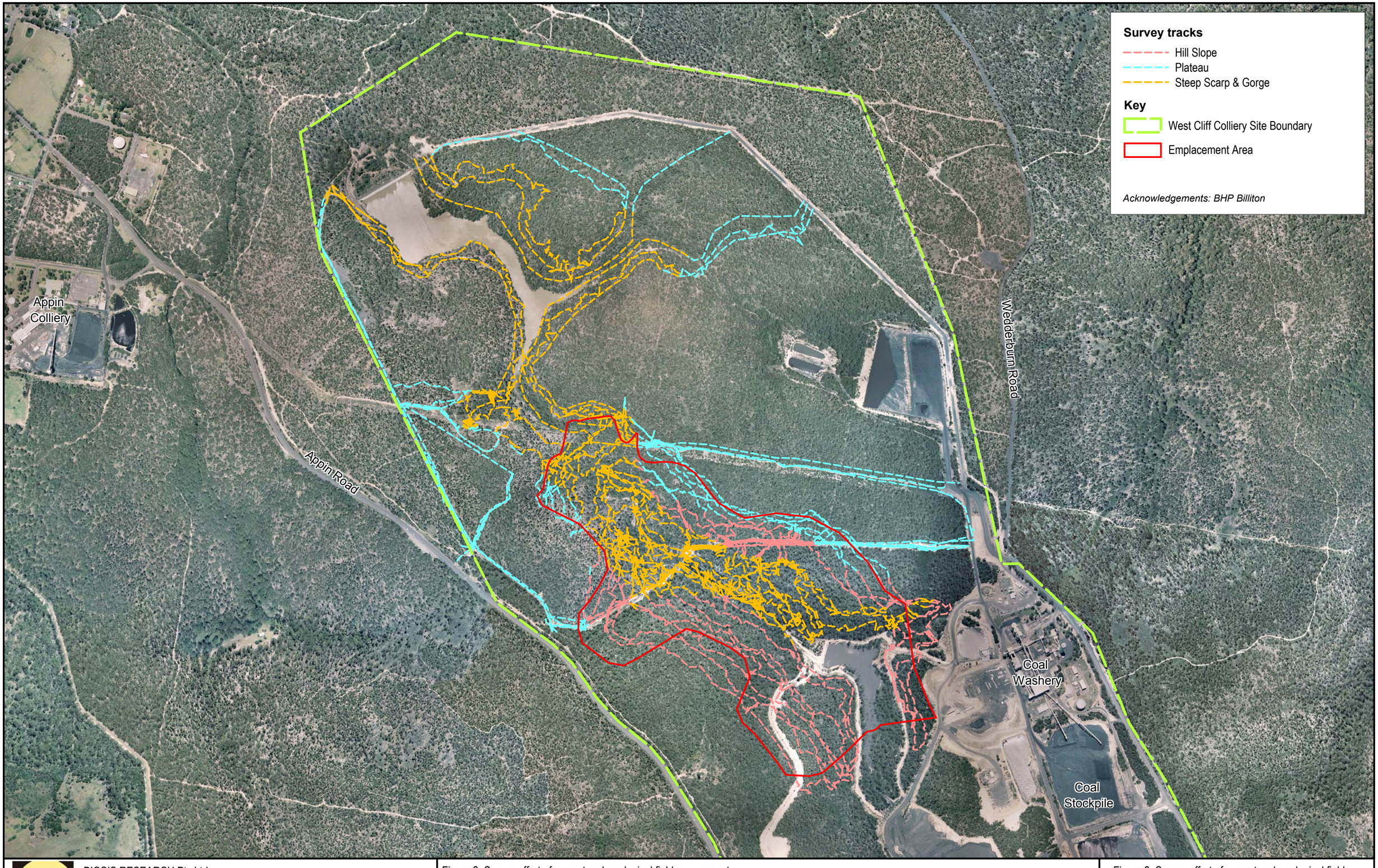

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Figure 3: Survey effort of current archaeological field assessment within the present study area.

DATE: 1 June 2007

Checked by: JR | File number: S4200

Location:-..4000\4200s\4200\SIS\SIS figures\S4200 cults_F3 tracks.WOR

Scale: 0 100 200 300 400 500 metres

Figure 3: Survey effort of current archaeological field assessment within the present study area.

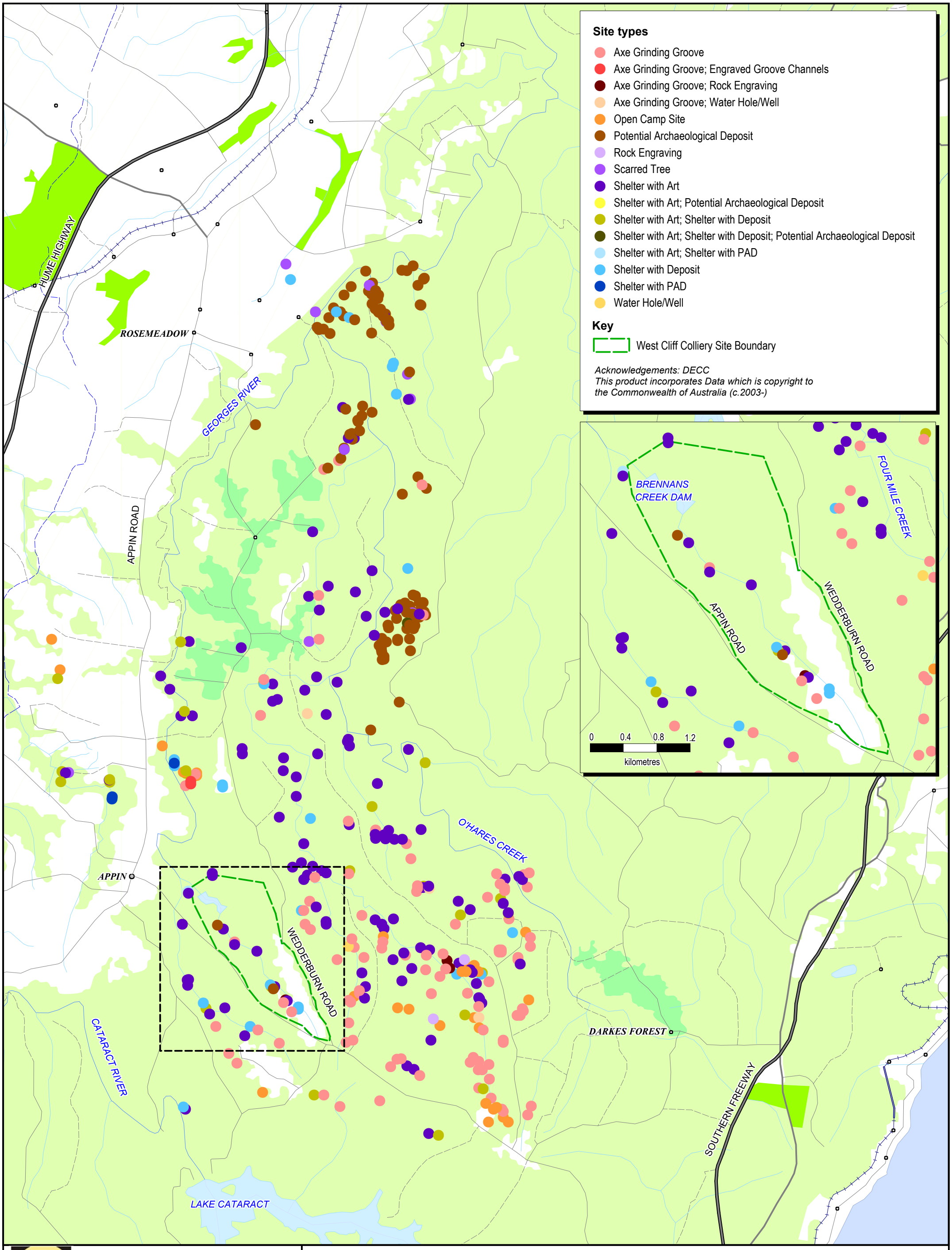

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Figure 4: Regional view showing previously recorded Aboriginal sites from AHIMS search within the Georges and O'Hares Catchments.

DATE: 25 May 2007
Checked by: MR/MT | File number: S4200
Loc:-4000\4200s\4200\SIS\SIS figures\S4200 cults_F4 AHIMS.WOR

Scale: 0 0.6 1.2 1.8 2.4 3.0 kilometres

N W E S

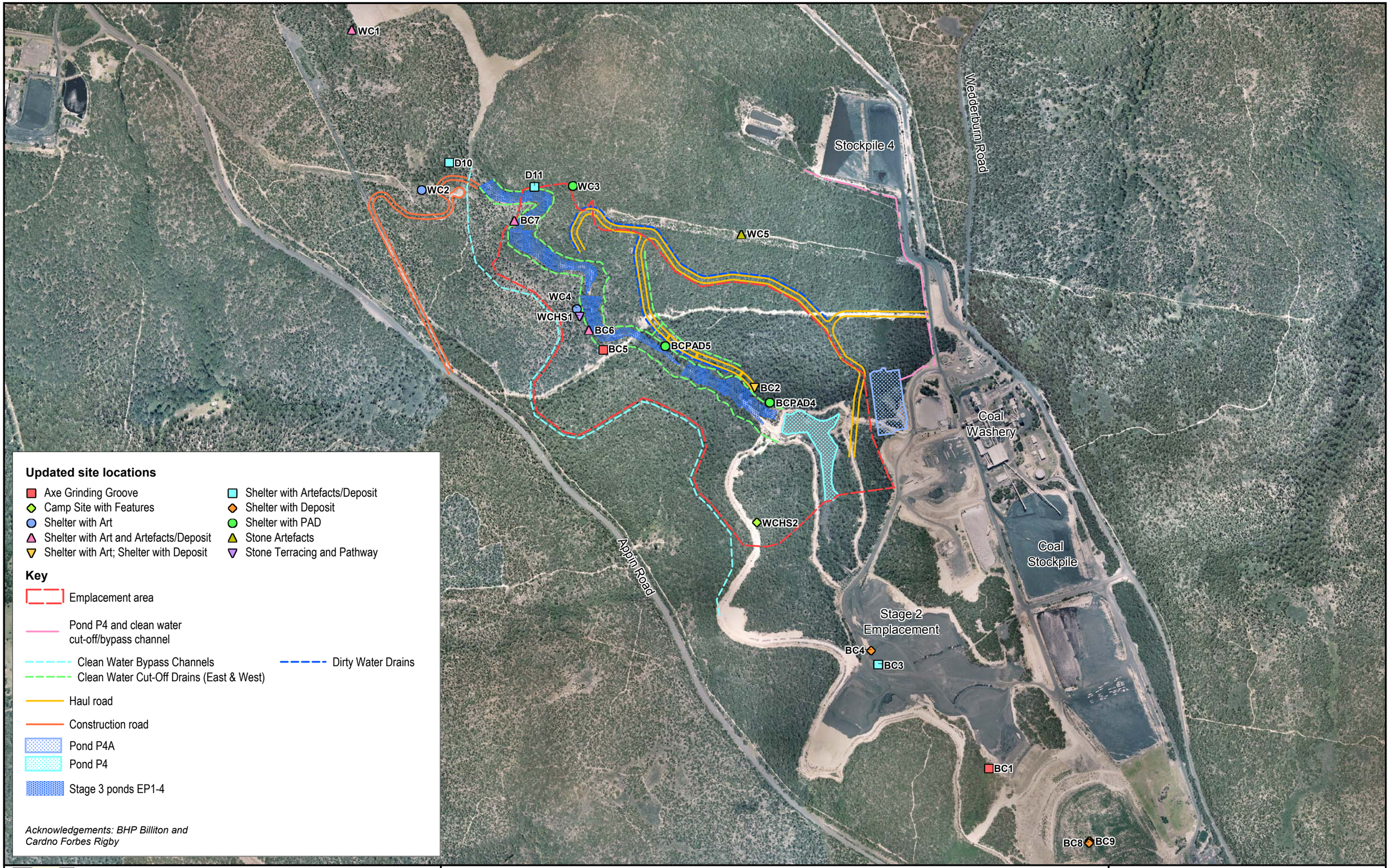

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Figure 5: Recorded Aboriginal sites within the wider West Cliff Colliery study area.

DATE: 19 June 2007
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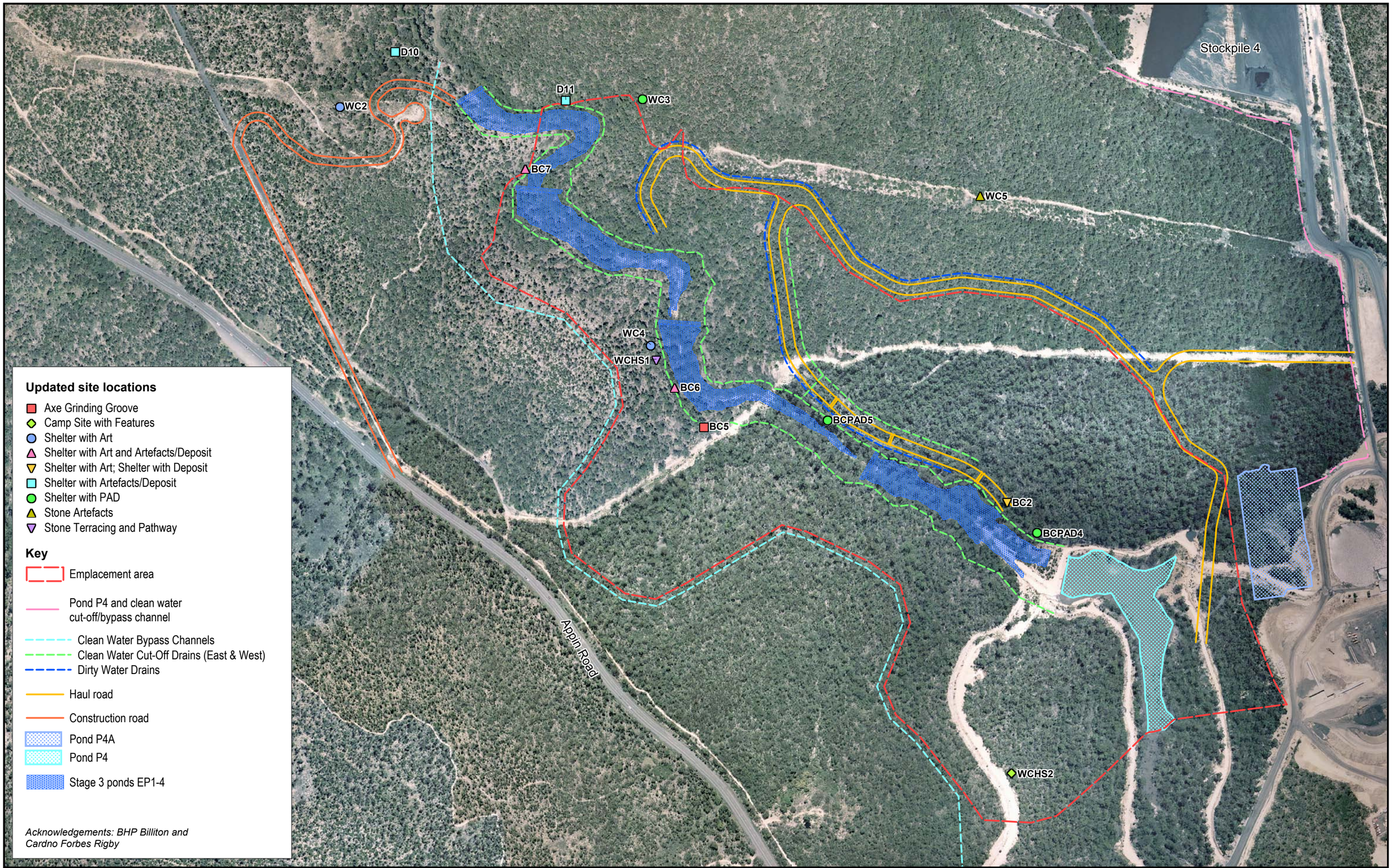
File number: S4200
Location:-..4000\4200s\4200\SIS\SIS fugures\S4200 _cults F5 sites colliery.WOR

Scale: 0 0.1 0.2 0.3 0.4 0.5 kilometres

N W E S

Figure 5: Recorded Aboriginal sites within the wider West Cliff Colliery study area.



Updated site locations

- Axe Grinding Groove
- Camp Site with Features
- Shelter with Art
- Shelter with Art and Artefacts/Deposit
- Shelter with Art; Shelter with Deposit
- Shelter with Artefacts/Deposit
- Shelter with PAD
- Stone Artefacts
- Stone Terracing and Pathway

Key

- Emplacement area
- Pond P4 and clean water cut-off/bypass channel
- Clean Water Bypass Channels
- Clean Water Cut-Off Drains (East & West)
- Dirty Water Drains
- Haul road
- Construction road
- Pond P4A
- Pond P4
- Stage 3 ponds EP1-4

Acknowledgements: BHP Billiton and Cardno Forbes Rigby

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Figure 6: Recorded Aboriginal archaeological sites situated within the proposed Stage 3 Emplacement Area.

DATE: 19 June 2007
Checked by: JR
File number: S4200
Location:-..4000\4200s\4200\SIS\SIS figures\S4200 _cults F6 sites emplacment.WOR

Scale: 0 50 100 150 200 250 kilometres

N W E S

Figure 6: Recorded Aboriginal archaeological sites situated within the proposed Stage 3 Emplacement Area.

AUSTRAL
SANDY POINT
HURSTVILLE
SUTHERLAND
CRONULLA
MAIANBAR
CURRACURRONG
STANWELL PARK
BULLI
NORTH WOLLONGONG
HUME HIGHWAY
GEORGES RIVER
APPIN ROAD
LAKE WORONORA
WEDDERBURN ROAD
O'HARES CREEK
APPIN
CATARACT RIVER
APPIN ROAD
SOUTHERN FREEWAY
LAKE CATARACT
MOUNT OUSLEY ROAD
LAKE CORDEAUX

Site type

- Charcoal Drawings
- Multichrome Drawing
- Multichrome Painting
- Red Ochre Drawings
- Red Ochre Painting
- Rock Engravings
- White Drawings

Key

- West Cliff Colliery Site Boundary

Acknowledgements: Sefton

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Figure 7: Distribution of fish motifs grouped by site type in the Illawarra Prehistory Group areas of interest.

DATE: 19 June 2007
Checked by: MR/MT | File number: S4200
Loc:-4000\4200s\4200\SIS\SIS figures\S4200 cults_F7 fish.WOR

Scale: 0 1.5 3.0 4.5 6.0 7.5 kilometres

N W E S

APPENDICES

APPENDIX 1: LEGISLATION

COMMONWEALTH LEGISLATION

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

In January 2004 the Commonwealth *Australian Heritage Commission Act 1975* was repealed and in its place amendments to the EPBC Act were made. The amendments were contained in three new pieces of Commonwealth Heritage Legislation. The three new Acts are the:

1. Environment and Heritage Legislation Amendment Act (No. 1) 2003 which:

   (a) amends the Environment Protection and Biodiversity Conservation Act 1999 to include 'national heritage' as a new matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution

   (b) establishes the National Heritage List

   (c) establishes the Commonwealth Heritage List

2. Australian Heritage Council Act 2003 which establishes a new heritage advisory body to the Minister for the Environment and Heritage, the Australian Heritage Council, and retains the Register of the National Estate.

3. Australian Heritage Council (Consequential and Transitional Provisions) Act 2003 which repeals the Australian Heritage Commission Act, amends various Acts as a consequence of this repeal and allows for the transition to the new heritage system.

Any place that has been nominated and assessed as having cultural heritage significance at a national level can be added to the National Heritage List.

Under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) an action requires approval from the Federal Environment Minister if the action will, or is likely to, have a significant impact on a matter of national environmental significance. Matters of national environmental significance relating to cultural heritage are:

- World Heritage Places, and
- National Heritage Places.

An action includes a project, development, undertaking, activity, or series of activities.

Actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land), and actions taken by the Commonwealth that are likely to have a significant impact on the environment anywhere in the world, may also require approval under the EPBC Act.

NATIVE TITLE ACT 1993

The Commonwealth Native Title Act establishes the principles and mechanisms for the preservation of Native Title for Aboriginal people.

Under Subdivision P of the Act, *Right to negotiate*, native title claimants can negotiate about some proposed developments over land and waters (known as 'Future Acts') if they have the right to negotiate. Claimants gain the right to negotiate if their native title claimant application satisfies the registration test conditions.

The right to negotiate applies over some proposed developments or activities that may affect native title. These are known as future acts under the Native Title Act 1993. Native title claimants only have the right to negotiate over certain types of future acts, such as mining. Activities such as exploration and prospecting on the land do not usually attract the right to negotiate.

The right to negotiate is not a right to stop projects going ahead — it is a right to have a say about how the development takes place. In some situations, the right to negotiate does not apply. In these circumstances, claimants may have the right to be notified, to be consulted, to object and to be heard by an independent umpire.

The right to negotiate is triggered when a government issues a notice to say that it intends to allow certain things to happen on land, such as granting a mining lease. This notice is called a 'section 29 notice.

People who claim to hold native title in the area, but have not yet made a native title claimant application, have three months from the date given in the section 29 notice to file a claim if they want to have a say about the proposed development. To get the right to negotiate, the claim must be registered within a month after that.

If the right to negotiate applies, the government, the developer and the registered native title parties must negotiate 'in good faith' about the effect of the proposed development on the registered native title rights and interests of the claimants.

The parties can ask the National Native Title Tribunal to mediate during the negotiations.

If the negotiations do not result in an agreement the parties can ask the Tribunal (no sooner than six months after the notification date) to decide whether or not the future act should go ahead, or on what conditions it should go ahead.

The National Native Title Tribunal administers the future act processes under the Commonwealth legislation. The Tribunal's role includes mediating between parties, conducting inquiries and making decisions (called 'future act determinations') where parties can't reach agreements.

When the Tribunal receives a future act determination application, it must conduct an inquiry (an arbitration) in order to determine whether the future act can be done and if so whether any conditions should be imposed.

A member of the Tribunal (or a panel of three members) will be appointed to conduct the inquiry, and will initially hold a preliminary conference and set directions for the parties to provide submissions and evidence. Members who have mediated a particular matter are not usually appointed as inquiry members. Inquiry members conduct hearings, receive submissions and evidence from the parties and take into account matters set out in section 39 of the Native Title Act such as:

- the effect of the future act on the enjoyment by the native title party of their registered native title rights and interests; their way of life, culture and traditions; the development of their social, cultural and economic structures; their freedom of access to the land and freedom to conduct ceremonies and other cultural activities; and the effect of the future act on any area or site of particular (special) significance to the native title party;
- the interests, proposals, opinions or wishes of the native title party;
- the economic or other significance of the future act;
- the public interest; and
- the presence of any existing non-native title rights and interests and use of the land by other persons (for instance, pastoralists).

ABORIGINAL AND TORRES STRAIT ISLANDER HERITAGE PROTECTION ACT 1984

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984 provides protection for Aboriginal cultural property. Whereas the State Act provides legal protection for all the physical evidence of past Aboriginal occupation, the Commonwealth Act deals with Aboriginal cultural property in a wider sense. Such cultural property includes any places, objects and folklore that ‘are of particular significance to Aboriginals in accordance with Aboriginal tradition’. There is no cut-off date and the Act may apply to contemporary Aboriginal cultural property as well as ancient sites.

PROTECTION OF MOVABLE CULTURAL HERITAGE ACT 1986

Australia's movable cultural heritage is protected at both Commonwealth and State levels. This web site only provides information on the Commonwealth laws.

In 1970 the United Nations Educational, Scientific and Cultural Organisation (UNESCO) adopted the UNESCO Convention on the Means of Prohibiting the Illicit Import, Export and Transfer of Ownership of Cultural Property. Australia ratified the convention by passing the *Protection of Movable Cultural Heritage Act 1986* (the Act), giving the 1970 Convention force in Australian law.

The Act regulates the export of Australia's significant cultural heritage objects. It is not intended to restrict normal and legitimate trade in cultural property and does not affect an individual's right to own or sell within Australia.

It implements a system of export permits for certain heritage objects defined by the Act as 'Australian protected objects'. Australian protected objects are objects which form part of the movable cultural heritage of Australia and which meet the criteria established under the National Cultural Heritage Control List. The Control List is located in the Regulations to the Act, and divides Australian protected objects into two classes:

- Class A objects which may not be exported
- Class B objects which may be exported if granted a permit under the Act.

A person wishing to export a Class B object is required to apply for a permit in writing. Applications are processed in accordance with the legislative process established under section 10 of the Act.

Certificates of Exemption, granted under section 12 of the Act, allow Australian protected objects that are currently overseas to be imported into Australia and subsequently re-exported. This includes Class A objects.

The Act also includes provisions that allow Australia to respond to an official request by a foreign government to return movable cultural heritage objects that have been illegally exported from their country of origin.

The *Protection of Movable Cultural Heritage Act 1986* is administered by the Minister for the Environment and Heritage. This responsibility was transferred from the Minister for Communication, Information Technology and the Arts in November 2001.

The Movable Cultural Heritage Unit in the Department of the Environment and Heritage provides the Secretariat to the National Cultural Heritage Committee

STATE LEGISLATION

NATIONAL PARKS AND WILDLIFE ACT 1974

The *National Parks and Wildlife Act 1974* provides for the protection of Aboriginal objects (sites, relics and cultural material) and Aboriginal places. Under the Act (S. 5), 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.*

This includes individual artefacts, scatters of stone artefacts, rock art sites, ancient camp sites, human burials, scarred trees, and ruins and archaeological deposits associated with Aboriginal missions or reserves.

Aboriginal places (areas of cultural significance to the Aboriginal Community declared by the Minister) are protected under Section 84 of the Act.

Aboriginal objects (any material evidence of the Aboriginal occupation of NSW) are protected under Sections 86, 87 and 90 of the Act. Section 86 of the Act identifies that a person, other than the Director-General or a person authorised by the Director-General in that behalf, who:

> *(a) disturbs or excavates any land, or causes any land to be disturbed or excavated, for the purpose of discovering an Aboriginal object*

is guilty of an offence under the NPW Act.

The *National Parks and Wildlife Act* requires that a permit from the Director General be obtained before archaeological fieldwork involving disturbance to an Aboriginal site is carried out. Consent is granted under section 87 and 90 of the Act. Queries and applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork, should directed to the relevant Planning and Aboriginal Section Manager at the appropriate Environment Protection and Regulation Branch office. For this study the relevant branch office is at Parramatta.

Section 91 of the Act requires the mandatory reporting of the discovery of Aboriginal objects, and establishes a mechanism for interim protection orders that may be used to protect objects. Identified Aboriginal objects and sites are registered with the NSW Department of Environment and Conservation (DECC) on the Aboriginal Heritage Information Management System (AHIMS). DECC administers *the National Parks and Wildlife Act 1974*.

HERITAGE ACT 1977

The *Heritage Act 1977* details statutory responsibilities for historic buildings and gardens, historic places and objects, historical archaeological sites, and historic shipwrecks. The Act is administered by the Heritage Council of New South Wales, through the NSW Heritage Office.

The aim of the Act is to conserve the 'environmental heritage' of the state, which includes items such as buildings, works, relics, moveable objects or precincts significant for historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. A 'Place' is defined as an area of land, with or without improvements and a 'Relic' is defined as any:

> *deposit, object or material evidence:*
>
> *(a) which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
>
> *(b) which is 50 or more years old.*

An excavation permit is required for any works, excavations or activities, associated with an archaeological site. Excavation permits are issued by the Heritage Council of New South Wales in accordance with sections 60 or 140 of the *Heritage Act*.

It is an offence to disturb or excavate land to discover, expose or move a relic without obtaining a permit from the NSW Heritage Council.

> *139 Excavation permit required in certain cases*
>
> *(1) A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.*
>
> *(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.*

Excavation permits are usually issued subject to a range of conditions that will relate to matters such as reporting requirements and artefact cataloguing, storage and curation. A permit may be required from the Heritage Council of NSW for works or activities associated with a registered place or object.

General queries about site issues and permit applications can be made to the archaeological officers at the Heritage Office. The contact details are:

NSW Heritage Office

3 Marist Place

PARRAMATTA NSW 2150

Ph: (02) 9873 8500

Fax: (02) 9873 8599

Consultation and discussion with the NSW Heritage Office should begin well before lodging an application for a permit to disturb or destroy a historical archaeological site.

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *NSW Environmental Planning and Assessment Act* will have relevance for all development projects because it requires that environmental impacts are considered in land-use planning and decision making. The definition of 'environment impacts' includes impacts on the cultural heritage of the project area. The Act has three relevant parts: Part III, which governs the preparation of planning instruments; Part IV, which relates to development where consent is required under an environmental planning instrument (EPI); and Part V, which relates to activity where development consent is not required but some other government approval assessments are needed.

Under the Act, local government authorities and The Department of Infrastructure, Planning and Natural Resources (formerly Planning NSW) prepare local and regional environmental planning instruments (LEPs and REPs) to give statutory force to planning controls. These may incorporate specific provisions for conserving and managing archaeological sites.

Integrated Development Assessment (IDA) was introduced under the *Environmental Planning and Assessment Act* so that all matters affecting a development application would be considered by the consent authority in an integrated way.

Integrated Development is one which requires development consent as well as one or more approvals from different government agencies. Such agencies may include NSW DECC or the NSW Heritage Council. If a development is likely to impact a heritage item, the consent authority must refer it, to NSW DECC (for Indigenous objects) or the NSW Heritage Council (for sites listed on the State Heritage Register) prior to approval determination.