DUNMORE HARD ROCK QUARRY – MODIFICATION 9
CROOME WEST EXTENSION
(DA 470-11-2003 MOD 9)

Aboriginal Heritage Management Plan

Prepared for
Boral Resources (NSW) Pty Limited

Shellharbour Local Government Area

September 2017

Ref. 1526

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Document Information

Project Name	Dunmore Hard Rock Quarry – Modification 9, Croome West Extension (DA 470-11-2003 MOD 9) Aboriginal Heritage Management Plan
Project Number	1526
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Client Name	Boral Resources (NSW) Pty Limited
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Approved by	Dr Matthew Kelleher; Alison Nightingale

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1 Introduction

Boral Resources (NSW) Pty Limited ('Boral') is seeking approval to expand the Croome Farm Pit, the westernmost of its existing extraction pits at the Dunmore Hard Rock Quarry on Tabbita Road, Dunmore in the Shellharbour Local Government Area. The pit expansion is required to enable the continuation of quarrying operations.

An Environmental Assessment (EA) was prepared by EMM Consulting Pty Ltd (February 2017) to accompany Boral's application to the Department of Planning and Environment (DP&E) to modify the existing Dunmore Quarry development consent (DA 470-11-2003). The modification for expansion of quarrying activities (Modification 9) is being sought under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by Boral to undertake a detailed Aboriginal archaeological assessment and prepare an Aboriginal Cultural Heritage Assessment Report (CHAR) to inform the Modification 9 EA (KNC 2017). The CHAR was prepared in accordance with the DP&E EA requirements for the project and Office of Environment and Heritage (OEH) requirements and guidelines for Aboriginal community consultation and Aboriginal cultural heritage assessment. The assessment was included in the EA as:

- *Appendix F Aboriginal cultural heritage assessment – "Dunmore Hard Rock Quarry, Proposed Croome Farm West Pit Expansion, Dunmore NSW: Aboriginal Cultural Heritage Assessment Report" (KNC 2017)*

The CHAR identified the proposed quarry expansion would impact on Aboriginal heritage, requiring management and mitigation activities. The OEH submission on the Modification 9 EA requested an Aboriginal Heritage Management Plan (AHMP) be prepared, detailing the required Aboriginal heritage management and mitigation measures, including:

- Aboriginal community consultation;
- Archaeological salvage excavation;
- Long term management of excavated Aboriginal objects; and
- Unexpected finds procedure.

1.1 Purpose and Objectives

This AHMP has been prepared to:

- Facilitate consultation and engagement with the local Aboriginal community to appropriately manage the Aboriginal cultural heritage values associated with the project;
- Describe how Aboriginal heritage will be managed for the project;
- Ensure that impacts to Aboriginal heritage are appropriately mitigated through archaeological salvage excavation;
- Address long term management of salvaged Aboriginal objects; and
- Ensure appropriate controls and procedures are implanted in relation to any unexpected finds, including human remains.

1.2 Implementation of AHMP

Boral is committed to implementing Aboriginal heritage management and mitigation measures as outlined in the CHAR (KNC 2017) and this AHMP. The management strategies within the AHMP work in association with the CHAR and should be implemented in conjunction with the CHAR.

The management and mitigation measures will be implemented following issue of the Modification 9 development consent.

2 Background

2.1 Identified Aboriginal Sites

Three Aboriginal archaeological sites were identified in the proposed expansion area (KNC 2017). The sites were registered on the OEH Aboriginal Heritage Information Management System (AHIMS) in accordance with Section 89A of the *National Parks and Wildlife Act 1974*. The sites are listed in Table 1 and locations shown on Figure 1.

Table 1. Registered Aboriginal sites – Dunmore Quarry Modification 9

AHIMS Site ID	Site Feature	Site Name	Easting	Northing	Datum
52-5-0851	Artefact	Croome West AFT 1	299035	6168718	GDA
52-5-0850	Artefact	Croome West AFT 2	299050	6168911	GDA
52-5-0849	Artefact	Croome West AFT 3	298880	6168925	GDA

Croome West AFT 1 (AHIMS 52-5-0851)
Site Croome West AFT 1 was located on the crest of a north west to south east running spurline in the south eastern portion of the study area and immediately south of a natural reservoir. Test excavation determined the site retained an intact low to moderate density archaeological deposit. 19 artefacts were recovered from seven test units excavated. Artefact density within the test excavation area, extrapolated to square metres, displayed a mean artefact density of 10.86/m^2. Artefact distribution was characterised by a low density deposit with a localised higher density in the middle of the tested area. The occurrence of localised higher density suggested limited horizontal movement within the deposit. The absence of cores and formalised tools within the assemblage indicated the site functioned as an area for maintenance and use of stone tools. The quality and aesthetic nature of the raw material indicated a selective activity area.

The site represented a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. In addition, the range of raw materials and artefact types found at the site and context adjacent to the natural reservoir is unusual. The site demonstrated moderate scientific value and further investigation would contribute to our understanding of Aboriginal landscape use in a location where Aboriginal archaeological objects have not commonly been found. Based on the intactness, representativeness and research potential of the site, Croome West AFT 1 was determined to have moderate archaeological significance (high research values, moderate levels of soils disturbance and low conservation value).

Croome West AFT 2 (AHIMS 52-5-0850)
Site Croome West AFT 2 was located on the crest of a saddle immediately north of a natural reservoir. Test excavation determined the site retained an intact moderate density archaeological deposit. 57 artefacts were recovered from the ten test units excavated. Artefact density within the test excavation area was significantly higher than those of the other two test excavation areas and extrapolated to square metres, the test area displayed a mean artefact density of 22.8/m^2. Artefact distribution was characterised by a moderate density deposit with a localised higher density along the western edge of the tested area. The occurrence of localised higher density suggested limited horizontal movement within the deposit. The assemblage contained a small quantity of cores and formalised tools indicating that the creation of stone tools occurred at the site but was secondary to the maintenance and use of stone tools. The quality and aesthetic nature of the raw material indicated a selective activity area.

The site represented a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. In addition, the range of raw materials and artefact types found at the site and context adjacent to the natural reservoir was unusual. The site demonstrated moderate scientific value and further investigation would contribute to our understanding of Aboriginal landscape use in a location where Aboriginal archaeological objects have not commonly been found. Further investigation may help to answer research questions related to Aboriginal occupation and exploitation of natural volcanic vents/reservoirs in the area, a rare physical landscape feature, as well utilisation of elevated areas such as hillcrests and ridgetops between the coast and sandstone escarpments to the west, transportation routes for movement of people or use of special areas or resources for specific or specialised activities. Based on the intactness, representativeness and research potential of the site, Croome West AFT 2 was determined to have moderate archaeological significance (high research values, moderate levels of soils disturbance and low conservation value).

Croome West AFT 3 (AHIMS 52-5-0849)
Site Croome West AFT 3 was located on the crest of hill in the western portion of the study area. Test excavation determined the site retained an intermittent low density archaeological deposit. Ten artefacts were recovered from the ten test units excavated. Artefact density within the test excavation area, extrapolated to square metres, displayed a mean artefact density of 4/m^2. Artefact distribution was characterised by an intermittent low density deposit. The overall unfocussed low density deposit and close proximity to structures suggested the deposit had been disturbed (house, outbuildings, agricultural activities and tree clearance). The absence of cores and formalised tools within the assemblage indicated the site functioned as an area for the maintenance and use of stone tools. The lower overall artefact density indicated the site area was a secondary/support activity location for limited maintenance.

The site represented a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. The site demonstrated low scientific value due to the disturbed nature and low density of the archaeological deposit. It is unlikely that further investigation would contribute to our understanding of Aboriginal landscape use in the region. Based on the intactness, representativeness and research potential of the site, Croome West AFT 3 was determined to have low archaeological significance.

2.2 Impact of Proposal on Aboriginal Objects

The entirety of the Modification 9 pit expansion area would be impacted by quarrying and associated activities. The expansion of quarrying operations will remove the three identified Aboriginal archaeological sites (Table 2).

Table 2. Modification 9 impact on Aboriginal sites

AHIMS Site ID	Site Name	Type of harm	Degree of harm	Consequence of harm	Significance of harm
52-5-0851	Croome West AFT 1	Direct	Total	Total loss of value	Moderate
52-5-0850	Croome West AFT 2	Direct	Total	Total loss of value	Moderate
52-5-0849	Croome West AFT 3	Direct	Total	Total loss of value	Low

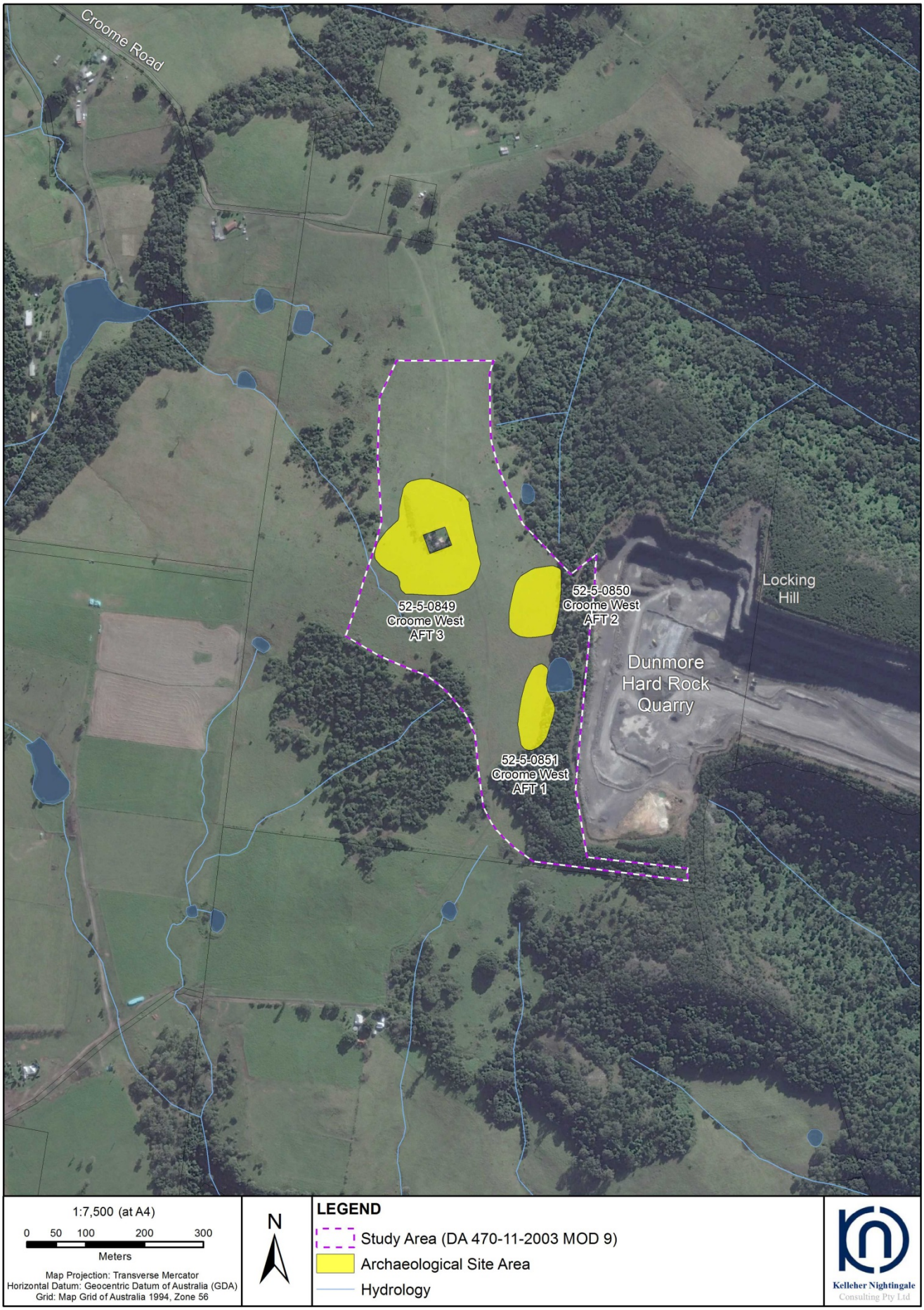

Figure 1. Aboriginal archaeological sites

3 Aboriginal Community Consultation

- **Registered Aboriginal Stakeholders will be consulted and provided with an opportunity to participate in the archaeological salvage excavation and contribute to the Aboriginal heritage assessment reporting.**

Boral is committed to effective consultation with the local Aboriginal community regarding their activities and Aboriginal cultural heritage values.

Twelve Aboriginal community groups or individuals registered their interest in the Modification 9 project. The Registered Aboriginal Stakeholders are listed in Table 3.

Table 3. Registered Aboriginal Stakeholders – Dunmore Quarry Modification 9

Registered Aboriginal Stakeholder	Representative and/or Contact Person
Illawarra Local Aboriginal Land Council	Derek Hardman
Peter Falk Consultancy	Peter Falk
Minnamunnung	Aaron Broad
Gundungurra Tribal Technical Services	Christopher Payne
Woronora Plateau Gundungara Elders Council	Paul Cummins
Goobah	Basil Smith
Biamanga	Seli Storer
Cullendulla	Corey Smith
Gary Caines	Gary Caines
Gulaga	Wendy Smith
Murramarang	Roxanne Smith
Registered Aboriginal Stakeholder*	Details withheld

* Details withheld in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*

Registered Aboriginal Stakeholders for the Modification 9 project have expressed the cultural heritage significance of the project area. Registered Aboriginal stakeholders will continue to be consulted in relation to impacts on Aboriginal cultural heritage and the archaeological salvage excavations.

Registered Aboriginal stakeholders have been consulted regarding the proposed management and mitigation measures outlined in this Aboriginal Heritage Management Plan. Registered Aboriginal Stakeholders have verbally expressed their support for the archaeological salvage program and their interest in participating in the salvage excavation, given the Aboriginal cultural heritage significance of the project area. No written comments were provided on the proposed management and mitigation measures or archaeological salvage methodology. A copy of the draft management plan has been provided to Registered Aboriginal Stakeholders for review and comment. Responses received will be incorporated into the Aboriginal Heritage Management Plan.

Registered Aboriginal Stakeholders will be provided with an opportunity to participate in the archaeological salvage program and contribute to the Aboriginal heritage assessment reporting.

Registered Aboriginal Stakeholders will be provided with a draft salvage excavation report for review and comment. Aboriginal stakeholder comments will be included in the final report.

Registered Aboriginal Stakeholders have been consulted on the storage and long term management of recovered Aboriginal objects.

Consultation with Registered Aboriginal Stakeholders will follow OEH consultation requirements as applicable *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010).

4 Archaeological Salvage Excavation

- **Archaeological salvage excavation will be undertaken according to the methodology attached as Appendix E to the CHAR (KNC 2017) to mitigate project impacts on Aboriginal heritage. The salvage program will be undertaken in consultation with Registered Aboriginal Stakeholders. Salvage excavation will occur following issue of Modification 9 approval and prior to commencement of actions in those areas.**

The following management and mitigation measures are required for identified Aboriginal heritage within the project area.

4.1 Management and Mitigation Required

The archaeological sites in Table 4 are of moderate Aboriginal heritage significance and will be impacted by the project. These sites require archaeological salvage excavation to mitigate the impacts. Salvage excavation can only occur after project approval is obtained.

The sites in Table 4 should be identified and protected until salvage excavation works have been completed at these sites (e.g. temporary fencing and/or identification in environmental management plan). The location of the sites in Table 4 should be monitored by the Applicant prior to the completion of salvage excavation.

Salvage excavation must be completed prior to any activities which may harm Aboriginal objects at these site locations.

Salvage excavation activities would be undertaken in accordance with the methodology attached as Appendix E to the CHAR (KNC 2017).

Table 4. Aboriginal sites requiring mitigation (salvage excavation)

Archaeological sites requiring management and mitigation	
Archaeological Sites (requiring salvage)	Croome West AFT 1 (AHIMS 52-5-0851) Croome West AFT 2 (AHIMS 52-5-0850)

4.2 No Archaeological Mitigation Required

No archaeological mitigation is required for the site in Table 5. The site may only be impacted after project approval is obtained.

Table 5. Aboriginal sites with no further archaeological mitigation required

No further archaeological mitigation required	
Archaeological Sites (no archaeological mitigation)	Croome West AFT 3 (AHIMS 52-5-0849)

4.3 Archaeological Salvage Excavation Report

An Archaeological Salvage Excavation Report will be prepared to document the findings of the archaeological salvage excavation program. The report will:

- include an executive summary
- describe the methods and results of the salvage excavation program
- describe any ongoing consultation with and involvement of Registered Aboriginal Stakeholders
- be completed with input and consultation with Registered Aboriginal Stakeholders
- detail the results of the analysis of recovered Aboriginal objects
- detail the long term management of Aboriginal objects
- include a statement of compliance with approval conditions and management and mitigation measures, and
- confirm that Aboriginal Site Impact Recording Forms have been completed and submitted to the OEH AHIMS Registrar.

5 Management of Salvaged Aboriginal Objects

- **Salvaged Aboriginal objects will be managed at a temporary storage location for analysis and reporting purposes and lodged for long term management with the Australian Museum.**

The short term management of excavated Aboriginal objects is as follows:

- Any Aboriginal objects that are removed from the land by actions authorised by the project approval, must be moved as soon as practicable to the temporary storage location (see below) for analysis, reporting and preparation for the long term management of the Aboriginal objects.
- The temporary storage location would be: Kelleher Nightingale Consulting Pty Ltd, Level 10, 25 Bligh Street, Sydney NSW 2000.
- Any Aboriginal objects stored at the temporary storage location must not be further harmed, except in accordance with the conditions of the approval.

The long term management of excavated Aboriginal objects is as follows:

- Once all analysis has been completed, recovered objects will be lodged with the Australian Museum in accordance with the *Australian Museum Archaeological Collection Deposition Policy* (January 2012, available online at: http://australianmuseum.net.au/document/Protocols-for-the-deposition-of-archaeological-materials).

6 Aboriginal Site Impact Recording Form

- **An Aboriginal Site Impact Recording Form will be completed following impacts to AHIMS sites authorised by the project approval.**

An Aboriginal Site Impact Recording Form (ASIRF) will be prepared and submitted to the AHIMS Registrar for each site, following impacts from actions authorised by the project approval. The Aboriginal Site Impact Recording Form is available online at: http://www.environment.nsw.gov.au/resources/cultureheritage/120558asirf.pdf

7 Heritage Training and Induction Process

- **Aboriginal heritage management procedures will be included in construction personnel training and induction process.**

Aboriginal heritage management procedures and responsibilities for compliance will form part of the project induction for construction personnel (employees, contractors, subcontractors and/or agents). This will include site identification (including construction heritage site map) to ensure all personnel are aware of Aboriginal heritage management responsibilities, issues affecting their activities and procedures for dealing with unexpected finds including human remains.

8 Unexpected Finds Procedure

- **Any unexpected Aboriginal heritage items (Aboriginal objects) will be managed appropriately.**

In the event that an unexpected find (Aboriginal object) is encountered the following procedure will apply:

1. Stop work and protect find area and report to environmental manager
2. Contact heritage advisor for identification
    a. No further action if the find is not an Aboriginal object
    b. If the find is an Aboriginal object proceed to next step
3. Undertake relevant regulatory requirements and contact with OEH/DP&E where required
4. Implement conservation or mitigation strategy
5. Obtain approval if required and comply with conditions
6. Recommence work

9 Suspected Human Remains

- **Note that Project Approvals do not include the destruction of human remains.**
- **Any potential human remains encountered will be protected and managed appropriately.**

All human remains in, on or under the land must not be harmed.

If suspected human remains are uncovered at any point, the following procedure will be implemented in accordance with *Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977* (NSW Heritage Office 1998) and the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NPWS 1997):

1. as soon as remains are exposed, all work is to halt at that location immediately and the Project environmental manager is to be immediately notified to allow assessment and management;
    i. stop all activities
    ii. secure the site
    iii. not further harm the remains
2. contact police, the discovery of human remains triggers a process which assumes that they are associated with a crime. The NSW Police retain carriage of the process until such time as the remains are confirmed to be Aboriginal or historic;
3. DP&E, as the approval authority, will be notified when human remains are found;
4. once the police process is complete and if remains are not associated with a contemporary crime contact DP&E. DP&E will determine the process, in consultation with OEH and/or the Heritage Division as appropriate;
    i. if the remains are identified as Aboriginal, the site is to be secured and DP&E and all Aboriginal stakeholders are to be notified in writing. DP&E will act in consultation with OEH as appropriate. OEH will be notified in writing according to DP&E instructions; or
    ii. if the remains are identified as non-Aboriginal (historical) remains, the site is to be secured and the DP&E is to be contacted. DP&E will act in consultation with the Heritage Division as appropriate. The Heritage Division will be notified in writing according to DP&E instructions;
5. once the police process is complete and if the remains are identified as not being human work can recommence once the appropriate clearances have been given.

References

DECCW, 2010. *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010: Part 6 National Parks and Wildlife Act 1974*. Department of Environment, Climate Change and Water NSW, Sydney.

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NSW National Parks and Wildlife Service (NPWS), 1997. *Aboriginal Cultural Heritage Standards and Guidelines Kit*. NSW National Parks and Wildlife Service, Hurstville.

DUNMORE HARD ROCK QUARRY
PROPOSED CROOME FARM WEST PIT EXPANSION
DUNMORE, NSW

Aboriginal Cultural Heritage Assessment Report

Prepared for Boral Resources (NSW) Pty Limited

Shellharbour Local Government Area

June 2017

Ref. 1526

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Document Information

Project Name	Dunmore Hard Rock Quarry – Proposed Croome Farm West Pit Expansion, Dunmore NSW Aboriginal Cultural Heritage Assessment Report
Project Number	1526
Revision	0.5
Client Name	Boral Resources (NSW) Pty Limited
Recipient	Kate Jackson, Planning and Development Manager BPG (Southern Region)
Issue Date	14 June 2017
Prepared by	Dr Matthew Kelleher; Mark Rawson; Ben Anderson
Approved by	Dr Matthew Kelleher; Alison Nightingale

Executive Summary

Boral Resources (NSW) Pty Limited ('Boral') is seeking approval to expand the Croome Farm Pit, the westernmost of its existing extraction pits at the Dunmore Hard Rock Quarry, Dunmore NSW. The Dunmore Quarry is among Boral's longest operating sites, having been worked for more than 90 years. The proposed pit expansion is required to enable the continuation of the current quarrying operations.

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by Boral to undertake a detailed Aboriginal cultural heritage assessment comprising Aboriginal community consultation and archaeological investigations, including test excavation program, and prepare an Aboriginal Cultural Heritage Assessment Report (CHAR) to inform the Environmental Assessment (EA) for the expansion project.

The assessment was carried out in accordance with the NSW Department of Planning and Environment EA requirements for the project and Office of Environment and Heritage (OEH) requirements and guidelines for Aboriginal community consultation and archaeological assessment including the D*ue Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales; Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW; Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and *Aboriginal cultural heritage consultation requirements for proponents 2010*.

Consultation with Aboriginal communities was undertaken to identify Aboriginal heritage in the study area, assess impacts of the proposed expansion activities and develop appropriate mitigation measures. Registered Aboriginal stakeholders consulted and involved in the assessment included:

- Biamanga
- Cullendulla
- Gary Caines
- Goobah
- Gulaga
- Gundungurra Tribal Technical Services
- Illawarra Local Aboriginal Land Council
- Minnamunnung
- Murramarang
- Peter Falk Consultancy
- Woronora Plateau Gundungara Elders Council
- one additional Aboriginal group/individual (details withheld in accordance with OEH consultation requirements).

Three Aboriginal archaeological sites were identified in the proposed pit expansion area: Croome West AFT 1, Croome West AFT 2 and Croome West AFT 3. All three sites would be impacted by the proposed works.

Archaeological significance of the identified Aboriginal sites was determined by their research value, representativeness, intactness and rarity. On the basis of these criteria, sites Croome West AFT 1 and Croome West AFT 2 have moderate archaeological significance and site Croome West AFT 3 low archaeological significance.

Consultation with the 12 registered Aboriginal stakeholders identified the study area has cultural heritage value to the local Aboriginal community. In particular, Aboriginal stakeholders expressed the cultural importance and significance of the landscape around the study area.

A mitigation program comprising archaeological salvage, undertaken prior to the commencement of the proposed works, is required where portions of significant Aboriginal sites would be impacted by the proposal. Significant Aboriginal sites are identified as exhibiting at least moderate archaeological value. Two sites within the study area require salvage excavation: Croome West AFT 1 and Croome West AFT 2.

The significance of the Croome West archaeological resource resides in the information it contains, as opposed to its conservation potential. The archaeological deposit suffers from vertical disturbance, which negates the long term conservation value of the site. However, the rarity of the archaeological landscape and selective nature of the identified Aboriginal objects means that recovery of the site's information will add substantial scientific and cultural knowledge. In this regard, salvage excavation of the Croome West archaeological resource is the best heritage outcome for the site.

Project approval is sought for the entirety of the lands subject to the proposed quarry expansion and specifically for Aboriginal objects associated with sites:

Croome West AFT 1	Artefact	Moderate significance	Total Impact	Salvage excavation to mitigate impact
Croome West AFT 2	Artefact	Moderate significance	Total Impact	Salvage excavation to mitigate impact
Croome West AFT 3	Artefact	Low significance	Total Impact	

Contents

Figures

Tables

1 Introduction

Boral Resources (NSW) Pty Limited ('Boral') is seeking approval to expand the Croome Farm Pit, the westernmost of its existing extraction pits at the Dunmore Hard Rock Quarry, Dunmore (Figure 1). The Dunmore Hard Rock Quarry is among Boral's longest operating sites, having been worked for more than 90 years. The quarry's location directly adjacent to the South Coast Railway and Princes Highway has been instrumental in its suitability for the use of its site materials for numerous projects across Sydney, the Illawarra, Southern Highlands and beyond. The proposed pit expansion is required to enable the continuation of the current quarrying operations.

Kelleher Nightingale Consulting Pty Ltd (KNC) was engaged by Boral to undertake an Aboriginal archaeological assessment and prepare an Aboriginal Cultural Heritage Assessment Report (CHAR) to inform the Environmental Assessment (EA) for the expansion project.

The CHAR has been prepared in accordance with the NSW Department of Planning and Environment EA requirements for the project and Office of Environment and Heritage (OEH) requirements and guidelines for Aboriginal community consultation and archaeological assessment.

1.1 Location and scope of activity

The proposed Croome Farm Pit extension area, referred to as Croome Farm West Pit (hereafter referred to as the study area), comprises approximately 20 hectares on the western side of the existing extraction pit (Figure 2). The study area is located to the west of Locking Hill within Lots 1 and 2 DP224597 in the Shellharbour Local Government Area. The proposed activity involves the expansion of quarrying activities into this area.

1.2 Project requirements

The objective of the Aboriginal cultural heritage assessment was to combine Aboriginal community consultation with archaeological investigation to identify if the proposed expansion would impact on Aboriginal cultural heritage and if so, what measures could be undertaken to manage or mitigate Aboriginal heritage impacts.

The assessment was carried out in accordance with the:

- NSW Department of Planning and Environment requirements;
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH 2010a);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (OEH 2010b);
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011); and
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010c).

The assessment included:

- effective consultation with Aboriginal communities to identify Aboriginal heritage in the study area, assess impacts of the proposed expansion activities and develop appropriate mitigation measures;
- detailed archaeological investigation of the study area, including archaeological test excavation;
- Aboriginal cultural heritage assessment, including both cultural and archaeological significance; and
- proposed impact mitigation and management measures.

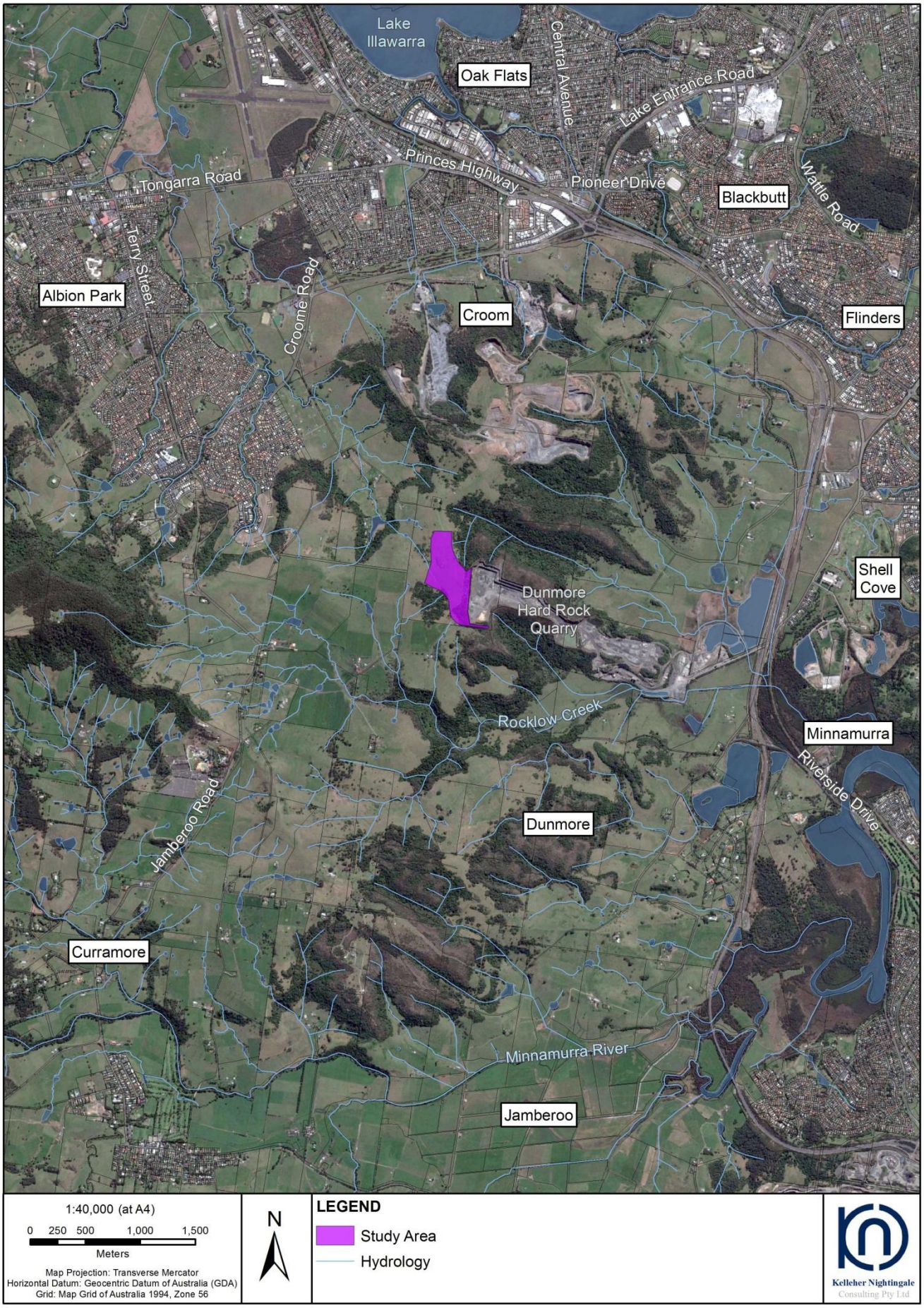

Figure 1. Location

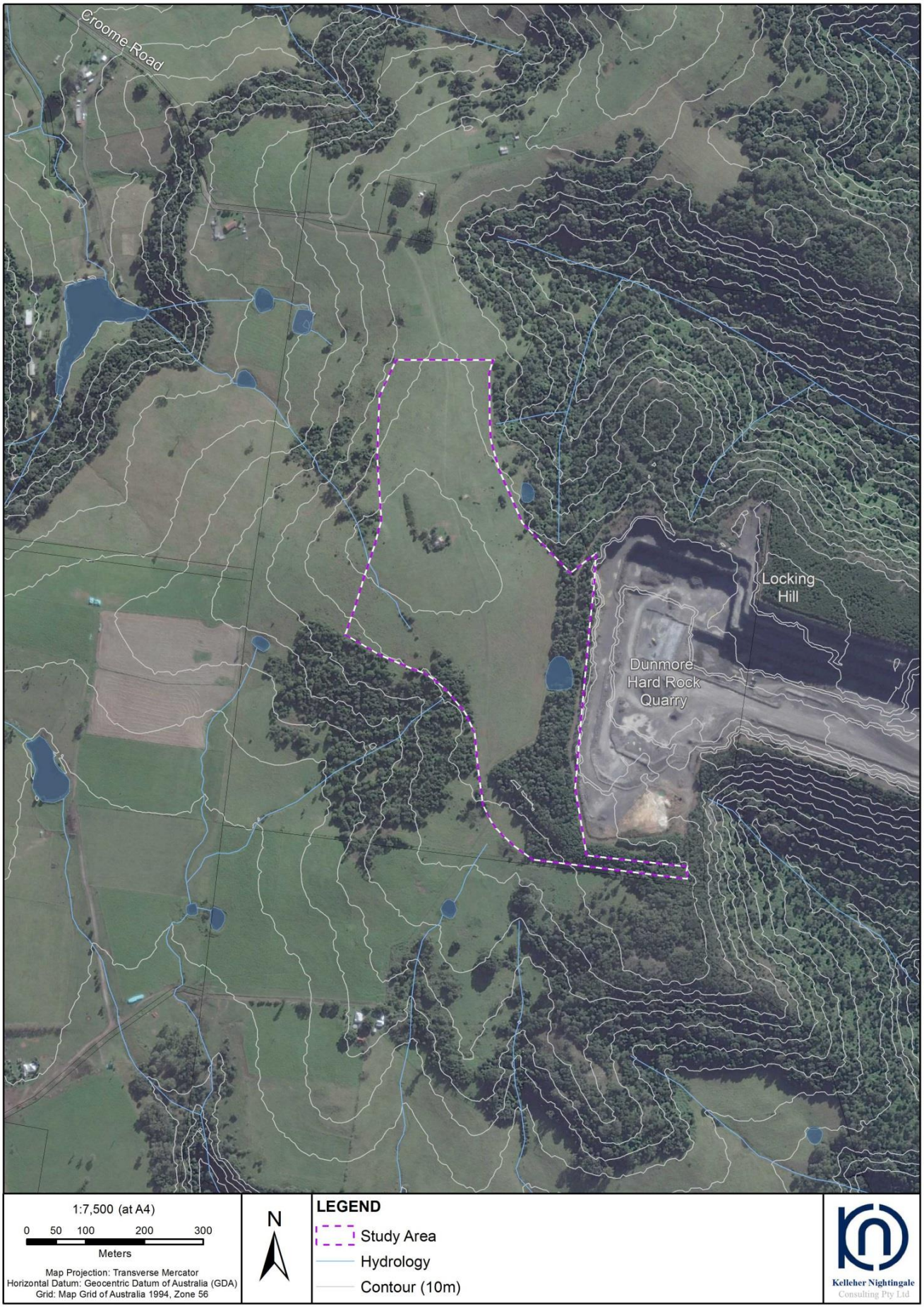

Figure 2. Proposed expansion area (study area)

2 Aboriginal Community Consultation

The aim of Aboriginal community consultation is to integrate cultural and archaeological knowledge and ensure registered stakeholders have information to make decisions on Aboriginal cultural heritage. For the preparation of this CHAR consultation with Aboriginal people has been undertaken in accordance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH 2010c) and the requirements of Clause 80C of the *National Parks and Wildlife Regulation 2009*. The formal consultation process has included:

- government agency notification letters (letters dated 01/03/2016);
- advertising for registered stakeholders in local media (Illawarra Mercury 03/05/2016: refer Appendix A);
- notification of closing date for registration (17/05/2016);
- ongoing compilation of registrants list, through continuing to register individuals and groups for consultation on the project;
- provision of project information and proposed cultural heritage assessment methodology (letters dated 30/06/2016) allowing for a 28 day review period;
- provision of proposed test excavation methodology for comment and review (30/06/2016), allowing for a 28 day review period;
- invitation to all registered Aboriginal stakeholder groups to participate in test excavation program;
- provision of draft CHAR (28 day review period); and
- ongoing consultation with the local Aboriginal community.

Aboriginal stakeholders were consulted throughout all stages of the assessment process and consultation details are attached in Appendix B.

2.1 Registration of interest

Aboriginal people who hold knowledge relevant to determining the cultural heritage significance of Aboriginal objects and Aboriginal places in the area were invited to register an interest in a process of community consultation. Twelve groups or individuals registered an interest in the project. Investigations for the Croome Farm West Pit included consultation with Aboriginal community individuals and groups as listed in Table 1.

Table 1. Registered Aboriginal stakeholders

Registered Aboriginal Stakeholder	Representative and/or Contact Person
Illawarra Local Aboriginal Land Council	Derek Hardman
Peter Falk Consultancy	Peter Falk
Minnamunnung	Aaron Broad
Gundungurra Tribal Technical Services	Christopher Payne
Woronora Plateau Gundungara Elders Council	Paul Cummins
Goobah	Basil Smith
Biamanga	Seli Storer
Cullendulla	Corey Smith
Gary Caines	Gary Caines
Gulaga	Wendy Smith
Murramarang	Roxanne Smith
Registered Aboriginal Stakeholder*	Details withheld

*One additional Aboriginal group/individual has registered for consultation on this project. This group/individual has chosen to withhold their details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* and is not included in the table above

2.3 Aboriginal community involvement

All registered Aboriginal stakeholders have participated in the Aboriginal cultural heritage assessment. Each stakeholder was invited to provide a representative to participate in the site investigations and test excavation program. The program was undertaken over six days between 29th August and 6th September 2016. Stakeholder representatives included:

- Aaron Broad (representing Minnamunnung);
- Basil Smith (representing Biamanga);
- Craig Tungai (representing Illawarra Local Aboriginal Land Council and Gary Caines);
- Newton Carriage (representing Goobah);
- Paul Cummins (representing Woronora Plateau Gundungara Elders Council);
- Richard Dutton (representing Murramarang and Cullendulla);
- Shane Hoskins (representing Gundungurra Tribal Technical Services); and
- one additional stakeholder (details withheld in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*).

2.4 Aboriginal cultural heritage values

The consultation process has identified that the study area has cultural heritage value to the local Aboriginal community. Some of the values expressed by stakeholders include:

- strong association with the land;
- responsibility to look after the land, including the heritage sites, plants and animals, creeks, rivers and the land itself;
- landscape features;
- artefacts found on the site;
- natural reservoirs;
- Indigenous plants and animals; and
- general concern for burials, as their locations are not always known and they can be found anywhere.

In particular, registered Aboriginal stakeholders have expressed the cultural importance and significance of the landscape around the study area, however no specific cultural information was offered for the specific study area.

One Aboriginal stakeholder (phone call dated 12/05/2016) expressed family connection to the area including knowledge of burials in the wider locality (not within the study area). He also advised that the general locale was significant due to the remaining native plants and animals in the area. Specifically, he referenced the mangroves to the east as some of the last mangroves left along the east coast and that a population of an endangered microbat was living in a gully to the south of the study area. The stakeholder also requested a site visit as it was “too important an area, not to do one” and subsequently participated in the fieldwork carried out to assess the area.

Paul Cummins of the Woronora Plateau Gundungara Elders Council (phone call dated 12/05/2016) advised that his family had a personal connection to the area, noting a family burial within the region (not within the study area). He also reinforced that that study area was of great significance to the wider Aboriginal community. Gary Caines (email dated 18/5/16) expressed interest in the study area and his ability to assess the cultural significance of objects and/ or places in Dunmore and across the Illawarra. Peter Falk Consultancy (email dated 6/05/16) also stated that they have Aboriginal cultural knowledge of the area, having worked in the Dunmore area before. They also expressed approval in the project methodologies (email dated 4/07/16).

Christopher Payne of Gundungurra Tribal Technical Services (phone call dated 28/07/16) asked for clarification of the location map and minor points of the project methodology. He also recommended a walkover take place to get an idea of the land from a ground view, as this cannot be assessed from an aerial photo or map. He stated that he was satisfied with the remainder of the methodology and indicated his organisation would be interested in undertaking any fieldwork and subsequently participated in the fieldwork program.

Comments regarding the cultural importance and significance of the area were reinforced through on site discussions which took place during the test excavation program.

3 Description of the Area

3.1 Landform, geology and soil landscape

The study area is situated atop Locking Hill, which forms part of the eastern foothills of the Illawarra Escarpment. The Illawarra Escarpment and Coastal Plain form a physiographic sub-region of the Sydney Basin. The Sydney Basin is a large geological feature stretching from Batemans Bay in the south to Newcastle in the north and Lithgow in the west. The basin formed between the Permian and Triassic when sedimentary rocks were created by the deposition of sediment from fluctuating marine advance and regression onto older basement rocks of the Lachlan Fold Belt and Late Carboniferous volcanoclastic sediments (Mayne et al. 1974). Earth movements between 180 and 200 million years ago within the southern side of the basin forced the layers of sedimentary and volcanic rock upwards (Young 1980a). The combination of erosion and the downward movement of debris on the southern side of the basin produced the Illawarra Escarpment which stretches from the Royal National Park in the north to Berry in the south and overlooks the Illawarra Coastal Plain.

The basal geology of the study area consists of Bumbo Latite, a member of the Gerringong volcanic facies and an intrusive feature of the Budgong Sandstone Formation (Figure 3). Bumbo Latite is a fine grained basalt-like aphanitic to porphyritic latite which formed during the Permian Period (Bowman 1974:37). The latite ranges from mid grey to black in colour with commonly occurring columnar jointing, breccia zones and inclusions of metamorphosed sandstones. In areas of the thickest development, the latite occurs in three flows that are separated by breccia zones and discontinuous sediment. The Kiama and Jamberoo Sandstones are present to the south and west of the study area and alluvial Quaternary valley fill has developed along the creek systems which dissect and drain the escarpment foothills. To the east, the Holocene development of the estuarine barrier and coastal plain system is evidenced by a complex depositional history reflecting the area's past as beach, saline swamp, tidal delta, estuary and subsequent fresh water alluvial swamp and floodplain.

Soils within the study area are derived from the Bombo Soil Landscape, developed on the low rolling hills (slope gradients 15% - 25%) of the escarpment foothills with benched slopes underlain by the Bumbo Latite (Figure 4). The erosional Bombo Soil Landscape is characterised by structured loams on crests, moderately deep krasnozems on upper slopes and benches while brown or red podzolic soils occur on mid to lower slopes. These soils include sandy clay loam or sandy loam topsoil to 0.15 m in depth underlain by light medium clay, sandy clay or medium clay subsoils. Limitations of the soils include rock outcrop and hard setting character. Soils within the immediate vicinity of the study area are characterised by reddish brown friable to clayey loams with depths ranging from 0.2m to 3m.

Analysis of European land use and subsequent effect on regional soils has identified that while evidence for erosion in the form of gullying and sheet erosion is widespread, overall soil erosion in the Illawarra region is generally low (Young 1980b). This relates to the biased European selection of volcanic/sandstone geological contexts (and subsequent soil landscape development) for agriculture and use as pasture. Land atop the sandstones and coastal sands was largely ignored for farming due to the low fertility of the sandy soils. In contrast, "even the smallest patches of basalt capping the sandstones have at some time been cleared for grazing" (Young 1980b). As intensive grazing requires a stable soil matrix to support good grass cover, these areas have generally been well maintained in order to facilitate their use as pasture.

Topographically, the study area is located within of a complex of interconnected lobate to elongated ridges connecting Locking Hill to Stockyard Mountain in the west and Wentworth Hills and Signal Hill in the north (Figure 5). The local topography of the study area is dominated by a ridge crest in the central west which slopes towards a spur crest in the south east corner of the study area. Prior to quarrying activities, the primary crest of Locking Hill was present to the east, connected to the study area by a gently sloping saddle. To the north, a ridge spur slopes to a saddle which joins Locking Hill with Wentworth Hills. Elevation within the study area ranges from 165m above sea level (ASL) on the ridge crest to 135m ASL on the steeper southern slopes.

Hydrology around the study area is characterised by the presence of several natural reservoirs which have formed in the underlying volcanic geology. Subsequent soil development on the bedrock has encouraged the formation of clays, leading to a relatively impermeable barrier lining the reservoir walls and allowing the retention of water within the cavities. One such natural reservoir is present within the eastern part of the study area, with several others located in close proximity. Drainage gullies have formed below the reservoirs and lead to intermittent tributaries of the major creek systems in the area. The study area is situated on the watershed between the Frazers Creek catchment to the north west and the Rocklow Creek catchment in the south. Frazers Creek flows northward across low lying areas near Rosetta Hill before joining the Macquarie Rivulet and eventually Lake Illawarra approximately 6km north west of the study area. To the south, Rocklow Creek and tributaries drain east from Stockyard Mountain and associated foothill/ridge systems, through the valley floors and a lowland swamp area to join the Minnamurra River approximately 4km south east of the study area. Saline water from the tidal influence of the Minnamurra River normally reaches the section of Rocklow Creek east of the Illawarra Railway Line and can extend into the section west of the Princes Highway. During the Holocene, the low lying areas of Rocklow Creek and the Minnamurra River, approximately 2km south east of the study area, formed part of an estuary.

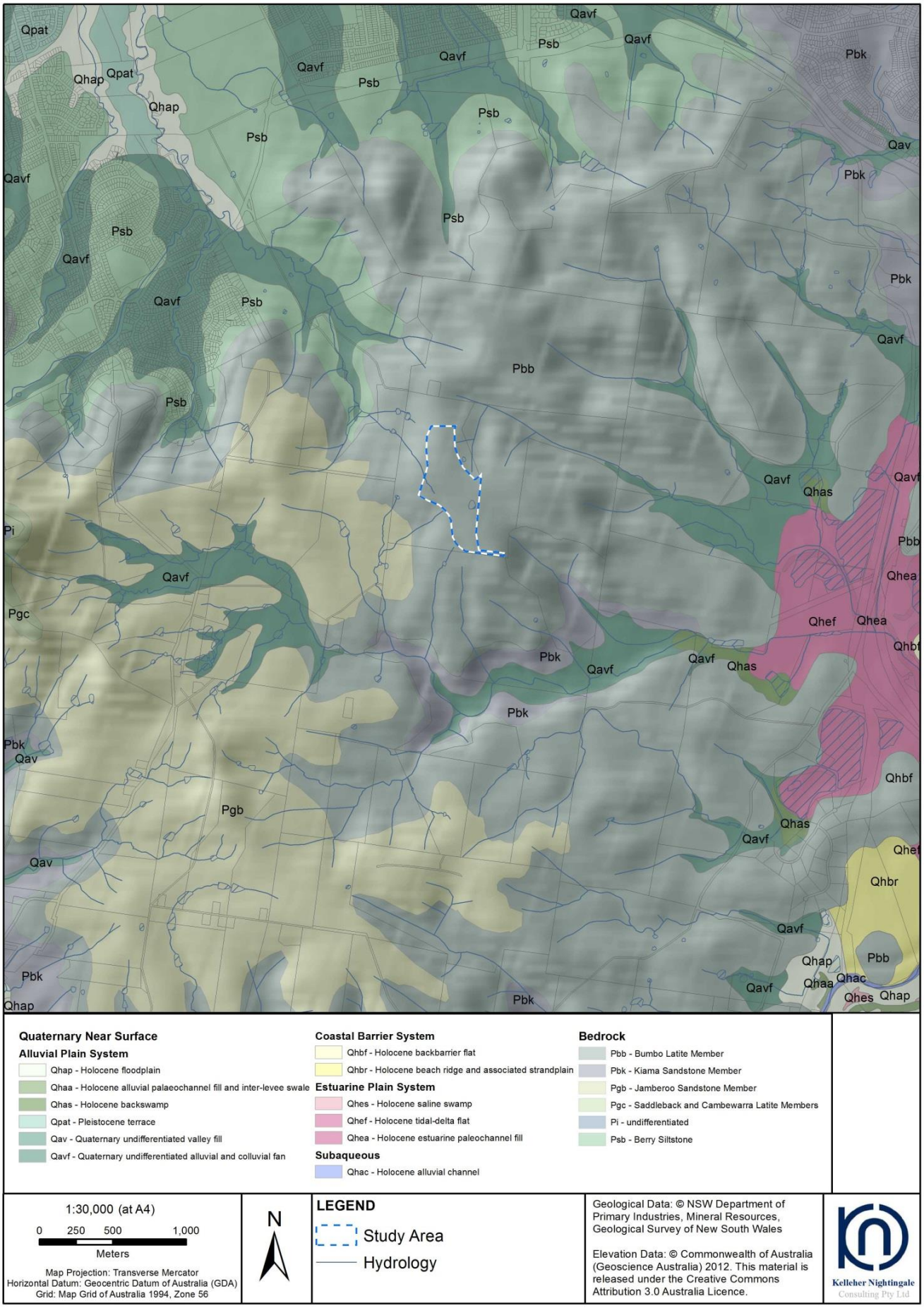

Figure 3. Geology

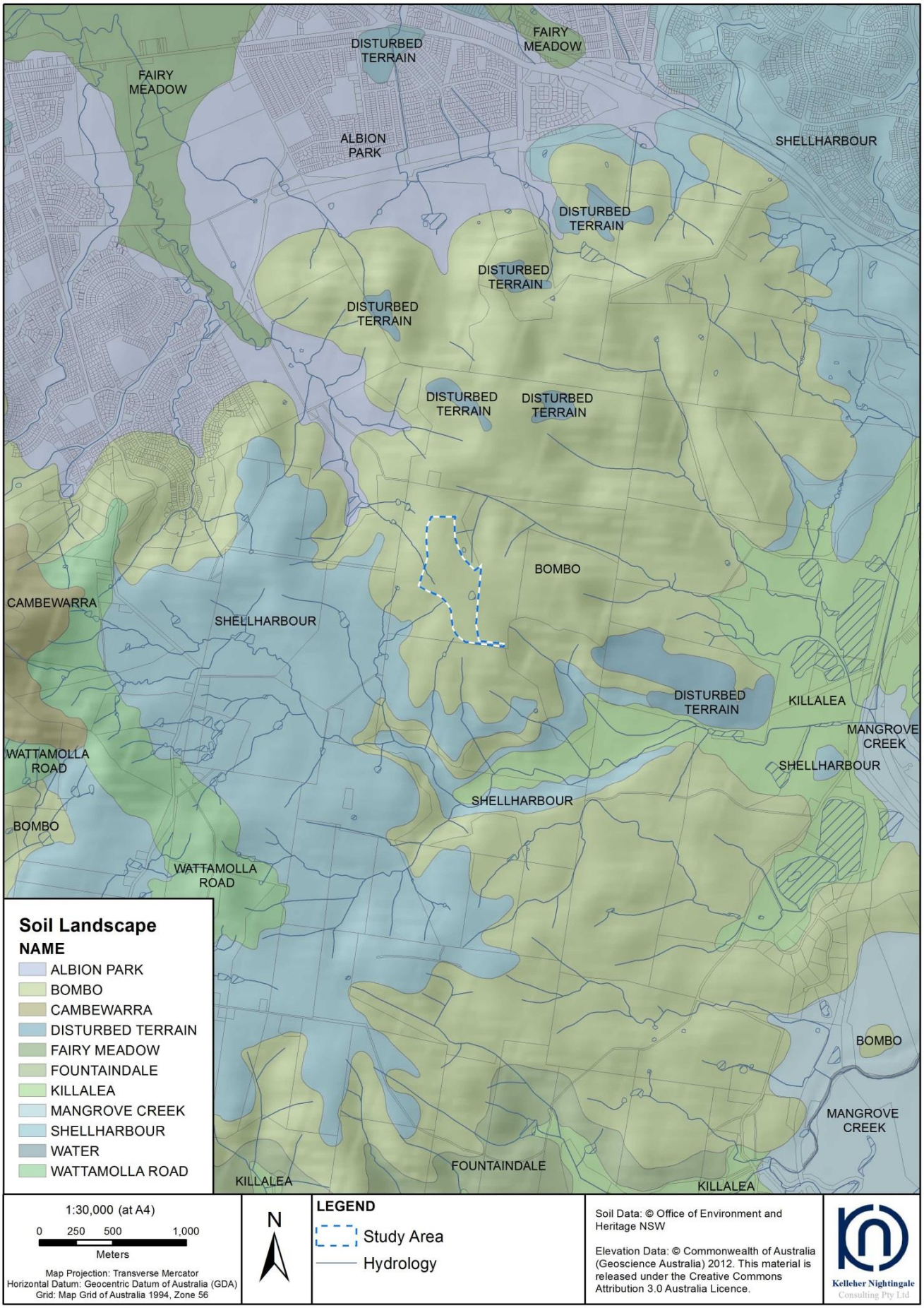

Figure 4. Soil landscapes

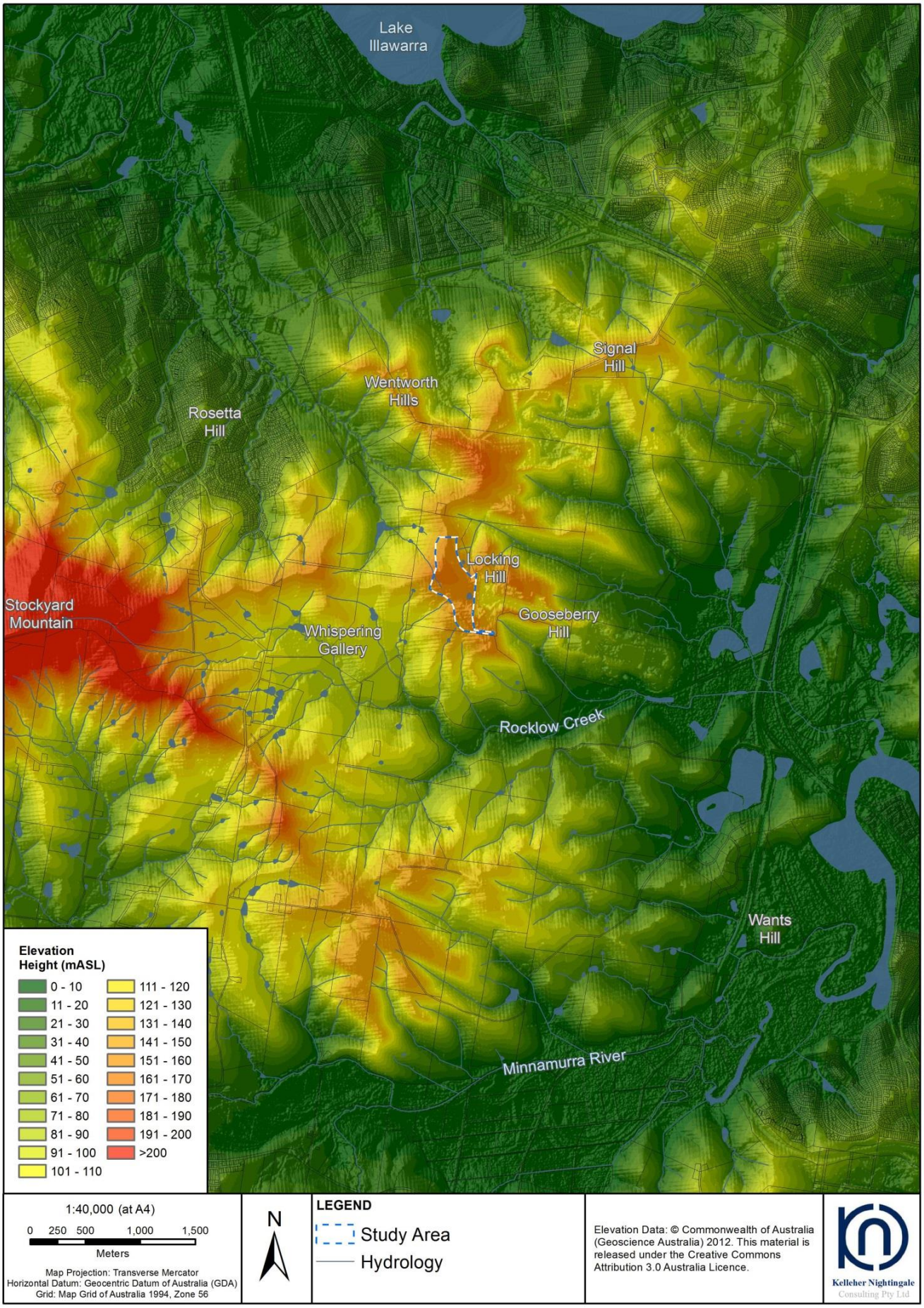

Figure 5. Topography

The geology, soil and landforms of the study area would have affected the presence of Aboriginal archaeological features. The soils derived from the volcanic geology of the study area supported native vegetation which was utilised by past Aboriginal people as a resource. The gentle slopes, relatively flat relief crest and saddle of the study area are likely to have suffered only limited erosion which is critical for the preservation of archaeological deposit that may be present in the study area. The ephemeral creeks which surround the study area would have been unreliable sources of fresh water for past Aboriginal people; however, naturally occurring reservoirs formed within the volcanic geology of the study area may have supplied a more stable source of fresh water. Natural reservoirs of fresh water within the study area would have enabled longer and possibly more intensive occupation by past Aboriginal people.

The adjacent catchment areas of Frazers Creek and Rocklow Creek would have contained important resources. These would have differed significantly during the Holocene when the flood plains and eastern portion of Rocklow Creek formed an estuary. Topographically, the study area is located within a context which would have facilitated movement north-south between these two areas and also east-west between the resources of the escarpment, hinterland and the coast.

3.2 Vegetation and land use

Prior to European settlement, the vegetation within the study area would have comprised mixed eucalypt and brush forest containing sassafras (*Doryphora sassafras*), beech, turpentine (*Syncarpia glomulifera*), cedar, various apples, coach wood (*Ceratopetalum apetalum*), Sydney blue gum (*Eucalyptus saligna*), grey ironbark (*Eucalyptus paniculata*), various box and blackbutt (Bowman 1974:13).

European settlement in the region began around 1815 with the first surveys conducted in 1816 and the first land grants in 1817 (DEC 2005: 15). In 1839, the study area formed part of 'Croom', a grant of 1280 acres given to Isabella Crocker (nee Reddall) the daughter of the Illawarra's first chaplain, Thomas Reddall. European settlement began the widespread clearance of native vegetation which originally included timber getting, possibly for Red Cedar (*Toona ciliata*), before large scale clearance occurred to create areas for growing crops and grazing cattle. Historical land use within the region included the cultivation of crops, grazing cattle and quarrying. The study area is now dominated by pastoral grasses while native vegetation has been confined to an area on the eastern boundary adjacent to Dunmore Quarry and occasional stands of scrub and regrowth on the ridge slopes. Currently, the study area is used as horse pasture.

3.3 Ethnohistoric context

The study area lies within a landscape which was important to, and intensively used by, past Aboriginal people. Aboriginal people living in the Illawarra spoke various dialects of the language known as Tharawal (also spelled Dharawal, Thurrawal, Turuwul, Darawal etc.), a local word for cabbage palm. It was spoken and understood from Botany Bay and Sydney in the north, west towards the Blue Mountains, Moss Vale and Goulburn, and south to the Shoalhaven River and Jervis Bay (DEC 2005: 6). The Tharawal language was largely associated with coastal groups however the boundaries of "languages or dialects can only be indicative at best", chiefly because groups of people and their language do not move around based on straight lines dividing language groups (Attenbrow 2002:34-35). The Tharawal people living in the vicinity of the study area were known as the Wodi Wodi (also spelled Wadi Wadi), whose traditional oral histories tell of their arrival at Lake Illawarra by canoe, long ago when the Ancestors were animals (DEC 2005:6). Traditional stories tell how they brought the Dharawal cabbage tree palm with them from the north and were named for it (DEC 2005:6).

Early European accounts indicate that the Wodi Wodi lived as a highly mobile and dispersed population, primarily in small territorial clans and local clans of extended family groups, forming larger bands through social and cultural links including marriage and communal participation in subsistence activities. The Illawarra and wider NSW South Coast offered many lakes, estuaries, sandy beaches and intertidal zones with a diversity and abundance of resources for the local people to use.

European observers noted that the large water bodies such as Lake Illawarra were important fishing areas for past Aboriginal people and were fished from canoes used bone hooks and lines or specially constructed spears (DEC 2005: 10). Historical accounts also recorded the use of the many creeks of the area for fishing using spears and fish traps made of loosely woven plant fibre and sticks. Spears, pit traps and snares were used to hunt wallabies in the forested hinterland away from the coast, while possums were smoked out of hollow trees and logs (DEC 2005: 12). Reptiles were hunted in the open forests along the escarpment, and wild honey collected from native bee hives. Plant resources, as well as providing important foodstuffs, were also used to construct spears, digging sticks, boomerangs and other tools. Forest trees yielded bark strips suitable for canoes and shelters, as well as fibres for string and rope. Plants from the swamps on the coastal plain were particularly used for fish nets and string bag-making. Other plants provided fish poison, dyes and paints.

4 Archaeological Context

4.1 Heritage register searches

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

A search of AHIMS was conducted at the start of the project to identify any registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (AHIMS Client Service ID 176898).

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

Eastings: 296000 – 302000
Northings: 6166000 - 6171000
Buffer: 0m (search coordinates included an extensive buffer around the study area)

The AHIMS search results revealed 11 Aboriginal sites had been recorded in or near the search area. No Aboriginal places had been declared in or near the search area. Site features ('site types') are listed in the table below. AHIMS search results are attached in Appendix C.

Table 2. Registered Aboriginal sites around the study area (AHIMS results)

Site Context	Site Features (Site Type)	Total	*%*
Open	Artefact (Open Camp Site)	8	*73*
	Artefact (Isolated Find)	1	*9*
	Grinding Groove (Axe Grinding Groove)	1	*9*
	Scarred Tree	1	*9*
	Total	11	*100*

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

- Shellharbour Local Environmental Plan 2013
- Kiama Local Environmental Plan 2011
- State Heritage Register and State Heritage Inventory
- Commonwealth Heritage List
- National Heritage List
- Australian Heritage Database
- Australian Heritage Places Inventory
- Register of the National Estate (non-statutory list).

No Aboriginal archaeological sites or Aboriginal heritage items listed on AHIMS or the heritage lists were situated within the study area.

Previous assessment for Boral's Dunmore Quarry (Navin Officer 1992) identified the scarred tree and one of the artefact scatters (open camp sites) registered on AHIMS within the existing quarry operation, east of the current study area. The location of registered Aboriginal sites within the search area is shown on Figure 6.

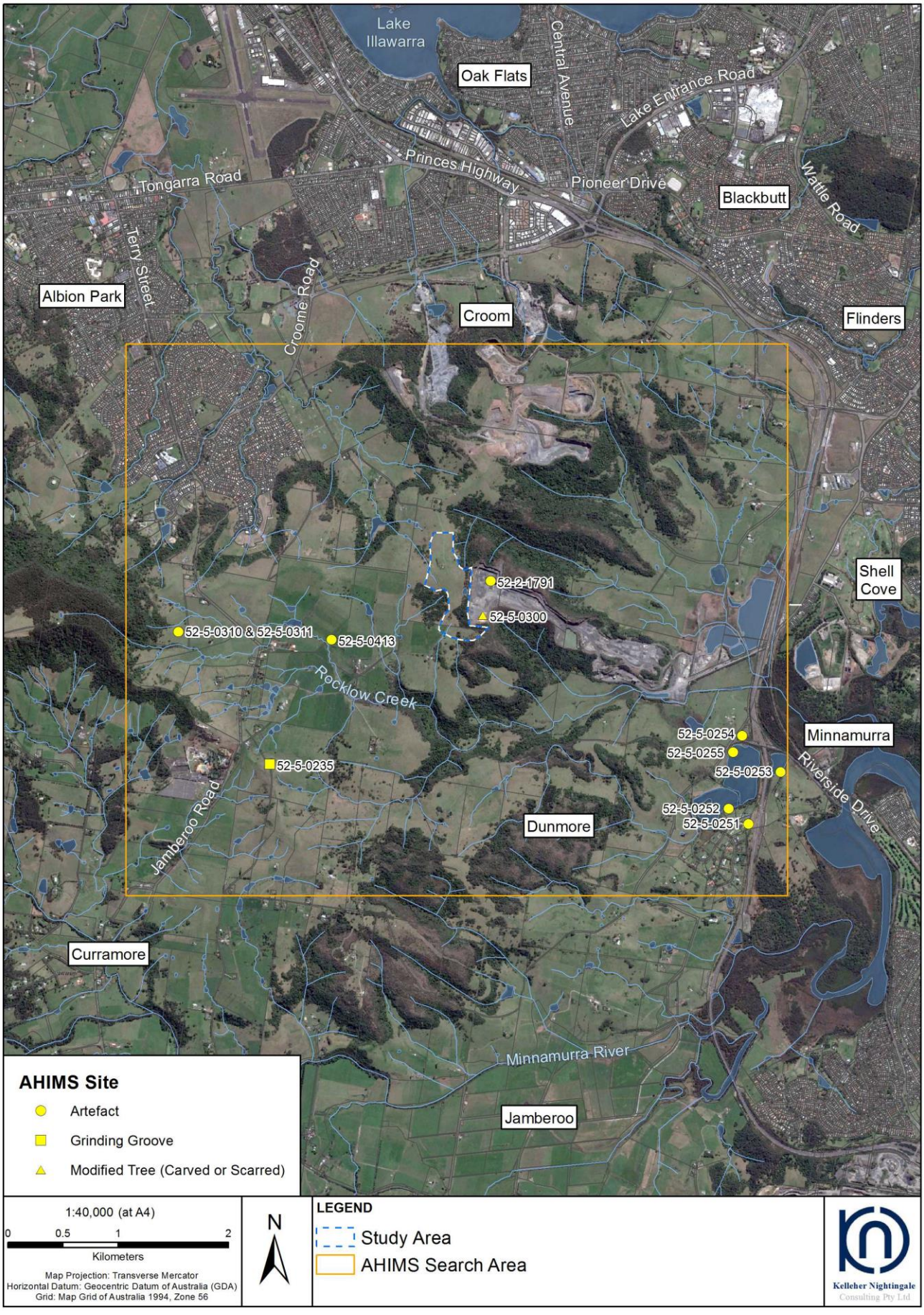

Figure 6. Registered Aboriginal sites near the study area (AHIMS results)

4.2 Previous investigations around the study area

A number of Aboriginal archaeological surveys and assessments have been undertaken at the existing Dunmore Hard Rock Quarry. These have included:

- 1986 survey and assessment undertaken as part of the development application (DA) for the Rail Infrastructure Corporation (RIC) land extension (Hanckel 1986);
- 1992 survey and assessment as part of the DA for the Croome Farm extension (Navin Officer 1992);
- 2003 survey and assessment of Lot 1 DP 571406, Dunmore Hard Rock Quarry (Australian Archaeological Survey Consultants Pty Ltd (AASC) 2003);
- 2003 and 2004 survey and assessment as part of the DA for the increase in production at the quarry (Robert Paton Archaeological Studies Pty Ltd 2003, R.W. Corkery &Company Pty Limited 2003, AASC 2004); and
- 2008 survey and assessment as part of the Statement of Environmental Effects for the proposed Hard Rock Quarry extension (AASC in R.W. Corkery &Company Pty Limited 2008).

The previous assessments identified one open artefact scatter (site DQ1; AHIMS # 52-2-1791) and one scarred tree (site DQ2; AHIMS # 52-5-0300) within the existing Dunmore Hard Rock Quarry area (Navin Officer 1992).

Dunmore Quarry 1 (DQ1) was a low density artefact scatter situated on the broad crest of a spurline shoulder. Fifteen artefacts were recorded in track exposures over an area approximately 200m x 150m. No artefacts were observed off the tracks, however it was noted a similar low density of artefacts was “probable” outside the track exposures for a distance of up to 100m either side of the main east-west ridgetop track (Navin Officer 1992). The soil was a dark brown loam with high latite gravel content. Surface level bedrock was observed to outcrop towards the sides of the spurline. Recorded artefacts were predominantly of chert including flakes, flaked pieces, angular fragments, a core and a scraper. A broken bipolar flake of red/brown silcrete and a dark grey brown fine grained volcanic flake were also recorded amongst the assemblage.

Dunmore Quarry 2 (DQ2) was a scarred tree recorded approximately 250m south of artefact scatter DQ1 (Navin Officer 1992), approximately 60m south of a drainage line running down slope from the north west. The tree was a mature Eucalypt located within a group of relict mature trees within the sheltered drainage gully. The tree was 15-18m high, 3m in girth and estimated to be at least 100-200 years old (Navin Office 1992:18). Two scars were identified on opposite sides of the trunk. The larger scar faced south east and had maximum dimensions (including regrowth) of 155cm x 75cm. The second scar faced north west and had maximum dimensions (including regrowth) of 150cm x 70cm. Both scars were symmetrical in outline with relatively even regrowth. Both ends of each scar were enclosed and not continuous with the ground level. Some fire damage to the tree was evident but considered to post-date the creation of the scars. The similarities of morphology, size, context and absence of features considered to indicate a European origin supported the classification of the scars as Aboriginal in origin. Archaeological significance was assessed as moderate to high.

Landscape assessment conducted as part of the archaeological background identified that major ridgelines were often used as preferred or convenient travel routes along and across the resource zones of coast and hinterland and frequently contained archaeological deposit relating to this landscape use. The Locking Hill ridgeline complex present within the study area was considered likely to form an important access corridor between the resources of the coastal plain and the inland sandstone plateau (Navin Officer 1992:12-13).

A number of other studies have been undertaken surrounding the study area with some interesting archaeological results. These have included the identification of an axe grinding groove site in an elevated location approximately 2km south west of the study area and a series of Aboriginal sites (all artefact scatters) associated with lowland alluvial and former estuarine deposits approximately 2.7km to the south east of the study area (Figures 3 and 4).

The axe grinding grooves (AHIMS # 52-5-0235) were recorded on a sandstone outcrop on the property “Croome Downs” by Navin in 1987 as part of her BA (Hons) research. Navin recorded 34 grooves at the site and observed that the site was eroding badly, with the grooves exfoliating and being damaged by cattle. The AHIMS site card notes that a Jamberoo resident had previously recorded 47 grooves at the site. The grooves varied in size and depth and occurred both singularly and in groups. The grooves were on an outcropping of sandstone very high on the western side of a hill with commanding and sweeping 260 degree views across the surrounding landscape. There were also some shallow potholes filled with water observed at the site, which may have provided a water source for axe grinding and camping activities.

A series of open artefact scatter sites were recorded to the south east of the current study area during an archaeological assessment of a proposed development area at Dunmore (Navin 1989). The cluster of recordings was associated with an alluvial plain and wetlands overlying earlier estuarine sand deposits. Dunmore 1 (AHIMS # 52-2-0251) was a small open artefact scatter identified on the edge of a ridge crest which formed a major boundary

between the Minnamurra River and the wetlands associated with the lower reaches of Rocklow Creek. Five artefacts were identified including a scraper, flakes and a flaked piece of silcrete, fine grained siliceous material, rhyolite and chert. Shell fragments of Sydney cockle and southern mud oyster were also identified. The site had been disturbed by European land use practices including agriculture and road construction.

Dunmore 2 (AHIMS # 52-2-0252) was a larger open artefact scatter identified on the eastern margins of the alluvial plain, at the base of a low ridge spur. Over 35 artefacts were identified across an area of approximately 60m x 40m, with exposed sections along a vehicle track containing artefacts at a depth of 30cm. The north western portion of the site was disturbed by road construction, erosion and sand mining but the majority of the site was considered likely to be intact. Artefacts included cores, choppers and retouched flakes, a scraper and numerous flakes and flake fragments. A wide range of raw materials was identified including rhyolite, silcrete, petrified wood, basalt and other igneous materials. Shell fragments of oyster, Sydney cockle and mud whelk were also identified at the site. The variation in artefact types and raw materials was considered reflective of a wide range of site activities.

Open artefact scatter site Dunmore 3 (AHIMS # 52-2-0253) was identified on the edge of a low terrace at the base of a north-running ridge spur. Based on topography, it was considered likely the terrace represented a former beach line or dune feature during the estuarine phase. Nineteen artefacts were identified across a 10m x 7m area but it was considered the site was likely to extend. Artefacts included a grey silcrete blade, red silcrete geometric microlith, red silcrete flaked piece, rhyolite blade, flakes of grey and red silcrete and fine grained volcanic flaked pieces, as well as alluvial basalt pebble manuports.

Dunmore 4 (AHIMS # 52-2-0254) was identified along the northern edge of a low dunal sand body, considered to be an eroded relic of a beach line from the area's estuarine or inlet phase. Twelve artefacts were identified across a recent exposure of the dune slope associated with tree removal works. Associated shell material included fragmented and weathered pieces of Sydney cockle, oyster and mud whelk. Artefacts included flakes and flaked pieces of rhyolite, chert, silcrete and quartz. Fine grained volcanic pebbles and pebble pieces were also identified. The low density of artefactual material was considered to indicate a mostly subsurface site which had been exposed through disturbance.

Dunmore 5 (AHIMS # 52-2-0255) was identified approximately 150m south of Dunmore 4, on the same dunal sand body. A medium density scatter of 40 artefacts and three oyster shell fragments were identified in an exposure of approximately 25 x 25m. The site had been disturbed by construction of a carpark to the south, which had effectively levelled and truncated the dune deposit. Artefacts included large (>50mm) quartz flakes and fractured pebbles, a chalcedony flake, pebble manuports, rhyolite scraper, rhyolite flakes, petrified wood flaked pieces, silcrete and chert flakes and flaked pieces, fine grained siliceous flakes, volcanic flakes and fractured pebbles and a retouched fine grained siliceous flaked piece displaying platform preparation. Given the landform context, it was considered highly likely that intact archaeological subsurface deposit occurred within the dune body between sites Dunmore 4 and Dunmore 5. Further archaeological investigation was recommended if impact to sites Dunmore 3, 4 and 5 could not be avoided.

Most other studies in the area have identified dispersed/low numbers of artefact scatter sites or isolated finds. Site EGP 3-34 (AHIMS # 52-5-0310) was an isolated artefact recorded as part of the Eastern Gas Pipeline Environmental Impact Assessment (Kuskie et al. 1995). It was recorded on Stockyard Mountain in an area described as having been disturbed by erosion. The site was situated on the basal valley slopes/flat adjacent to an unnamed creek. The chert core was observed on a silty substrate amidst an erosion scar measuring 15x10m. No other artefacts were observed in the erosion scar, despite good visibility of around 80%. However the site record notes that there was moderate potential for further surface and subsurface artefacts in the vicinity. The site was within the proposed pipeline easement and it was recommended consent to destroy be sought for the site.

Site EGP 3-35 (AHIMS # 52-5-0311) is registered on AHIMS with the same coordinates as 52-5-0310. This open artefact scatter site was also recorded as part of the Eastern Gas Pipeline project (Kuskie et al. 1995) and consisted of two artefacts identified in a similar landform context as 52-2-0310. Artefacts included a flake and core of chert and a second, unidentified material. The site was within the proposed pipeline easement and it was recommended consent to destroy be sought for the site.

Overall, previously recorded Aboriginal archaeological sites around the study area demonstrate a variety of site types and geographical locations. AHIMS results and background research indicate that a relationship exists between site type and environmental context, demonstrating the different ways in which Aboriginal people used the landscape and the subsequent archaeological record of these activities.

Outcropping sandstone in proximity to water sources provided a suitable environment for axe grinding grooves. Regionally, outcropping sandstone is more common along the western part of the Illawarra coastal plain and is present along elevated, benched slopes. The extensive axe grinding grooves located at site 52-5-0235 are located in an elevated landscape context to the south west of the study area and are representative of this type of landscape use.

Within lowland areas along watercourses, artefact scatter sites and isolated finds are the most common site type, reflecting the day-to-day economic activities and camping locations of Aboriginal people (e.g. 52-5-0413 situated near an inland valley stream). Along waterways closer to the coast, the association of shell remains with artefact deposits also indicates the exploitation of freshwater molluscs and possibly, earlier estuarine food resources at sites 52-5-0251 – 52-5-0255. Higher levels of disturbance have also been reported at the lowland sites, in part due to the more concentrated modern land use of these areas for intensive agriculture, transport and urban development. Artefact raw materials identified at the sites are available from the diverse underlying regional geologies (see section 2.3).

Artefact scatter sites have also been identified along ridgelines and in elevated areas, including at Locking Hill adjacent to the study area (52-2-1791) and on the high mid-slopes of Stockyard Mountain to the west (52-5-0310/52-5-0311). Previous archaeological investigations have suggested these elevated areas were used as travel corridors between the different resource zones of the coast and hinterland. Steep slopes and drainage gullies along the ridges are also less likely to have been subject to European land clearance, increasing the likelihood of remnant old growth vegetation and the survival of scarred trees such as site DQ2 (52-5-0300).

Summary

The review of background information revealed there were no known Aboriginal archaeological sites within the study area. Two AHIMS registered sites, DQ 1 (open artefact scatter) and DQ2 (scarred tree) were located within the Croome Farm extraction area of the Dunmore quarry immediately east of the study area. The identification of these archaeological sites on the Locking Hill ridge indicates that the study area has potential to contain Aboriginal objects relating to Aboriginal activities on this specific landform.

Within the wider local area, a number of Aboriginal archaeological site types have been recorded. The variety of site types around the study area demonstrates that the local landscape retains archaeological evidence of varied Aboriginal activities and landscape uses, variably affected by disturbance. Some landscape patterning in site type distribution is evident. Previous investigations have identified the Locking Hill ridge system as an important access corridor between the elevated sandstone plateau to the west and the coastal zone to the east. Archaeological materials related to this landscape use may be retained within the study area where disturbance levels are low.

5 Visual Inspection

A visual inspection was carried out as part of the due diligence assessment of the study area in accordance with the Office of Environment and Heritage (OEH) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH 2010a).

The visual inspection included a pedestrian walk over covering the entire study area. Visual inspection aimed to assess the integrity of the archaeologically sensitive landforms identified within the area, the nature and extent of previous disturbance and the remaining potential for Aboriginal objects to be present within the area.

Visual inspection of the study area commenced in the northern part of the proposed extension area, to the north of an established house and outbuildings located atop a defined ridge crest. North of the crest, the study area comprises gentle slopes running north along the less elevated portion of the ridge towards a saddle leading to the Wentworth Hills (Plate 1). Slopes drop sharply to the east and west beyond the flattened spine of the ridge containing the road.

The western slopes drain towards Frazers Creek and eventually Lake Illawarra, indicating the study area forms part of the watershed between this and the Minnamurra River catchment. Minor exposures along the track were inspected for Aboriginal objects but none were identified (Plate 2). Slopes north of the crest displayed low archaeological potential as they provide no landform focus for Aboriginal activity.

Plate 1. Looking north down spine of ridgeline to the Wentworth Hills. Note slope gradient increase to east and west

Plate 2. Looking south to ridge crest at right of photo. Note minor exposures on track in foreground

Soil depth appeared variable and correlated to the proximity of underlying bedrock (as opposed to external or surface influences). The study area has been cleared of its original woodland vegetation and introduced pasture grasses and tussock now dominate the landscape. Soils visible in exposures were dark brown to black and of a sticky, plastic consistency, consistent with the characteristics of Kraznozem soils after drainage patterns are altered due to devegetation.

Limited surface erosion was observed across the crest landform, with more pronounced erosion visible on the adjoining moderately steep upper slopes. Soil disturbance from extensive ploughing or agriculture was not observed on the crest and the soil likely retains some measure of horizontal (and possibly vertical) integrity. Archaeologically, soils across the crest landform display characteristics conducive to the preservation of archaeological deposit.

The ridge crest landform provides a focal point in the landscape and offers views to interconnected ridgelines and valleys to the north and south, the Illawarra Escarpment to the west and Bass Point to the east. The construction of the house and outbuildings has contributed to localised ground disturbances on a portion of the crest but the majority of the landform appeared intact. Thick pasture grasses limited visibility of the ground surface but all exposures were inspected for Aboriginal objects. Some larger exposures were present west of the house and along fencelines, but no Aboriginal objects were observed (Plate 3).

Erosion was limited on the flat crest area, with soils appearing stable and little evidence of colluvial movement down the adjoining slopes. Landform context, soil stability and the surrounding environmental factors (semi-permanent to permanent water source and access to raw materials) indicate that the crest displays good archaeological potential for intact and possibly significant archaeological deposit. As such, the crest (hereafter referred to as CW3) is considered an archaeologically sensitive landform which will require further assessment.

Plate 3. Exposures along fenceline near house on ridge crest. Surface erosion is minor

Plate 4. Rock outcrops on eastern slopes below ridge crest

Some disturbance was evident east of the crest beyond the track, with an uneven and undulating surface visible below the pasture grass. This may be related to historic disturbance or to an uneven and rocky landform surface on the gentle inclined fringes of the crest to the east. Degraded concrete slabs, rubble and the remains of various historic built structures are present in the area.

Rock outcropping was observed in this area, indicating the proximity of bedrock to the surface. The larger outcrops displayed pitting and shallow depressions that may have held water after periods of rain. These outcrops were closely inspected for Aboriginal axe grinding grooves but none were identified, with the rock surface generally too coarse grained or uneven to be suitable as a grinding surface (Plate 4). This area displayed low archaeological potential.

Plate 5. Rock outcrop along south western edge of crest. Note change in slope gradient below outcrop

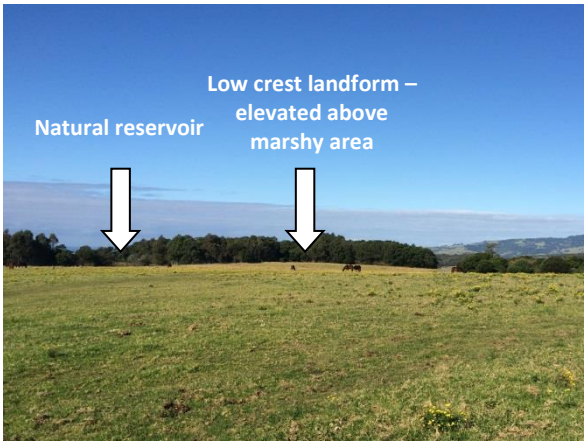

Plate 6. Low crest landform to the south of natural reservoir (arrowed)

To the south west of the house, a long fringe of outcropping bedrock was observed running north west to south east along the edge of the flat area around the crest (Plate 5). Slopes beyond this outcrop were of a higher (steeper) gradient and the ground drops away towards drainage gullies running south and west to Rocklow Creek. The slopes west of the rock outcrop also displayed increased erosion and evidence of colluvial movement of soils downslope. These areas displayed low archaeological potential.

The natural reservoirs present around the study area would have provided an at least semi-permanent water source for Aboriginal people. Within the wider Sydney Basin, elevated ground near water sources is a common location for Aboriginal archaeological sites. One reservoir is located within the eastern part of the study area near the existing western limit of the Croome extraction pit. This area was inspected and the surrounding area was assessed for archaeological potential. The area immediately surrounding the reservoir is relatively low lying and retains water, creating a boggy or marshy surface which would have been unsuitable for Aboriginal camp sites.

One saddle to the north and one low crest to the south are located near the reservoir (Plate 6) (Figure 8). These locations would have offered a drier environment for camping while still remaining close to the water source. These landforms appear to have suffered low disturbance and retain moderate archaeological potential. As such, the saddle (hereafter referred to as CW2) and crest (hereafter referred to as CW1) are considered an archaeologically sensitive landform which will require further assessment.

The southern portion of the study area is located across a south westerly tending slope at the head of drainage gullies running south to Rocklow Creek. A minor crest is present in the east above steep slopes which fall to the north east and form a drainage gully below the natural reservoir to the north. During the visual inspection the western slopes were assessed as archaeologically unfavourable due to poor drainage (Plate 7). Another natural reservoir is present immediately to the south of the study area within the Glenbrook property and it is likely this has influenced the drainage pattern of the upper slopes within the study area (Plate 8). This area retains low archaeological potential.

Plate 7. Looking east to minor crest. Note marsh grasses along slopes

Plate 8. Looking south to natural reservoir beyond southern study area boundary

Summary

Previous archaeological assessments and the distribution of recorded archaeological sites across the landscape indicated a relationship between site type and geological, topographic and geographic factors. Additionally, environmental factors contribute directly to survivability of archaeological sites within the landscape. The combination of landscape factors within the study area (elevated ridgeline with commanding views and an immediate water source) is rare at the local level. Aboriginal archaeological sites associated with these landscape features would have the potential to contribute significantly to our understanding of Aboriginal landscape use of unique environmental contexts.

Given the degree of grass cover, no Aboriginal objects were identified during the inspection. Visual inspection confirmed the potential for Aboriginal objects based on: stability of erosion, intact soil profiles, topographically favourable features related to the elevated level ground and vistas, proximity to known archaeological sites and presence of natural reservoirs within and near the study area. The erosion cycle for portions of the property is archaeologically favourable because soil movement is likely to follow a circular deflationary process, whereby artefacts (if present) would be inclined to move vertically resulting in horizontal spatial stability. In other words, if Aboriginal objects are on the property they will be located in a spatially discrete locale such as the crest or saddle. Most importantly the natural reservoirs create a potentially selective environmental setting, which would have enabled the somewhat rare use of elevated space for longer term occupation. All of these factors combine to indicate a moderate level of archaeological potential for portions of the study area.

Three areas were identified with potential for subsurface archaeological deposits (CW1, CW2 and CW3). CW1 was located on the crest of a north west to south east running spurline, CW2 was located on the crest of saddle landform and CW3 encompassed the crest of a hill around several farm structures. Soils appeared stable with little evidence of colluvial movement or modern disturbance. The assessment noted that the natural reservoirs present on Locking Hill created a potentially selective environmental setting, which would have enabled the somewhat rare use of elevated space for longer term occupation.

Further detailed investigation (subsurface testing) was required to determine the nature, extent and significance of any associated archaeological sites and Aboriginal objects within the study area.

6 Archaeological Test Excavation

Archaeological test excavation was carried out by KNC and registered Aboriginal stakeholders over six days between 29th August and 6th September 2016, in accordance with the OEH *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. Aims, methodology and results of the test excavation program are presented below.

6.1 Aims

The purpose of the test excavation program was to identify whether Aboriginal objects occur in the study area. The test area had no identified surface archaeology but was considered to have archaeological potential. Therefore the primary aim of the test program was to confirm the presence, nature and extent of potential archaeological deposits CW1, CW2 and CW3. Additional goals of the test excavation were: to assess the boundary of the site areas in relation to the proposed development, to investigate the relationship between specific topographic features and archaeological deposits and to observe the effects of disturbance on archaeological deposits.

Test excavation results would inform the archaeological assessment, including development of appropriate management and mitigation measures. The sampling area was restricted to ensure an adequate sample without having significant impact on the archaeological value of any identified sites.

Plate 9. View to north along baseline transect from TS4, CW1. Natural reservoir at right

6.2 Methodology

The field methodology was developed and carried out in accordance with Requirement 16a of the OEH *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. The study area was divided into three excavation areas based on the three areas of archaeological potential (CW1, CW2 and CW3). The proposed test areas are differentiated from the surrounding landscape by the presence of unique geologic formation (volcanic vents containing natural reservoirs) and spatially defined by contours. Test transects were placed near the volcanic vents and natural reservoirs to confirm the location and extent of archaeological deposits in the area.

Test transects were placed on a systematic grid at 15m intervals and test excavation points placed at 15m intervals along these transects. Easting/northing coordinates were taken at the north west corner of each excavation unit. The test units were then given an arbitrary identifying number (e.g. TS 1, TS 2,TS 3). Test excavation units measured 50cm x 50cm. A total of 27 test squares (6.75m^2) were excavated, all dispersed test squares, TS 1-7 at CW1, TS 8-17 at CW2 and TS 18-27 at CW3.

In accordance with the code of practice, the first excavation unit of each investigation area was excavated in 5cm spits onto a culturally sterile deposit to determine the nature of the subsurface deposit and the presence or absence of artefactual material. Based on the results of the first excavation square, subsequent squares in each area were excavated in 10cm spits until culturally sterile soils were reached.

Where artefacts were identified during excavation (i.e. in situ), measurements were taken of the artefact's position and depth in the excavation unit, as well as its relation to any other features such as charcoal, baked clay, tree roots or other evidence of disturbance.

Plate 10. Hand excavation of 5cm spit at TS1, CW3

All excavation was undertaken using hand tools. All excavated material was placed in buckets and transported to the adjacent sieving area and wet sieved using a combination of nested 5 millimetre and 2.5 millimetre wire mesh screens. Artefacts retrieved from the excavation were retained for further investigation.

The information from each test excavation square including a detailed deposit description, any excavated features and unit depths were recorded onto standardised excavation forms. At the end of the excavation program, all squares were photographed and soil section profiles were drawn. As per OEH requirements, the test excavation ceased when enough information had been recovered to adequately characterise the archaeological deposits or Aboriginal objects present with regard to their nature and significance.

Plate 11. Hand excavation of 50cm X 50cm test square TS18, CW3

Excavation Director: Dr Matthew Kelleher
Senior Archaeologist/Site Supervisor: Mark Rawson
KNC Archaeologists**:** Tristram Miller, Tyler Beebe, Owen Barrett
Aboriginal Stakeholder Representatives*: Aaron Broad (Minnamunnung), Basil Smith (Biamanga), Craig Tungai (ILALC and Gary Caines), Newton Carriage (Goobah), Paul Cummins (WPGEC), Richard Dutton (Murramarang and Cullendulla) and Shane Hoskins (GTTS).

* One additional Aboriginal group/individual participated in the test excavation program. This group/individual has chosen to withhold their details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* and is not included in the list of Aboriginal stakeholder representatives above.

6.3 Results

6.3.1 Soils, stratigraphy and disturbance

Sediment profiles varied across the tested areas. Native vegetation had been extensively cleared in the past and current ground vegetation was primarily a combination of ungrazed and grazed pasture. Soil disturbances across the study area were a result of animal grazing/trampling, ploughing and past landscape modifications. Representative sections of test square excavation across the study area are presented and described below.

Figure 7. CW1 - TS3 north section

I. 0-16cm: Dark grey-brown silty loam, humic, moist. Frequent fine root systems in top 5cm, infrequent throughout. Angular latite cobbles <5cm 5%. Diffuse boundary to:
II. 20cm-base: Mid red-brown silty clay, moist, increasingly compact with depth. Infrequent fine root systems. Angular latite cobbles <5cm 5%. Diffuse boundary to:
III. Base: Mid red-brown clay, moist, compact. Angular latite cobbles <10cm 5%.

Figure 8. CW1 – TS6 east section

I. 0-30cm: Dark brown silty clay loam, humic, moist. Frequent fine root systems throughout. Angular latite cobbles <15cm and gravels 25%. Diffuse boundary to:
II. 30cm-base: Mid grey-brown light clay, moist. Infrequent fine root systems. Angular latite cobbles <15cm 10%. Clear boundary to:
III. Base: Latite bedrock

Figure 9. CW2 – TS12 east section

I. 0-20cm: Dark yellow-brown, silty clay loam, humic, dry. Frequent fine root systems throughout. Angular latite cobbles <10cm 5%. Clear boundary to:
II. 20cm-base: Mid red-brown silty clay, dry. Frequent fine root systems. Angular latite cobbles <10cm 5%. Clear boundary to:
III. Base: Latitie bedrock and mid red-brown clay, dry, compact.

Figure 10. CW2 – TS14 east section

I. 0-18cm: Dark brown, silty clay loam, humic, moist. Frequent fine root systems throughout. Angular latite cobbles <20cm 10%. Clear boundary to:
II. 18cm-base: Pale grey-brown silty clay, moist. Frequent fine root systems. Angular latite cobbles <20cm 10%, increasing with depth. Diffuse boundary to:
III. Base: Grey brown silty clay, moist.

Figure 11. CW3 – TS21 south section

I. 0-20cm: Dark brown, silty clay loam, humic, moist. Frequent fine root systems in top 5cm, infrequent throughout. Angular latite cobbles <5cm 5%. Clear boundary to:
II. 20-38cm: Mid orange-brown silty clay, moist. Infrequent fine root systems. Angular latite cobbles <5cm 10%, increasing with depth. Diffuse boundary to:
III. Base: Mid orange-brown light clay, moist. Angular latite cobbles <5cm 30%

Figure 12. CW3 – TS26 east section

I. 0cm-base: Dark brown, silty clay loam, humic, moist. Frequent fine root systems in top 5cm, infrequent throughout. Angular latite cobbles <5cm 5%. Clear boundary to:
II. Base: Mid orange-brown light clay, moist. Infrequent fine root systems.

6.3.2 Artefact Distribution

A total of 86 artefacts were recovered by the test excavation program. Artefacts were recovered from 21 out of 27 excavated test squares. No definitive knapping floors were encountered that would indicate intensive stone reduction. Most artefacts were remnants from a number of different small overlapping events. Artefact densities for the test squares are shown in Table 3 and Figure 13.

Table 3. Test excavation square artefact densities

CW1		CW2		CW3	
Test Square	**Total**	**Test Square**	**Total**	**Test Square**	**Total**
TS 1	3	TS 8	5	TS 18	1
TS 2	4	TS 9	5	TS 19	0
TS 3	4	TS 10	5	TS 20	0
TS 4	5	TS 11	2	TS 21	2
TS 5	0	TS 12	5	TS 22	0
TS 6	1	TS 13	5	TS 23	1
TS 7	2	TS 14	0	TS 24	1
		TS 15	12	TS 25	3
		TS 16	14	TS 26	0
		TS 17	4	TS 27	2

Artefact distribution was characterised by a generally low density deposit of between 1-3 artefacts with localised higher concentrations at CW1 and CW2. The two highest artefact counts came from TS 15 (n=12) and TS 16 (n=14) at CW2. These squares were 15 metres apart on the same transect. The two test squares were situated on the crest of the saddle landform linking Locking Hill to the hill crest at CW3. The localised higher densities at CW1 and CW2 suggest limited horizontal movement within the deposit at these locations.

Within the CW1 test excavation area, six out of seven test squares contained artefacts. Extrapolated to square metres, CW1 displayed a mean artefact density of 10.86/m^2. At the CW2 test excavation area, nine out of ten test squares contained artefacts. Extrapolated to square metres, CW2 displayed a mean artefact density of 22.8/m^2. Artefacts were recovered from six of the ten test squares excavated at CW3. Extrapolated to square metres, the test squares excavated at CW3 displayed a mean artefact density of 4/m^2. Artefacts were predominantly recovered from the upper 20cm of the deposit (70%, n=60).

6.3.3 Lithics

The test excavation program uncovered a diversity of stone artefact raw materials and artefacts were mostly of good to high quality stone. The dominant raw material (n=31) was fine grained siliceous stone classified as agate. This raw material ranged in colour from pale grey to red brown and included examples of chalcedony and chert. Many examples had tiny white spot inclusions or blotches, or were partially translucent. Objects with crusts of quartz suggest a volcanic origin. Smaller quantities of quartz (n=10), silicified tuff/mudstone (n=10), unidentified fine grained siliceous (n=8), jasper (n=7), unidentified medium grained siliceous (n=5), igneous (n=3), petrified wood (n=2) and quartzite (n=2) were also recovered.

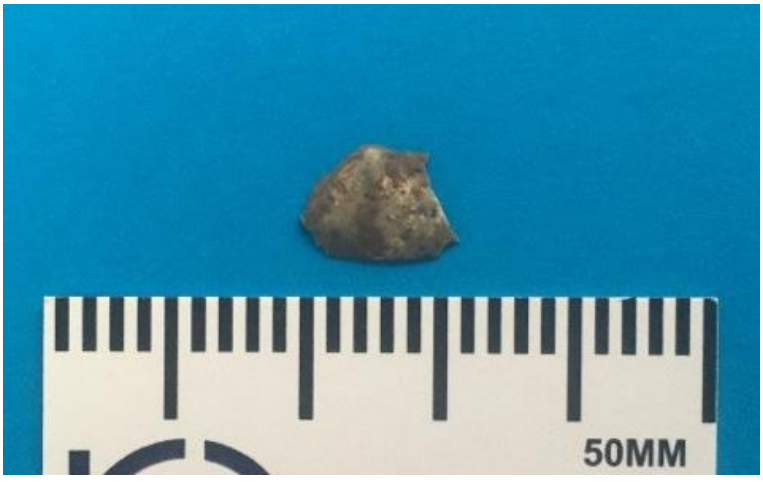

Plate 12. Agate flake (ID 23) with white spot inclusions from spit 1, TS 9

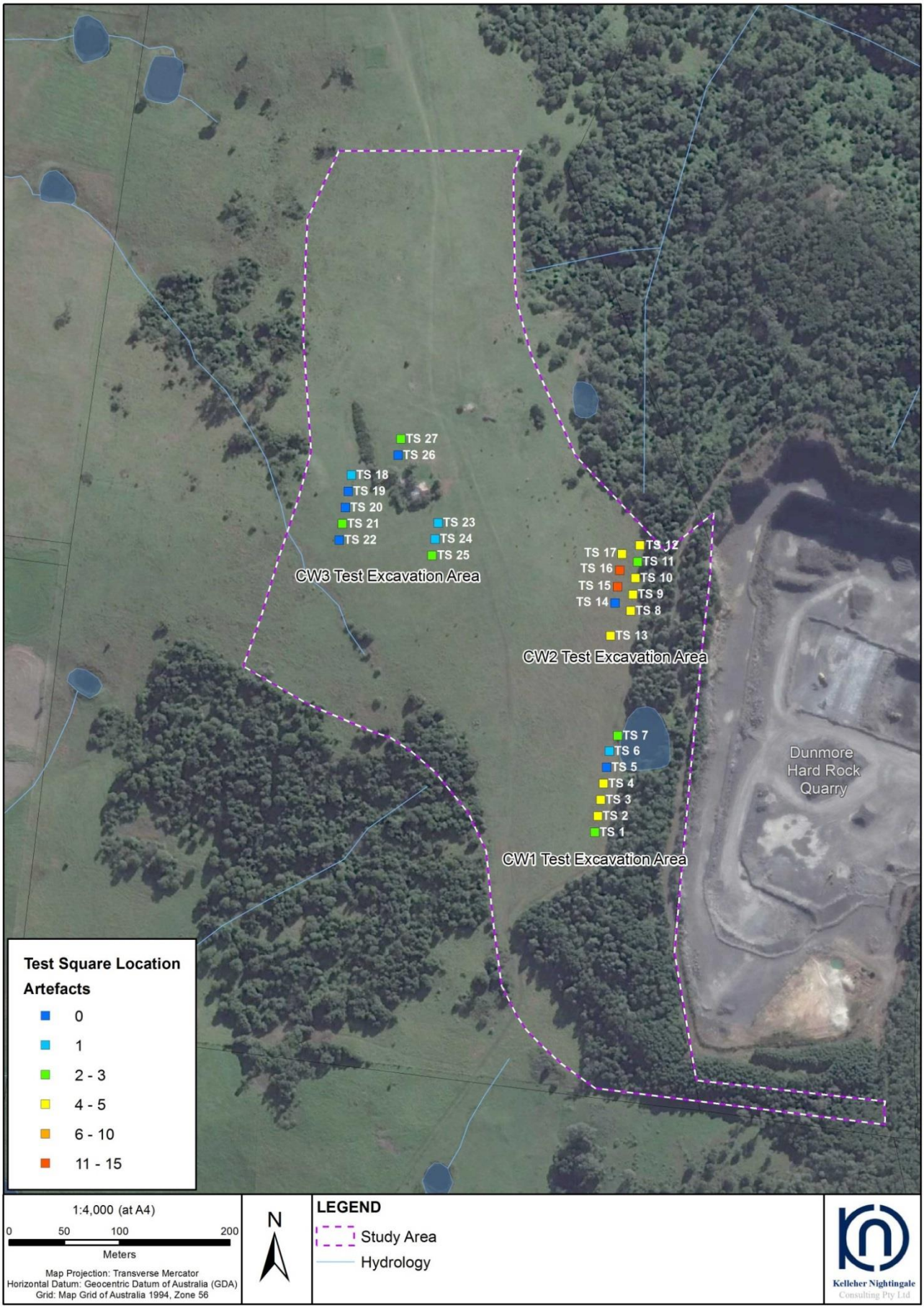

Figure 13. Test square locations and artefact density

The local latite which outcrops in the area is not fine grained or durable enough for stone tool use and all artefact raw materials uncovered by the test excavation program had to be brought in to area. Agates can occur as nodules formed in gaseous cavities of volcanic rocks and are known to be found in gravels along the coast to the east of Croome West, in the vicinity of Shellharbour and Bass Point. Examples of artefacts recovered during the test excavation program with smooth cobble cortex suggest these were sourced in stream gravels, from coastal gravels, or possibly from breccia deposits associated with igneous intrusions.

Most of the artefacts were of good quality isotropic stone, with zero cortex, and small in size (<25 millimetres) suggesting that artefact raw materials were being conserved. There was evidence of recycling as seen in the hammer/anvil/ground items. One possible recycled hatchet fragment of basalt (ID 63) was found in Spit 3 of TS 16 (Plate 13). This artefact had two smoothed faces and peck marks, suggesting the artefact formed part of a ground hatchet/anvil. The artefact also had three unifacial negative flake scars and other impact points indicating attempts to reduce it. One weathered flake of brown igneous stone (ID 41) was found in Spit 4 of TS 12 and was possibly flaked from a ground hatchet head.

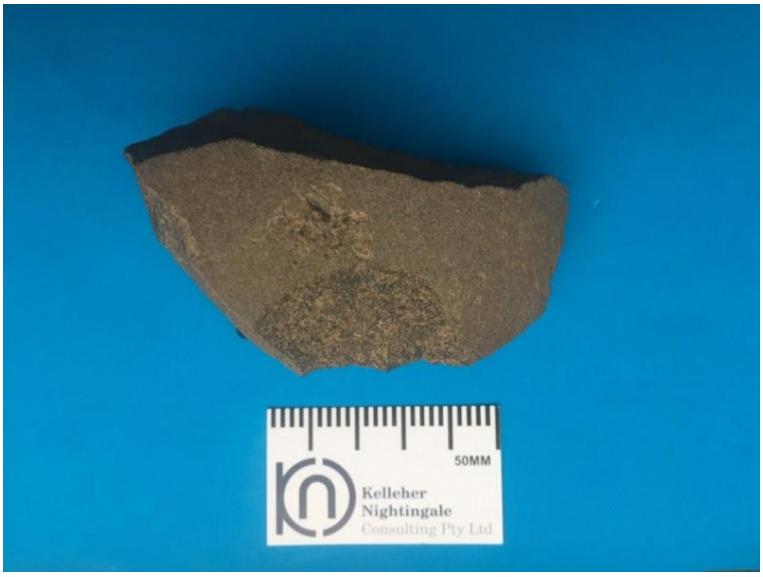

Plate 13. Hatchet/anvil fragment recycled as a core (ID 63) from spit 3, TS 16.

The majority of artefacts were small in size with the most common size of artefact between 10-15 millimetres (n=34) (Table 4). The two largest artefacts were modified cobbles. The largest artefact recovered was a split cobble with one end unifacially flaked, which measured 108 millimetres in length (ID 49). The artefact had pecking on one surface indicating previous anvil use.

Table 4. Artefact size classes

Size (mm)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	50-55	80-85	105-110
n	17	34	10	6	7	4	4	1	1	1	1

A total of 19 whole flakes were found during the test excavation program with the majority having plain or cortical platforms. Most of the knapped stone artefacts were unifacially flaked and there was evidence of freehand knapping.

All of the tools recovered during the test excavation program were recovered on the same landform, at CW2. This is located at the top of a natural amphitheatre that slopes north down to a second natural reservoir.

One backed artefact (ID 33) was identified in Spit 2 of TS 10 and comprised a tiny fragment of fine grained siliceous agate with blunting retouch on one margin. One core and one core fragment were also recovered. The core was a poor quality jasper tabular cobble fragment with crenate or heat fractured surfaces, while the core fragment comprised a high quality fragment of translucent agate with four unidirectional scars. Eight artefacts indicated on site tool use and were classed as flake tools with either retouch or utilised margins. Five artefacts appeared to be retouched and used, while the remaining three had usewear on margins but not retouch.

Table 5. Artefact types

Core/Fragment	Backed	Retouch/Utilised	Hammer/Anvil/Ground	Unmodified	*Total*
2	1	8	5	70	*86*

6.4 Discussion

The test excavation program established the presence of archaeological deposit in all three test excavation areas and consequently identified three Aboriginal archaeological sites:

- Croome West AFT 1 (formerly CW1);
- Croome West AFT 2 (formerly CW2); and
- Croome West AFT 3 (formerly CW3).

Test squares averaged 30cm in depth, with a few pits encountering deeper deposit to 40cm (Croome West AFT 3). Soils across the tested area contained silty clay loams over clay and/or weathered bedrock. Local latite rock inclusions increased in the proximity of the natural reservoir.

Artefact distribution was characterised by a low density deposit with localised higher concentrations at sites Croome West AFT 1 and Croome West AFT 2. The areas of localised higher density suggest limited horizontal movement within the deposit at these sites. The low density and unfocused spread of artefacts at the Croome West AFT 3 suggests that horizontal movement had occurred at this location, possibly as a result of past land use practices such as ploughing or disturbance from the construction of farm structures.

Flaked artefacts were made of a diverse range of stone raw materials. These included agate, quartz, jasper, silicified tuff, petrified wood, silcrete, unidentified fine grained siliceous, quartzite, basalt and other igneous rocks. Sources of these raw materials are unknown in the immediate vicinity of the test excavation areas. The predominantly small size of artefacts and evidence of artefact recycling indicate that the materials were brought to the area from elsewhere.

The results of the test excavation program demonstrate that Croome West AFT 1 and Croome West AFT 2 have moderate archaeological research potential due to the diversity of raw material and tool types, relatively intact nature of the subsurface deposit at these locations and their proximity to the natural reservoir. Croome West AFT 3 has low archaeological research potential due to the low density of artefacts recovered and the disturbed nature of the site.

6.5 Conclusion

All the identified Aboriginal objects at Croome West were brought to the site. The artefacts and raw materials were specifically chosen for aesthetics and quality, representing a distinct end of a cultural continuum, indicating a focused activity area far removed from the mundane spatial associations related to domestic behaviour. The elevated location was selected for its geographic nature and unusual volcanic reservoirs. Croome West was clearly a focus point in the landscape, where past Aboriginal people utilised special topographic characteristics to enable specialised activity – far removed from the mundane nature of daily life.

The surviving archaeological resource at Croome West has benefited from its isolated position, which reduced the loss of artefacts from erosion; however, the in situ cycling of soil (from natural and agricultural activity) has resulted in a disturbed vertical deposit. The result is a hill top containing a cultural jumble of information, where potentially thousands of years of Aboriginal activity have collapsed into a heritage layer (a ‘time-capsule’ blanket of cultural material), which is horizontally intact but requires careful separation to elucidate past activities.

The scientific value of Croome West is linked to the association of select archaeological activities in association with select topography. This rare combination yields intriguing insights into the specialised behaviours, which are at the heart of Aboriginal culture. The recovery and investigation of these specialised behaviours through archaeological salvage excavation will greatly advance understanding of the complex sociocultural organisation of Aboriginal culture.

7 Identified Aboriginal Sites

The Aboriginal cultural heritage assessment, including review of previous archaeological investigations, Aboriginal community consultation and archaeological investigations including test excavation has identified three Aboriginal archaeological sites within the study area (Figure 14). These sites comprise the three artefact scatters and are listed in Table 6.

Table 6. Identified Aboriginal cultural heritage values within the study area

Site Name	AHIMS #	Site Feature
Croome West AFT 1	52-5-0851	Artefact
Croome West AFT 2	52-5-0850	Artefact
Croome West AFT 3	52-5-0849	Artefact

Croome West AFT 1
Site Croome West AFT 1 was located on the crest of a north west to south east running spurline in the south eastern portion of the study area and immediately south of a natural reservoir. Test excavation determined the site retained an intact low to moderate density archaeological deposit. 19 artefacts were recovered from the seven test units excavated (Appendix D).

Artefact density within the test excavation area, extrapolated to square metres, displayed a mean artefact density of 10.86/m^2. Artefact distribution was characterised by a low density deposit with a localised higher density in the middle of the tested area. The occurrence of localised higher density suggested limited horizontal movement within the deposit. The absence of cores and formalised tools within the assemblage indicates that the site functioned as an area for the maintenance and use of stone tools. The quality and aesthetic nature of the raw material indicated a selective activity area.

Croome West AFT 2
Site Croome West AFT 2 was located on the crest of a saddle immediately north of a natural reservoir. Test excavation determined that the site retained an intact moderate density archaeological deposit. 57 artefacts were recovered from the ten test units excavated (Appendix D).

Artefact density within the test excavation area was significantly higher than those of the other two test excavation areas and extrapolated to square metres, the test area displayed a mean artefact density of 22.8/m^2. Artefact distribution was characterised by a moderate density deposit with a localised higher density along the western edge of the tested area. The occurrence of localised higher density suggested limited horizontal movement within the deposit. The assemblage contained a small quantity of cores and formalised tools indicating that the creation of stone tools occurred at the site but was secondary to the maintenance and use of stone tools. The quality and aesthetic nature of the raw material indicated a selective activity area.

Croome West AFT 3
Site Croome West AFT 3 was located on the crest of hill in the western portion of the study area. Test excavation determined that the site retained an intermittent low density archaeological deposit. Ten artefacts were recovered from the ten test units excavated (Appendix D).

Artefact density within the test excavation area, extrapolated to square metres, displayed a mean artefact density of 4/m^2. Artefact distribution was characterised by an intermittent low density deposit. The overall unfocussed low density deposit and close proximity to structures suggested that the deposit had been disturbed. The absence of cores and formalised tools within the assemblage indicates that the site functioned as an area for the maintenance and use of stone tools. The lower overall artefact density indicates the site area was a secondary/support activity location for limited maintenance.

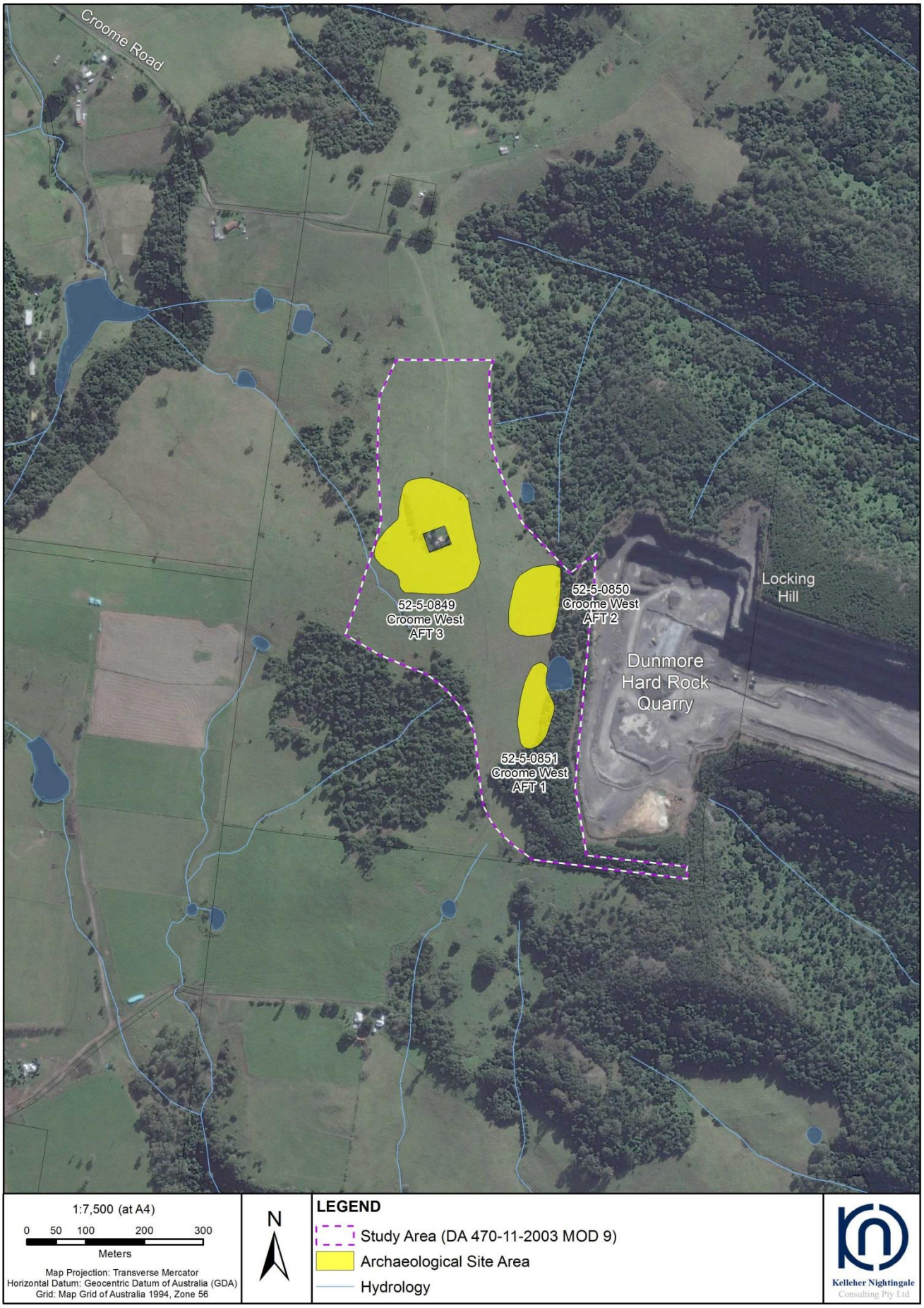

Figure 14. Identified Aboriginal archaeological sites in the study area

8 Cultural heritage values and statement of significance

8.1 Significance assessment criteria

One of the primary steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984; Pearson and Sullivan 1995:7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long term outcomes for future generations as the nature of what is conserved and why, also changes over time.

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

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

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

8.2 Statement of significance

The project area has cultural value for the local Aboriginal community. The identified cultural value is a feeling of attachment and responsibility for the land. These values become tangible when tied to identified Aboriginal objects found at the archaeological sites. In this way, the Aboriginal objects can be seen as exhibiting both scientific information and cultural meaning, knowledge about the past tied with social values and belief systems.

The study area contained three identified Aboriginal archaeological sites as defined under the *National Parks and Wildlife Act 1974*. Two Aboriginal archaeological sites (Croome West AFT 1 and Croome West AFT 2) were assessed as being of moderate significance and site Croome West AFT 3 of low significance. This assessment was based on consideration of the research value, representativeness, intactness and rarity of the sites in a local and regional context as outlined below.

Croome West AFT 1
Site Croome West AFT 1 was a low to moderate density artefact scatter situated on the crest of a north west to south east running spurline, immediately south of a natural reservoir. The site had been subject to limited human disturbance and the results from the test excavation suggest that horizontal movement within the deposit was limited. The site represents a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. In addition, the range of raw materials and artefact types found at the site and context adjacent to the natural reservoir is unusual. The site demonstrated moderate scientific value and it is likely that further investigation could contribute to our understanding of Aboriginal landscape use in a location where Aboriginal archaeological objects have not commonly been found. Based on the intactness, representativeness, and research potential of the site, Croome West AFT 1 was determined to have moderate archaeological significance (high research values, moderate levels of soils disturbance and low conservation value).

Croome West AFT 2

Site Croome West AFT 2 was a moderate density artefact scatter situated on the crest of a saddle immediately north of a natural reservoir. The site had been subject to limited human disturbance and the test excavation results suggest horizontal movement of artefacts within the deposit was limited. The site represents a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. In addition, the range of raw materials and artefact types found at the site and context adjacent to the natural reservoir is unusual. The assemblage contained a small quantity of cores and formalised tools indicating stone tool manufacture as well as tool maintenance and use occurred at the site, adding to its research value.

The site demonstrated moderate scientific value and it is likely that further investigation could contribute to our understanding of Aboriginal landscape use in a location where Aboriginal archaeological objects have not commonly been found. Further investigation may help to answer research questions related to Aboriginal occupation and exploitation of natural volcanic vents/reservoirs in the area, a rare physical landscape feature, as well utilisation of elevated areas such as hillcrests and ridgetops between the coast and sandstone escarpments to the west, transportation routes for movement of people or use of special areas or resources for specific or specialised activities.

Based on the intactness, representativeness, and research potential of the site, Croome West AFT 2 is determined to have moderate archaeological significance (high research values, moderate levels of soils disturbance and low conservation value).

Croome West AFT 3

Site Croome West AFT 3 was a low density artefact scatter situated on the crest of a hill in the western portion of the study area. The site had been subject to moderate human disturbance from construction of a house and outbuildings, agricultural activities and tree clearance. The absence of localised higher density deposit and overall low density suggested horizontal movement within the deposit. The site represents a commonly occurring site type in the region; however, the site type is uncommon in a ridgetop landform context. The site demonstrated low scientific value due to the disturbed nature and low density of the archaeological deposit. It is unlikely that further investigation would contribute to our understanding of Aboriginal landscape use in the region. Based on the intactness, representativeness and research potential of the site, Croome West AFT 3 is determined to have low archaeological significance.

9 Proposed activity and impact assessment

Boral proposes to expand the existing Croome Farm Pit, the westernmost extraction pit at Dunmore Quarry, further to the west into the study area. The entirety of the study area will be impacted by quarrying and associated activities.

The three identified Aboriginal sites would be impacted by the proposal. Assessed impacts to sites identified within the study area detailed in Table 7.

Table 7. Aboriginal heritage impacts

Site Name	AHIMS ID	Type of harm	Degree of harm	Consequence of harm	Significance of harm
Croome West AFT 1	52-5-0851	Direct	Total	Total loss of value	Moderate
Croome West AFT 2	52-5-0850	Direct	Total	Total loss of value	Moderate
Croome West AFT 3	52-5-00849	Direct	Total	Total loss of value	Low

10 Avoiding and/or mitigating harm

The three Aboriginal archaeological sites identified within the study area have been considered by Boral in relation to the proposed extraction pit expansion. While conservation is the best approach when considering Aboriginal heritage, impact to the three sites is unfortunately unavoidable due to the nature of the expansion project. The most significant sites are situated adjacent to the existing operations.

The scientific value of archaeological sites is linked to the physical information the sites contain. Site Croome West AFT 3 has low archaeological significance and does not warrant further archaeological investigation; however, measures for mitigating harm to Aboriginal objects (salvage excavation) are recommended for sites Croome West AFT 1 and Croome West AFT 2.

The loss of intrinsic Aboriginal cultural value of impacted sites cannot be offset; however the salvaged information will increase our understanding, strengthen our interpretations and improve ongoing and future management of Aboriginal heritage in the surrounding area. The presence of archaeological deposits and activities related to Aboriginal occupation of ridgetop landform contexts is little known due to limited large scale excavation data. In this light, the project offers a unique opportunity to significantly advance the interpretation and management of Aboriginal heritage of the surrounding area by providing a foundation for future heritage assessments.

11 Management and recommendations

The following management and mitigation measures are required for identified Aboriginal heritage within the Croome Farm West Pit Expansion area.

11.1 Mitigation through archaeological salvage excavation

The archaeological sites in Table 8 are of moderate Aboriginal heritage significance and will be impacted by the project. These sites require archaeological salvage excavation to mitigate the impacts. Salvage excavation can only occur after project approval is obtained.

Salvage excavation must be completed prior to any activities which may harm Aboriginal objects at these site locations. Salvage excavation activities would be undertaken in accordance with the methodology attached as Appendix E.

Table 8. Aboriginal sites requiring mitigation (salvage excavation)

Archaeological sites requiring mitigation	
Archaeological Sites (requiring salvage)	Croome West AFT 1 Croome West AFT 2

11.2 No archaeological mitigation required

No archaeological mitigation is required for the site in Table 9. The site may only be impacted after project approval is obtained.

Table 9. Aboriginal sites with no further archaeological mitigation required

No further archaeological mitigation required	
Archaeological Sites (no archaeological mitigation)	Croome West AFT 3

11.3 Salvaged Aboriginal objects

The short term management of collected Aboriginal objects is as follows:

- Any Aboriginal objects that are removed from the land by actions authorised by the project approval, must be moved as soon as practicable to the temporary storage location (see below) pending any agreement reached about the long term management of the Aboriginal objects.
- The temporary storage location would be: Kelleher Nightingale Consulting Pty Ltd, Level 10, 25 Bligh Street, Sydney NSW 2000.
- Any Aboriginal objects stored at the temporary storage location must not be further harmed, except in accordance with the conditions of the approval.

The long term management of collected Aboriginal objects is as follows:

- Recovered objects will be lodged with the Australian Museum in the first instance in accordance with the *Australian Museum Archaeological Collection Deposition Policy* (January 2012, available online at: http://australianmuseum.net.au/document/Protocols-for-the-deposition-of-archaeological-materials). If required, a variation will be sought for recovered objects to be held by the Aboriginal community or reburied.
- Requirement 26 "Stone artefact deposition and storage" in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (24 September 2010, available online at: http://www.environment.nsw.gov.au/resources/cultureheritage/10783FinalArchCoP.pdf) must be complied with.

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Appendix A Advertisement for registration of interest

Notice for Registration of Interest

Boral Resources (NSW) Pty Limited ('Boral') proposes to expand existing operations at Dunmore Quarry. The quarry is located off Tabbita Road at Dunmore, south of Albion Park Rail and west of Dunmore Railway Station and the Princes Highway, in the Shellharbour Local Government Area. The proposal, referred to as the Croome West Pit Expansion project, involves extending the westernmost extraction pit further to the west.

The project is being assessed under the Environmental Planning and Assessment Act 1979 as a State Significant Development (SSD) project and will not require an Aboriginal heritage impact permit in accordance with Part 6 of the National Parks and Wildlife Act 1974. Boral proposes to carry out consultation with Aboriginal people in accordance with the Office of Environment and Heritage (OEH) Aboriginal cultural heritage consultation requirements for proponents 2010. The purpose of this consultation process is to inform the preparation of an environmental assessment for the project and assist the Department of Planning and Environment in its consideration of the project application.

Boral invites Aboriginal groups andr Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects andr places in Dunmore, NSW to register interest in a process of community consultation regarding the proposed activity, with the contact shown below (on behalf of Boral, as proposed applicant).

To register your interest in the consultation process, please contact:
Matthew Kelleher
Kelleher Nightingale Consulting
Level 10, 25 Bligh St
Sydney NSW 2000
Ph 9232 5373
Fax 9223 0680

The closing date for registration of interest is 17 May 2016.

Please be advised that in accordance with the OEH requirements, the details of all parties who register their interest will be forwarded to OEH and the Local Aboriginal Land Council unless specified otherwise.

Appeared in: Illawarra Mercury (Tuesday 3 May 2016)

Appendix B Aboriginal Stakeholder Consultation

DUNMORE QUARRY – PROPOSED CROOME FARM WEST PIT EXPANSION, DUNMORE NSW
LOG OF ABORIGINAL CULTURAL HERITAGE CONSULTATION
Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010

Date	To	From	Medium	Brief Description
1/3/16	Illawarra Local Aboriginal Land Council	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	National Native Title Tribunal	KNC	Letter & Search Request	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	NTSCORP Limited	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	Office of Environment and Heritage	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	Office of the Registrar Aboriginal Lands Right Act	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	Shellharbour City Council	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
1/3/16	South East Local Land Services	KNC	Letter	Statutory Government Agency Letter – Request for list of Aboriginal stakeholders
3/3/16	KNC	National Native Title Tribunal	Email	Response to Statutory Government Agency Letter – Advised no Native Title Claims within study area
7/3/16	KNC	Office of the Registrar, Aboriginal Lands Right Act	Email & Letter	Response to Statutory Government Agency Letter – Advised no Registered Aboriginal Owners under the *Aboriginal Land Rights Act 1983* (NSW) and suggested KNC contact ILALC
9/3/16	KNC	South East Local Land Services	Letter	Response to Statutory Government Agency Letter – Suggested KNC contact OEH
10/3/16	KNC	Office of Environment and Heritage	Email & Letter	Response to Statutory Government Agency Letter – Provided list of Aboriginal Stakeholders
2/5/16	Badu	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Bellambi Indigenous Heritage Corporation Gandangara Traditional Owners	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Biamanga	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Bilinga	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Bilinga Cultural Heritage Technical Services	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gary Caines	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Coomaditchie United Aboriginal Corporation	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Cullendulla	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Dharug	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation

Date	To	From	Medium	Brief Description
2/5/16	James Davis	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Ken Foster	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gadhu Dreaming	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Goobah Developments Pty Ltd	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – David Bell	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Pimmy Johnson Bell	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Peter Foster	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Teangi Mereki Foster	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Larry Hoskins	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Christopher Payne	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gundungurra Tribal Technical Services – Sam Wickman	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gunyuu	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Gunyuu Cultural Heritage Technical Services	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Guunamaa Dreamin Sites and Surveying	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Illawarra Aboriginal Corporation	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Illawarra Local Aboriginal Land Council	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Jerringong	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Karrial Cultural Heritage Technical Services	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Korewal Elouera Jerrungurah Tribal Elders Council	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Kullila Site Consultants and Koori Site Management	KNC	Letter	Notification of project proposal and invitation to register interest for consultation

Date	To	From	Medium	Brief Description
2/5/16	La Perouse Botany Bay Corporation	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Minnamunung	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Munyunga	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Munyunga Cultural Heritage Technical Services	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Murramarang	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Murrumbul	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Murrumbul Cultural Heritage Technical Services	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Northern Illawarra Aboriginal Cooperative	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Nundagurri	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Pemulwuy	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Peter Falk Consultancy	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Norma Simms	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Three Ducks Dreaming Surveying and Consulting	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	The Wadi Wadi Coomaditchie Aboriginal Corporation	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Walbunja	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Walgalu	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Wingikara	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Wingikara Cultural Heritage Technical Services	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Wodi Wodi Elders Corporation	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Woronora Plateau Gundungura Elders Council	KNC	Letter	Notification of project proposal and invitation to register interest for consultation
2/5/16	Wullung	KNC	Letter	Notification of project proposal and invitation to register interest for consultation

Date	To	From	Medium	Brief Description
2/5/16	Yerramurra	KNC	Email & Letter	Notification of project proposal and invitation to register interest for consultation
3/5/16	Public Notice Advertisement placed in the *Illawarra Mercury* Newspaper (p.22) – Advertising for potential Aboriginal stakeholders to register interest in the project			
6/5/16	KNC	Peter Falk – Peter Falk Consultancy	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project and expressed Aboriginal cultural knowledge of the area and that he had worked in the area previously
6/5/16	KNC	Aaron Broad – Minnamunnung	Phone	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
10/5/16	KNC	Christopher Payne – Gundungurra Tribal Technical Services	Phone	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
12/5/16	KNC	Registered Aboriginal Stakeholder – details withheld as requested	Phone	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project and expressed personal family connection to the project area, advised on the significance of the local landscape. Expressed interest in attending field visits
12/5/16	KNC	Paul Cummins – Woronora Plateau Gundungara Elders Council	Phone	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project, expressed the significance of the area to his family and the wider Aboriginal community
16/5/16	KNC	Basil Smith – Goobah	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
17/5/16	KNC	Seli Storer – Biamanga	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
17/5/16	KNC	Corey Smith – Cullendulla	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
17/5/16	KNC	Wendy Smith – Gulaga	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
17/5/16	KNC	Roxanne Smith – Murramarang	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project
18/5/16	KNC	Gary Caines	Email	Response to Notification of Project Proposal and Registration of Interest Letter – Registered interest in the project and expressed both cultural knowledge of the project area and the experience to identify culturally significant sites
3/6/16	Office of Environment and Heritage	KNC	Letter	Statutory Aboriginal Stakeholder Consultation - Record of Registration of Interest Letter
3/6/16	ILALC	KNC	Letter	Statutory Aboriginal Stakeholder Consultation - Record of Registration of Interest Letter
30/6/16	Registered Aboriginal Stakeholders	KNC	Letter	Project Information and Proposed Assessment Methodology Letter – Invitation to stakeholders to comment and provide feedback on the methodology. 28 day comment period provided

Date	To	From	Medium	Brief Description
4/7/16	KNC	Peter Falk – Peter Falk Consultancy	Email	Response to Project Information and Proposed Assessment Methodology Letter – Peter Falk Consultancy agree with the proposed methodology
28/7/16	KNC	Christopher Payne – Gundungurra tribal Technical Services	Phone	Response to Project Information and Proposed Assessment Methodology Letter – Requested clarification on project location and minor points of the methodology. Indicated interest in fieldwork. KNC clarified parts of the methodology and Christopher expressed satisfaction with this
12/8/16	Office of Environment and Heritage	KNC	Letter	Statutory Notification of Test Excavations at Dunmore, NSW letter
23/8/16	Office of Environment and Heritage	KNC	Letter	Aboriginal Stakeholder Consultation – Updated stakeholder list provided to OEH confirming stakeholder details
23/8/16	Wendy Smith – Gulaga	KNC	Email	Requested update on the development of the project
23/8/16	KNC	Wendy Smith – Gulaga	Email	Response to Gulaga update email – Advised that test excavation was being organised and that fieldwork dates were forthcoming
22/8/16 23/8/16	Registered Aboriginal Stakeholders	KNC	Email & Letter	Fieldwork Invitation for Archaeological Test Excavation
22/8/16	KNC	Derek Illawarra Local Aboriginal Land Council	Email	Acceptance of Fieldwork Invitation
22/8/16	KNC	Kayla Williamson – Woronora Plateau Gundungara Elders Council	Email	Acceptance of Fieldwork Invitation
23/8/16	KNC	Biamanga	Email	Acceptance of Fieldwork Invitation
23/8/16	KNC	Cullendulla	Email	Acceptance of Fieldwork Invitation
23/8/16	KNC	Goobah	Email	Acceptance of Fieldwork Invitation
23/8/16	KNC	Murramarang	Email	Acceptance of Fieldwork Invitation
24/8/16	KNC	Aaron Broad – Minnamunung	Phone	Acceptance of Fieldwork Invitation
24/8/16	KNC	Gary Caines	Email	Acceptance of Fieldwork Invitation
24/8/16	Registered Aboriginal Stakeholders	KNC	Email & Letter	Updated details and confirmation of Fieldwork for Test Excavation
25/8/16	KNC	Christopher Payne – Gundungurra Tribal Technical Services	Email	Acceptance of Fieldwork Invitation
18/11/16	Registered Aboriginal Stakeholders	KNC	Email & Letter	Draft Aboriginal Cultural Heritage Assessment Report – Letter and Copy of the Report with invitation to provide further information and feedback on the report and advise on the Aboriginal cultural heritage significance of identified sites and the project area. 28 day review and comment period provided
13/12/16	Registered Aboriginal Stakeholders	KNC	Email	Reminder of upcoming closure of comment period on the Draft CHAR - Request for feedback and comments on the draft report

Appendix C AHIMS Search Results

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 1451
Client Service ID : 176898

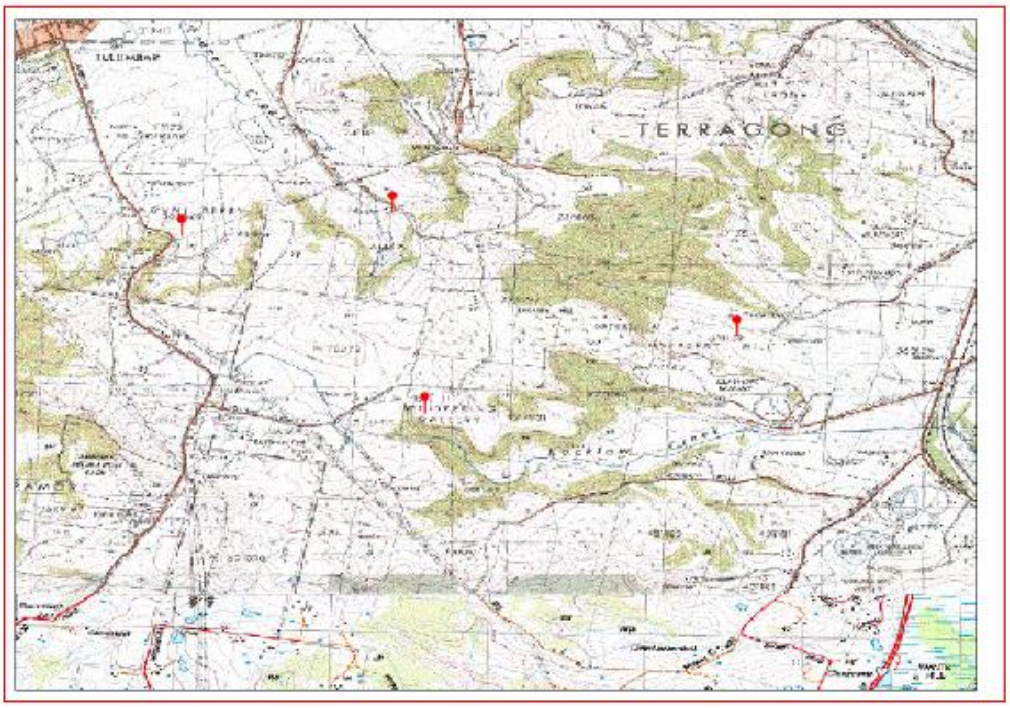
Kelleher Nightingale Consulting Pty Ltd
Level 10 25 Bligh Street
Sydney New South Wales 2000
Attention: Benjamin Anderson
Email: ben.anderson@knconsult.com.au

Date: 11 June 2015

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 296000 - 302000, Northings : 6166000 - 6171000 with a Buffer of 0 meters, conducted by Benjamin Anderson on 11 June 2015.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

11	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Purchase Order/Reference : 1451

Client Service ID : 176898

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-5-0251	Dunmore 1	AGD	56	301540	6166460	Open site	Valid	Artefact : -	Open Camp Site	687,1662,2048
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
52-5-0252	Dunmore 2;	AGD	56	301360	6166600	Open site	Valid	Artefact : -	Open Camp Site	1662
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
52-5-0253	Dunmore 3	AGD	56	301830	6166930	Open site	Valid	Artefact : -	Open Camp Site	687,1662,2048
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
52-5-0254	Dunmore 4;	AGD	56	301480	6167260	Open site	Valid	Artefact : -	Open Camp Site	1662
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits	1519	
52-5-0255	Dunmore 5;	AGD	56	301400	6167110	Open site	Valid	Artefact : -	Open Camp Site	1662
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits	1519	
52-5-0300	DQ2;	AGD	56	299130	6168350	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1992
	Contact	Recorders	Mr.Kelvin Officer					Permits	1770,2137	
52-5-0235	Tabbogong;	AGD	56	297200	6167000	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	1330
	Contact	Recorders	Kerry Navin					Permits		
52-5-0310	EGP 3-34;Stockyard Mountain;Eastern Gas Pipline;	AGD	56	296370	6168200	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
52-5-0311	EGP 3-35;Eastern Gas Pipline;	AGD	56	296370	6168200	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
52-5-0413	Duke -9	AGD	56	297760	6168130	Open site	Valid	Artefact : 2		
	Contact	Recorders	Stuart Huys					Permits		
52-2-1791	DQ1;	AGD	56	299200	6168660	Open site	Valid	Artefact : -	Open Camp Site	1992
	Contact	Recorders	Mr.Kelvin Officer					Permits		

Report generated by AHIMS Web Service on 11/06/2015 for Benjamin Anderson for the following area at Datum :GDA, Zone : 56, Eastings : 296000 - 302000, Northings : 6166000 - 6171000 with a Buffer of 0 meters. Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 11

Page 1 of 1

Appendix D Test Excavation Lithics Database

Table 10. Test excavation lithics database

ID	TS	Spit	Depth (cm)	Raw material	Colour	Lustre	Size range (cm)	Weight (g)	Cortex (%)	Activity	Reduction	Flake shape	L (mm)	W (mm)	Th (mm)	Platform	Termination	Core flaking pattern	Core platforms	Core scars	Core longest scar	Usewear	Comments
1	TS1	3	10 to 15	Sil Tuff	Pale Brown	Dull	1.5-1.9	0.44	0	Debitage	Flake	W>L	14	15	3	Ridged	Feather						
2	TS1	3	10 to 15	Agate?	Pale Grey	Slight	1-1.4	0.29	0	HSDebitage	HSSthgFlkd												potlid scar
3	TS1	3	10 to 15	Jasper	Red	Slight	1-1.4	0.05	0	Debitage	Distal Frag						Hinge						
4	TS2	1	0 to 10	MGS	Dark Brown	Dull	0.5-0.9	1.38	0	Debitage	Prox Frag					Plain							
5	TS2	2	10 to 20	MGS	Dark Brown	Dull	2-2.4	1.91	0	Debitage	Split F (R)					Plain							potlid scars on dorsal
6	TS2	2	10 to 20	FGS	Grey green	Dull	3-3.4	3.83	0	Utilised	Flake	W>L	22	31	7	Plain	Feather					Usewear	bending fracture on distal.
7	TS2	2	10 to 20	Jasper	Red	Slight	0.5-0.9	0.22	0	HSDebitage	HSSthgFlkd												potlid scars
8	TS3	1	0 to 10	MGS	Dark Brown	Dull	1-1.4	0.79	0	Debitage	Prox Frag					Plain							
9	TS3	1	0 to 10	Sil Tuff	Red brown	Slight	1-1.4	0.19	0	CFDebitage	CFSthgFlkd												
10	TS3	1	0 to 10	Silcrete	Red	Glossy	1-1.4	0.23	0	Debitage	Flake	L>W	13	9	2	Plain	Feather						
11	TS3	2	10 to 20	FGS	Red	Glossy	0.5-0.9	0.08	0	Debitage	Prox Frag					Plain							blotches red white, resembles bakelite.
12	TS4	1	0 to 10	Agate?	Pale Grey	Glossy	0.5-0.9	0.08	0	Debitage	Prox Frag					Focal							very fine quality. margin breaks
13	TS4	2	10 to 20	FGS	Pink	Dull	2.5-2.9	3.04	0	Utilised	Split F (L)					Plain						Usewear	banded.single notch left margin.distal snap.
14	TS4	3	20 to 30	Sil Tuff	Red brown	Glossy	1.5-1.9	0.45	0	Debitage	Med Frag												very fine. found b/w 20-25cm depth.
15	TS4	4	30 to 33	Pet Wood	Grey brown	Dull	3.5-3.9	6.95	0	Debitage	FP												Prov at c.32cm depth at clay boundary
16	TS4	4	30 to 33	Agate?	Grey	Slight	1-1.4	0.12	0	Debitage	FP												grey white blotches
17	TS6	2	10 to 20	Sil Tuff	Red brown	Slight	1-1.4	0.22	0	Debitage	Med Frag												
18	TS7	2	10 to 20	MGS	Red brown	Dull	2.5-2.9	3.3	40-60	HSDebitage	HSSthgFlkd												
19	TS7	2	10 to 20	MGS	Red brown	Dull	1-1.4	0.7	0	HSDebitage	HSSthgFlkd												
20	TS8	2	10 to 20	Jasper	Red	Slight	2-2.4	3	0	HSDebitage	HSSthgFlkd												
21	TS8	2	10 to 20	Quartz	Milky		0.5-0.9	0.09	0	Debitage	Distal Frag						Feather						
22	TS8	2	10 to 20	Quartz	Granular		0.5-0.9	0.05	0	Debitage	Prox Frag					Crushed							
23	TS8	2	10 to 20	Quartz	Transluc		0.5-0.9	0.04	0	Debitage	FP												Prov at 17cm depth
24	TS8	2	10 to 20	Pet Wood	Black	Glossy	2.5-2.9	1.49	0	CFDebitage	CFSthgFlkd												Prov at 18cm depth. banded, fine
25	TS9	1	0 to 10	Agate?	Grey	Slight	1-1.4	0.68	0	Debitage	Flake	W>L	12	15	4	Faceted	Plunging	Alternating					fine quality,grey ,white spots. Distal has removed platf off small rotated core.
26	TS9	1	0 to 10	Agate?	Grey	Slight	1-1.4	0.18	0	Debitage	Flake	W>L	8	11	2	Scarred	Hinge	Alternating					fine quality, grey, white spots.bifacial.alternating.
27	TS9	1	0 to 10	Agate?	Grey	Slight	0.5-0.9	0.05	0	HSDebitage	HSSthgFlkd												
28	TS9	1	0 to 10	Sil Tuff	Red brown	Dull	1-1.4	0.38	0	Debitage	FP												
29	TS9	2	10 to 20	Quartz	Milky		0.5-0.9	0.18	0	Debitage	FP												
30	TS10	1	0 to 10	Agate?	Red brown	Glossy	2.5-2.9	2.8	0	Debitage	Distal Frag						Plunging						fine quality.pale brown, red blotches. 4 dorsal parallel scars-off blade core
31	TS10	1	0 to 10	Agate?	Grey brown	Glossy	2.5-2.9	1.78	0	Debitage	Distal Frag						Plunging					Usewear	fine quality. has false platf-old break.
32	TS10	1	0 to 10	Agate?	Grey pink	Glossy	1-1.4	0.35	<30	Debitage	Flake	W>L	9	12	3	Focal	Hinge						fine quality. smooth like bakelite.
33	TS10	2	10 to 20	Agate?	Pale Grey	Slight	0.5-0.9	0.09	0	Backed	Med Frag												tiny frag.backing scars one margin
34	TS10	2	10 to 20	Quartz	Transluc		1-1.4	0.77	<30	Debitage	Prox Frag					Cortical							platf cortical off pebble/cobble.
35	TS11	2	10 to 20	Agate?	Pink	Slight	1-1.4	0.34	0	Debitage	FP												pink with remnant tiny geode crystals, white crust - igneous origin?
36	TS11	2	10 to 20	Sil tuff	Red brown	Dull	1-1.4	0.25	0	Debitage	Flake	L>W	11	10	3	Plain	Hinge						
37	TS12	2	10 to 20	Agate?	Pale Grey	Glossy	1-1.4	0.16	0	HSDebitage	HSSthgFlkd												tiny white spot inclusions. potlid scar

ID	TS	Spit	Depth (cm)	Raw material	Colour	Lustre	Size range (cm)	Weight (g)	Cortex (%)	Activity	Reduction	Flake shape	L (mm)	W (mm)	Th (mm)	Platform	Termination	Core flaking pattern	Core platforms	Core scars	Core longest scar	Usewear	Comments
38	TS12	2	10 to 20	Quartz	Milky		1-1.4	0.74	<30	Debitage	Flake	L>W	15	11	4	Cortical	Feather						off cobble, many flaws
39	TS12	3	20 to 30	Agate?	Red brown	Slight	3-3.4	10.1	0	Ret/Utilised	Prox Frag		32	33	7	Ridged						Usewear	patinated, red/white blotches, flake tool, dist ret, R margin edge fract
40	TS12	3	20 to 30	FGS	Dark brown	Slight	3.5-3.9	6.62	0	Ret/Utilised	Prox Frag		22	37	7	Plain						Usewear	highly patinated.
41	TS12	4	30 to 40	Igneous	Dark Grey	Dull	4-4.4	15.3	<30	Hatchet frag?	Distal Frag	L>W	41	35	11	Crushed	Plunging					Usewear	spall off cobble. weathered. off hammer or hatchet? Dorsal peckmarks, faint striations distal end.
42	TS13	2	10 to 20	Silcrete	Dark grey	Slight	1-1.4	0.39	0	Debitage	Distal Frag						Feather						Distal of split flake (left)
43	TS13	2	10 to 20	Jasper	Red brown	Dull	1-1.4	0.32	0	Debitage	FP												
44	TS13	2	10 to 20	Sil Tuff	Dark grey	Dull	1-1.4	0.36	0	HSDebitage	HSSthgFlkd												
45	TS13	3	20 to 30	Igneous	Pale Grey	Dull	3.5-3.9	6.28	<30	Hatchet Frag?	Flake	W>L	28	37	7	Cortical	Step	Unifacial				Usewear	smooth platform cortical or poss ground.
46	TS13	3	20 to 30	Qzite	Red brown	Slight	2.5-2.9	2.51	<30	Hatchet Frag?	Flake	W>L	20	27	4	Cortical	Feather	Unifacial				Usewear	smooth platform cortical or poss ground.
47	TS15	1	0 to 10	FGS	Dark Grey	Dull	3-3.4	6.18	0	Ret/Utilised	Med Frag											Usewear	amorphous shape.ret 2 margins.
48	TS15	1	0 to 10	Sil tuff	Pale Brown	Dull	0.5-0.9	0.03	0	Debitage	Flake	W>L	4	7	1	Plain	Feather						banded
49	TS15	2	10 to 20	Qzite	Pale Brown	Dull	10.5-10.9	299	>70	Hammer/Anvil/ Ground	Cobble Frag		108	44	40							Usewear	Prov x=15,y=42,z=11-15.Unifac flkd one end.old anvil peck marks.smooth poss ground surfaces, silica gloss.multifunctional.
50	TS15	2	10 to 20	Agate?	Dark Grey	Glossy	3.5-3.9	3.54	0	Ret/Utilised	Med Frag											Usewear	white spot inclusions. amorphous frag.one thin end edge fract.
51	TS15	2	10 to 20	FGS	Grey green	Dull	2-2.4	2.06	0	HSDebitage	HSSthgFlkd												potlid scars
52	TS15	2	10 to 20	Agate?	Yellow Brown	Slight	1.5-1.9	1.07	40-60	Debitage	Flake	W>L	12	18	6	Focal	Feather						dorsal scars at 90 deg to platf-rotated.
53	TS15	2	10 to 20	Agate?	Grey White	Slight	1.5-1.9	0.97	40-60	Debitage	Flake	W>L	12	15	7	Faceted	Feather						dorsal step scars-platf or ridge prep.pink cortx
54	TS15	2	10 to 20	FGS	Grey	Dull	1-1.4	0.17	0	Debitage	Flake	W>L	6	14	2	Plain	Feather						large cone
55	TS15	2	10 to 20	Quartz	Milky		0.5-0.9	0.08	0	Debitage	FP												
56	TS15	3	20 to 30	Agate?	Green pink	Dull	2-2.4	1.48	0	HSDebitage	HSSthgFlkd												potlid scars
57	TS15	3	20 to 30	Agate?	Red brown	Slight	1-1.4	1.67	0	Core Frag	HSSthgFlkd		12	11	10			Unifacial	1	4			fine quality, transluc. off small core.4 unidirect scars.rough flat ventral
58	TS15	3	20 to 30	Agate?	Pale Grey	Dull	0.5-0.9	0.08	0	HSDebitage	HSSthgFlkd												potlid
59	TS16	1	0 to 10	Agate?	Dark Grey	Slight	3.5-3.9	11.18	40-60	Ret/Utilised	Flake	W>L	30	37	10	Plain	Feather					Usewear	flake tool, tiny quartz crystals on dorsal.transluc.white spot inclusions. ret/use scars on distal.
60	TS16	2	10 to 20	Sil Tuff	Dark Brown	Dull	1.5-1.9	0.47	0	Debitage	FP												
61	TS16	2	10 to 20	Quartz	Transluc		1-1.4	0.5	0	Debitage	Prox Frag					Crushed							poss bipolar deb
62	TS16	2	10 to 20	Quartz	Milky		0.5-0.9	0.1	0	Debitage	FP												
63	TS16	3	20 to 30	Igneous	Grey Black	Dull	8-8.4	172	40-60	Hammer/Anvil/ Ground	Cobble Frag		82	60	33			Uni rotated	2	5		Usewear	reused hatchet?.two remnant smooth surfaces. anvil peck marks.faint striations. reused as core.two platfs
64	TS16	3	20 to 30	Agate?	Dark Grey	Slight	1.5-1.9	0.21	0	Debitage	Distal Frag						Feather						fine quality.
65	TS16	3	20 to 30	Agate?	Dark Grey	Slight	1-1.4	0.18	0	Debitage	Distal Frag						Feather						
66	TS16	3	20 to 30	Silcrete	Grey Pink	Glossy	1.5-1.9	0.91	<30	Debitage	Med Frag												smooth pink pebble/cobble cortex.fine quality
67	TS16	3	20 to 30	Silcrete	Yellow Red	Glossy	1.5-1.9	0.39	100	Debitage	Distal Frag						Feather						smooth red pebble/cobble cortex.fine quality

ID	TS	Spit	Depth (cm)	Raw material	Colour	Lustre	Size range (cm)	Weight (g)	Cortex (%)	Activity	Reduction	Flake shape	L (mm)	W (mm)	Th (mm)	Platform	Termination	Core flaking pattern	Core platforms	Core scars	Core longest scar	Usewear	Comments
68	TS16	4	30 to 40	Jasper	Red brown	Dull	2-2.4	2.52	0	HSDebitage	HSSthgFlkd												root feature.3 found 30-40cm.
69	TS16	4	30 to 40	Silcrete	Yellow Red	Glossy	1-1.4	0.33	0	Debitage	Med Frag												fine quality.3 parallel blade scars on dorsal
70	TS16	4	30 to 40	Agate?	Pink white	Slight	1-1.4	0.34	<30	Debitage	FP												
71	TS16	4	40 to 55	Agate?	Grey Red	Slight	2-2.4	1.99	0	Debitage	FP												root feature contd. 2 more artefacts found b/w 40-55cm.
72	TS16	4	40 to 55	Silcrete	Yellow red	Glossy	1.5-1.9	1.43	100	Utilised	Flake	L>W	19	17	4	Focal	Feather					Usewear	Prov at x=6, y=27, z=40cm.pink dorsal highly polished. Poss resid from use.
73	TS17	1	0 to 10	Silcrete	Grey	Glossy	1-1.4	0.17	0	Debitage	Flake	L>W	13	7	2	Focal	Plunging						very fine quality
74	TS17	1	0 to 10	Quartz	Clear		0.5-0.9	0.09	0	Debitage	FP												
75	TS17	2	10 to 20	Jasper	Red grey	Dull	5-5.4	36.52	40-60	Core	CFSthgFlkd		52	31	16			Unifacial	2	2	19		2 red waterworrn tabular cobble surfaces.crenate/rough
76	TS17	2	10 to 20	Silcrete	Yellow red	Glossy	1.5-1.9	1.05	0	Debitage	Prox Frag					Scarred							very fine quality.distal breakage edge fract.parallel dorsal scars.
77	TS18	4	30 to 40	Agate?	Grey White	Glossy	0.5-0.9	0.05	0	Debitage	Distal Frag						Feather					Photo	banded grey and white, transluc.fine quality
78	TS21	2	10 to 20	Agate?	Dark Grey	Glossy	1-1.4	0.1	0	Debitage	Med Frag												fine quality
79	TS21	4	30 to 40	FGS	Pale Brown	Dull	1-1.4	0.3	0	HSDebitage	HSSthgFlkd												
80	TS23	2	10 to 20	Sil Tuff	Dark Brown	Dull	2.5-2.9	6.07	>70	Debitage	Distal Frag						Hinge						
81	TS24	2	10 to 20	Agate?	Grey pink	Slight	1-1.4	0.26	0	Debitage	Flake	W>L	10	13	2	Plain	Feather						
82	TS25	1	0 to 10	Agate?	Dark Grey	Glossy	1-1.4	0.23	0	Debitage	Split F (R)											Photo	fine quality.like flint
83	TS25	1	0 to 10	Agate?	Dark Grey	Glossy	1.5-1.9	2.3	0	Debitage	Flake	W>L	15	18	11	Plain	Plunging						unifac, mottled, edge worn
84	TS25	2	10 to 20	Agate?	Pale Grey	Glossy	1.5-1.9	0.5	0	Debitage	Prox Frag	L>W				Focal							fine quality.like flint.left margin broken
85	TS27	2	10 to 20	Jasper	Red	Glossy	1.5-1.9	0.72	0	Debitage	Distal Frag						Step						similar to bakelite in texture.
86	TS27	2	10 to 20	Agate?	Red	Glossy	0.5-0.9	0.05	0	Debitage	Distal Frag						Feather					Photo	fine quality.transluc red.

Appendix E Salvage Excavation Methodology

Methodology

Research Aims

The main aims of the proposed salvage excavation program are:

- To salvage a representative sample of the identified archaeological sites prior to development impact.
- To analyse the salvaged archaeological material to gain and conserve knowledge and understanding of the scientific and cultural information exhibited by the activities associated with natural reservoirs on ridgetop landforms.

The further scientific aim of the salvage excavation program would be to determine the subsurface integrity, extent, spatial distribution and nature of the cultural deposit and the specific types of associated archaeological/cultural activities.

- Determining the integrity of the deposit involves assessing the degree of disturbance which is present.
- Determining the statistical extent of the sites and/or activity areas involves identifying the boundaries associated with the identified archaeological deposit.
- Assessing the spatial distribution involves identifying the presence/absence of archaeological material across the identified archaeological sites.
- The nature of the sites refers to the type of activities indicated by the artefactual material (e.g. primary production, domestic knapping, hunting camps). The goal would be to retrieve entire assemblages from specific activities if such activities were present.
- Retrieved assemblages would be compared with the results from other relevant archaeological projects in order to assess significance.

Research Questions

Archaeologically, the Croome West sites represent rare resource enabled (from permanent water) elevated focal points. Intriguingly such rare elevated focal points are often associated with very selective activity, which is reinforced by the selective and high quality nature of the artefacts recovered during the test program. The results of the proposed salvage excavation would increase our understanding of subsurface archaeology within the study area. In particular, research would focus on the archaeologically-identifiable cultural activities that took place in the vicinity of natural reservoirs on ridgetop landforms. Croome West AFT 1 and Croome West AFT 2 represent a site types uncommon on ridgetop landforms in the region and the close association with a natural reservoir may have facilitated longer or more specialised use of this area.

What can we expect?

It is anticipated that differences in stone tool assemblages may be related to different cultural activities (e.g. primary reduction vs maintenance flaking). Results from the test excavation program indicate that the sites may display assemblages with different characteristics, possibly representing different activities or site uses. The science of archaeology is paramount to any research question and it is important to stress that the goal for the salvage program for all excavated sites is straight forward: to retrieve a viable sample for comparative analysis using established techniques (see Field Methods below). In this regard interpretation would not precede data collection. The proposed archaeological program would systematically sample the relevant areas using standard techniques with the outcome being a viable, robust and comparable sample. Analysis of the sample would follow and interpretations would be made distinctly separate from the results.

Question 1: What cultural activities are archaeologically identifiable in association with the natural volcanic vents/ reservoirs in the area?

Question 2: How does past Aboriginal use of this area relate to activities in adjacent areas (the coast and the more elevated sandstone escarpments further west)?

Question 3: Do the sites display any unique or distinguishing traits that may be the result of their location in a unique landscape?

Archaeological Salvage Areas

Salvage excavation would be undertaken on identified archaeological sites Croome West AFT 1 and Croome West AFT 2. Salvage excavation of these sites would focus on the extraction of collections of artefacts related to activity areas and geomorphic information.

FIELD METHODS

The goal of the field excavation program is to recover significant assemblages of artefacts and investigation of contributing geomorphic processes.

Salvage Program

In order to achieve the most robust and comparable result, KNC advocates an open area salvage excavation. The first phase in open area salvage is to establish the statistical boundaries of the previously identified archaeological deposit. This approach is designed to salvage the spatial properties of the site as shown in the lithic continuum; in other words, recording the spread of activities across the site and wider landscape.

Phase 1

Where Phase 1 test results identified information bearing deposit Phase 2 excavation will be completed. Information bearing deposits are identified by triggers such as: significant quantities of artefacts, variations in raw material, unusual artefacts, chronological material and/or taphonomic indicators. In this context chronologic material is anything that can be used to date artefacts or deposit: charcoal or charcoal bearing deposit (e.g. hearth ash), sandy deposit, gravels (e.g. aluminium feldspar). Where necessary additional Phase 1 squares can be excavated on a transect grid overlain on each site to confirm the spread of lithics and related geomorphic activity. Phase 1 squares would be positioned to complement and augment the information from the previous test excavation program (see Figure 15).

Phase 2

Open area salvage, Phase 2 will expand on Phase 1 squares to encompass entire activity areas. It is anticipated that around 75-100m^2 will be excavated during the Phase 2 salvage program.

Individual excavation squares measuring 1 m^2 would be hand excavated in stratigraphic units (Unit A, Unit B, etc.). Squares would be excavated until the basal layer or culturally sterile deposit is reached (potentially up to 70cm below the surface). Excavation will be undertaken by stratigraphic unit.

Wet sieving of the excavated deposit is required with *three* nested sieve sizes: 5mm, 2.5mm and 1mm. The use of the 1mm sieve mesh is important to capture micro debitage necessary for assessing depositional movement (deflation and colluvial activity) and interpreting activity area. The use of 1mm sieve mesh has been shown to contribute significant information about site integrity and artefact reduction.

Core samples measuring at least 1m deep will be collected and archived using a 50mm hand corer to describe a cross section of the project area (around 10-15 samples will be required). In addition, thin section profiles (where feasible) would also be collected from open areas. The soil profiles of all areas would be fully documented and appropriate records would be archived.

Carbon samples will be collected and analysed for material relating to both the archaeology and geomorphology. Where appropriate cosmogenic and radiometric dating of soils and rock surfaces will be applied (Nishiizumi et al. 1986, 1993).

The location of each excavated square would be identified on a surveyed plan of the site. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit would be drawn and all squares would be photographed.

Analysis

Artefacts would be analysed on a comparable level with previous analyses of excavated assemblages. Information derived from this analysis; in particular the identification of specific artefact types and their distributions and associations; would be used to put together interpretations about how sites were used, where sites were located across the landscape, the age of sites and to assess cultural heritage values. By comparing different areas it would be possible to determine whether there were differences in the kinds of activities carried out and if different activities were related to different landforms.

The geoarchaeological assessment will focus on the integrity of the deposit and the ramifications of geomorphic change for: artefact survivability, interspatial assessments and scientific significance.

A range of stone artefacts may be present across the salvage areas and the analysis would expand accordingly to account for artefact variability. All information would be recorded in database form (MS Excel). Various types of evidence would be used to determine the kinds of activities that were carried out. A short description of the proposed analysis in outlined below.

- Field analysis would record basic data, such as material type, number and any significant technological characteristics, such as backing or bipolar techniques; added to this would be any provenance data such as pit ID and spit number. The purpose of the field recording is twofold: 1) establish a basic recording of artefacts retrieved and 2) to allow on-going assessment of the excavation regime (e.g. whether higher stratigraphic resolution is required while digging).
- Detailed (laboratory) analysis would entail recording a larger number of characteristics for each individual artefact. These details would be recorded in matrices suitable for comparative analysis (e.g. multivariate and univariate) of the excavated assemblage on a local and regional basis.
- Lithic characteristics to be recorded cover a range of basic information but are not limited to these categories (see example below). For transparency, terms and category types would in large part be derived from Holdaway and Stern (2004).

Sample Categories		
Record Number	% Cortex	Flake Type
Pit ID	Length	Termination Type
Spit Number	Width	Core Type
Count	Thickness	Number of Scars (Core)
Raw Material	Weight	Scar Type (Core)
Colour	Modification	Shape of Flake
Quality	Reduction Type	Platform Type

- A detailed explanation and glossary would be provided with the final excavation report.
- Minimum Number of Flake (MNF) calculations formulated by Hiscock (2002) would be undertaken where applicable (although past experience indicates MNF calculations would not be required for this excavation program).

The analysis of artefacts recovered during the excavation program would be undertaken in a transparent and replicable fashion so as to permit the comparison of the entire excavated assemblage with data from other areas. This would also allow for an interpretation of the study area's archaeological significance.

Field Team

KNC directors, Dr Matthew Kelleher and Alison Nightingale, would be responsible for the salvage excavation program. Dr Matthew Kelleher would direct the excavation component of the Aboriginal archaeological assessment. Matthew has extensive experience in managing archaeological excavations and research projects. Matthew would also be the principal contact for the overall Aboriginal archaeological assessment for the project. The salvage excavation will be undertaken in partnership with registered Aboriginal stakeholders.

Figure 15. Indicative salvage location