HUMECOAL
PROJECT

VOLUME 3

Hume Coal Project and Berrima Rail Project

Response to Submissions
Appendices 3 to 7

Prepared for Hume Coal Pty Limited
June 2018

EMM

VOLUME 1 Main Report

VOLUME 2A Appendices 1 to 2

Appendix 1 Register of submitters

Appendix 2 Hume Coal Project Revised Water Assessment
– Main report
– Appendices A to C

VOLUME 2B Appendix 2

Appendix 2 Hume Coal Project Revised Water Assessment
– Appendix D – Part 1

VOLUME 2C Appendix 2

Appendix 2 Hume Coal Project Revised Water Assessment
– Appendix D – Part 2

VOLUME 2D Appendix 2

Appendix 2 Hume Coal Project Revised Water Assessment
– Appendices E to F

VOLUME 2E Appendix 2

Appendix 2 Hume Coal Project Revised Water Assessment
– Appendices G to M

VOLUME 3 Appendices 3 to 7

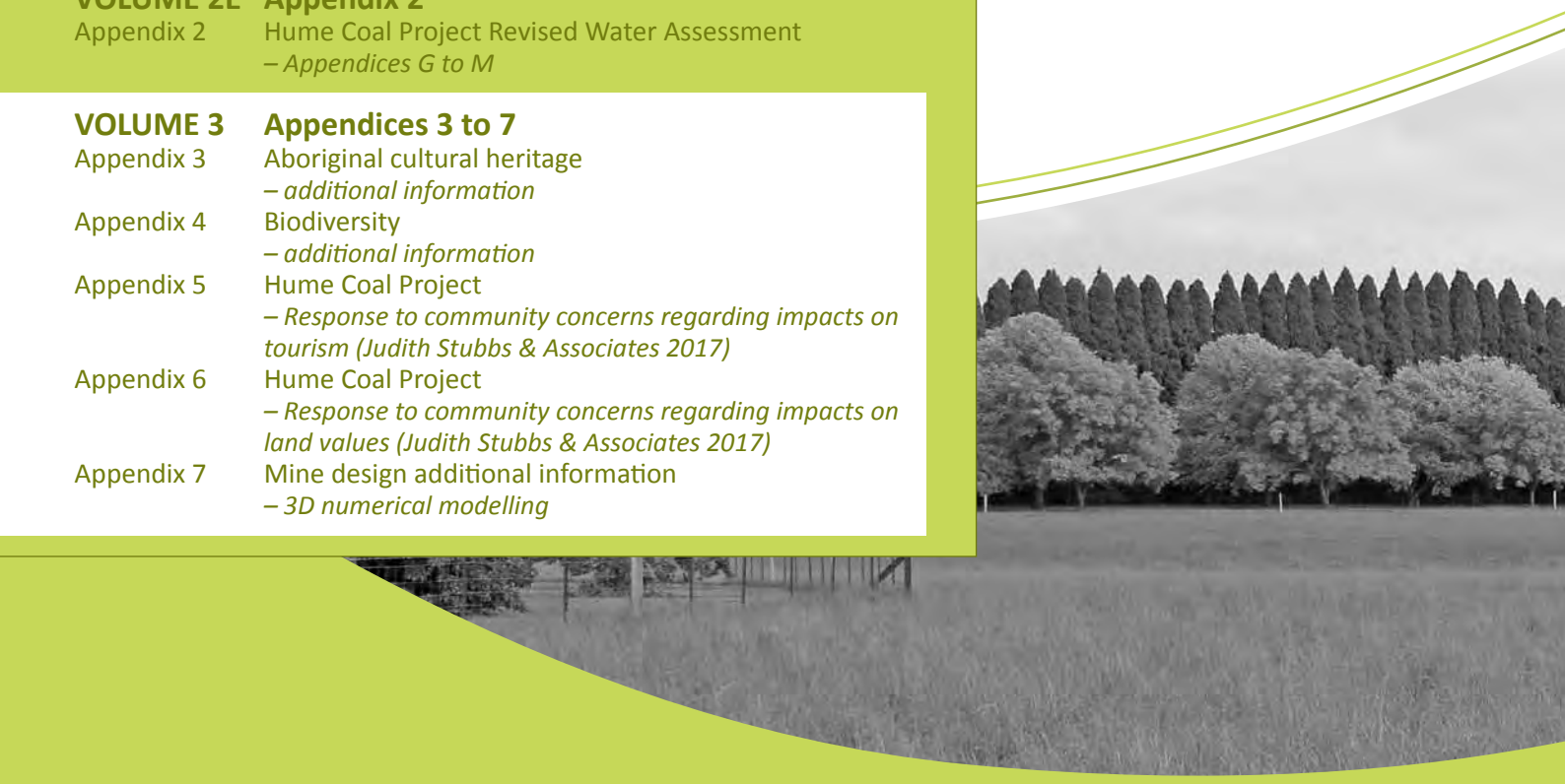
Appendix 3 Aboriginal cultural heritage
– additional information

Appendix 4 Biodiversity
– additional information

Appendix 5 Hume Coal Project
– Response to community concerns regarding impacts on tourism (Judith Stubbs & Associates 2017)

Appendix 6 Hume Coal Project
– Response to community concerns regarding impacts on land values (Judith Stubbs & Associates 2017)

Appendix 7 Mine design additional information
– 3D numerical modelling



Appendix 3

Aboriginal cultural heritage
– additional information

Appendix 3.1

Aboriginal heritage archaeological test excavation report (EMM 2018) Sites HC_146 and HC_179

Hume Coal Project and Berrima Rail Project

Response to Submissions | Appendix 3.1
Aboriginal heritage archaeological test excavation report

Prepared for Hume Coal Pty Limited | 27 March 2018

Aboriginal heritage archaeological test excavation report

Sites HC_146 and HC_179 | Hume Coal Project and Berrima Rail Project | Completed as part of the project response to submissions (RTS) report

Prepared for Hume Coal Pty Ltd | 27 March 2018

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065

T +61 2 9493 9500
F +61 2 9493 9599
E info@emmconsulting.com.au

www.emmconsulting.com.au

Aboriginal heritage archaeological test excavation report

Final

Report J12055RP1 | Prepared for Hume Coal Pty Ltd | 27 March 2018

Prepared by	**Ryan Desic**	Approved by	**Pamela Kottaras**
Position	Senior Archaeologist	Position	Heritage Services Manager
Signature		Signature	
Date	27 March 2018	Date	27 March 2018

Document Control

Version	Date	Prepared by	Reviewed by
1	27/03/2018	Ryan Desic	Pamela Kottaras

T +61 (0)2 9493 9500 | F +61 (0)2 9493 9599

Ground Floor | Suite 01 | 20 Chandos Street | St Leonards | New South Wales | 2065 | Australia

www.emmconsulting.com.au

Table of contents

Chapter 1 Introduction 1
1.1 Background 1
1.2 Approval process 1
1.3 Purpose and objectives 3
1.4 Consultation for this report 3
1.5 Authorship and acknowledgements 6

Chapter 2 Archaeological context 7
2.1 Previous work for the projects 7
2.1.1 Archaeological survey 7
2.1.2 Archaeological test excavation 7
2.2 Background of sites HC_179 and HC_146 8
2.2.1 Location 8
2.2.2 Site HC_179 8
2.2.3 Site HC_146 10

Chapter 3 Test excavation 11
3.1 Test excavation method 11
3.2 Test excavation results: HC_179 11
3.2.1 Test pit layout and depth 11
3.2.2 Soils 14
3.2.3 Artefact frequency and distribution 16
3.3 Raw materials 17
3.4 Artefact types 19
3.5 Test excavation results: HC_146 23
3.5.1 Test pit layout and depth 23
3.5.2 Soils 23
3.5.3 Artefact frequency and distribution 23
3.6 Artefact attributes 26

Chapter 4 Discussion 29

Chapter 5 Significance assessment 31
5.1 Overview 31
5.2 Socio-cultural and historical value: significance for the Aboriginal community 31
5.3 Scientific value 31
5.3.1 Overview 31
5.3.2 Scientific values 32

Table of contents *(Cont'd)*

Chapter 6 Impact assessment, management measures and conclusion 35

6.1 Impact assessment 35

6.1.1 Overview 35

6.1.2 HC_179 35

6.1.3 HC_146 35

6.2 Management measures 35

6.2.1 Overview 35

6.2.2 Management measures for HC_179 38

6.2.3 Management measures for HC_146 38

6.3 Site summaries 39

References 41

Appendices

A OEH submission

B Aboriginal consultation

C Test excavation artefact data

Tables

1.1 List of RAPs 4

1.2 Cubbitch Barta Native Title Claimants comments on the test excavation report 4

4.1 Predicted artefact density and actual results 29

5.1 Assessment of significance HC_179 32

5.2 Assessment of significance HC_146 33

6.1 Site summaries 39

Table of contents *(Cont'd)*

Chapter 6 Impact assessment, management measures and conclusion 35

6.1 Impact assessment 35

6.1.1 Overview 35

6.1.2 HC_179 35

6.1.3 HC_146 35

6.2 Management measures 35

6.2.1 Overview 35

6.2.2 Management measures for HC_179 38

6.2.3 Management measures for HC_146 38

6.3 Site summaries 39

References 41

Appendices

A OEH submission

B Aboriginal consultation

Tables

1.1 List of RAPs 4

1.2 Cubbitch Barta Native Title Claimants comments on the test excavation report 4

4.1 Predicted artefact density and actual results 29

5.1 Assessment of significance HC_179 32

5.2 Assessment of significance HC_146 33

6.1 Site summaries 39

Figures

1.1	Regional context	2
2.1	Local context of HC_146 and HC_179	9
3.1	HC_179 excavation layout and results	13
3.2	HC_146 excavation layout and results	24
6.1	Impact assessment HC_179	36
6.2	Impact assessment HC_146	37

Plates

3.1	Wet sieving at HC_179 (view south-west)	12
3.2	View north from the crest of HC_179 onto the flood plain below and Medway Rivulet	12
3.3	Example of 1 m x 1 m test pit (Transect 2, test pit 034E 133N)	12
3.4	Site HC_146 view south-east at Transect 1	12
3.5	Soil profile of test pit 034E 133N	14
3.6	Soil profile of test pit 044E 173N	15
3.7	Artefact frequency per spit level showing number of artefacts recovered from each spit across HC_179	16
3.8	A sample of raw material types	18
3.9	Raw material types and their percentages	19
3.10	A sample of flakes from HC_179	20
3.11	Artefact types and their frequencies	20
3.12	Cores from HC_179 including quartz core (top left), a chalcedony core (top right) and a small quartz core fragment (bottom)	21
3.13	Implements from HC_179 showing a unifacial point (top), two thumbnail scrapers (middle row) and two Bondi Points (two bottom left), a geometric microlith (bottom centre right) and a Bondi Point (bottom Right)	22
3.14	Artefact frequency per spit level at HC_146	23
3.15	Test pit 486E 610N showing large shale inclusions	25
3.16	Test pit 486E 570N showing minimal shale inclusions	26
3.17	All artefacts recovered from HC_146 including one geometric microlith identified from test pit 486E 610N (top row centre)	27

1 Introduction

1.1 Background

Hume Coal Pty Limited (Hume Coal) proposes to construct and operate an underground coal mine and associated mine infrastructure in the Southern Coalfield of New South Wales (NSW) (the Hume Coal Project). The mine will produce metallurgical coal with a secondary thermal coal product. Around 50 million tonnes (Mt) of run-of-mine coal will be extracted from the Wongawilli Seam via a first-workings mining system, resulting in approximately 39 Mt of saleable coal over a project life of 23 years. The Hume Coal Project area is located to the west of Moss Vale, in the Wingecarribee local government area (LGA). Figure 1.1 illustrates the location of the project at a regional scale.

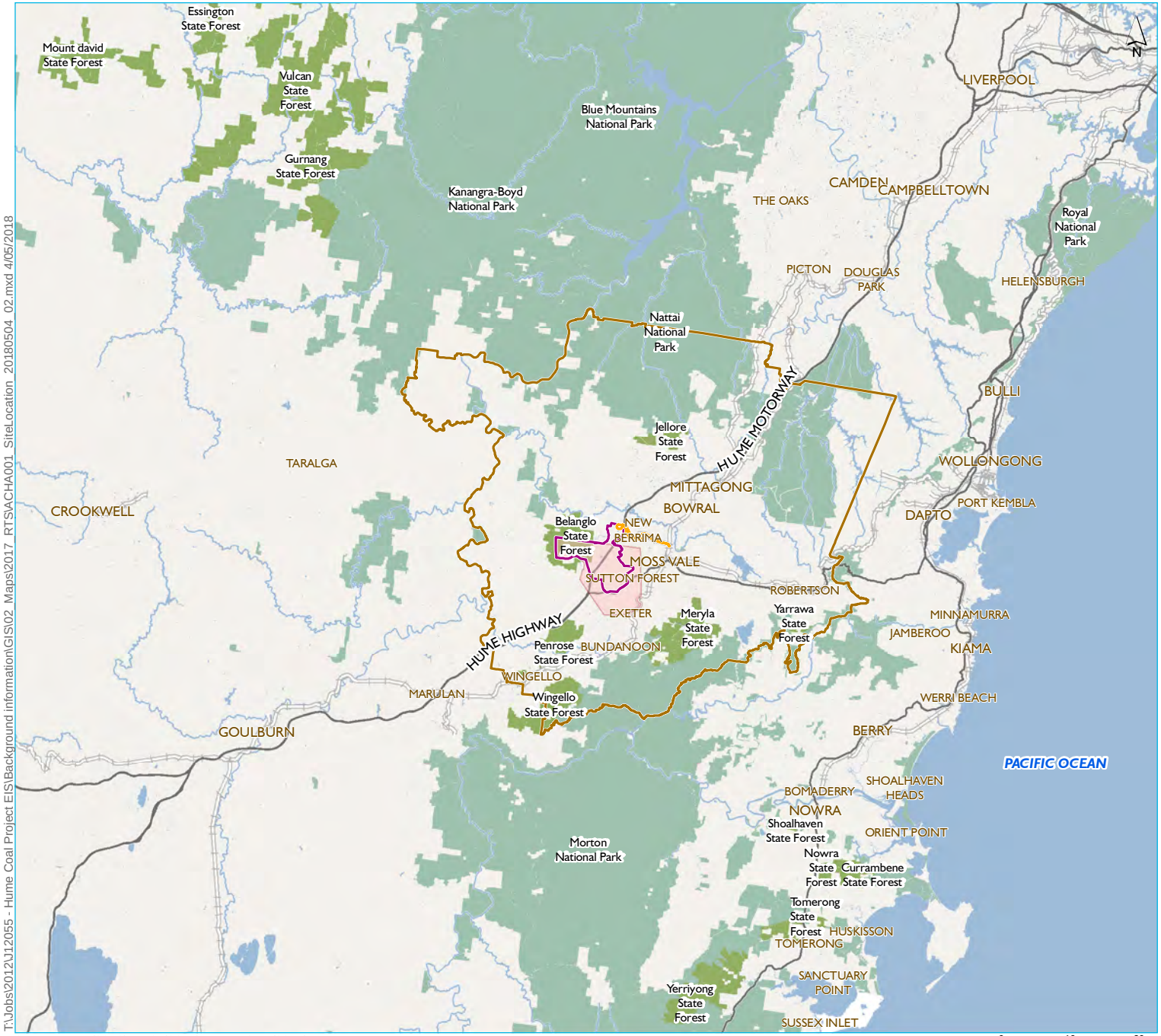
Hume Coal is also seeking approval in a separate development application for the construction and operation of a new rail spur and loop, known as the Berrima Rail Project. Coal produced by the Hume Coal Project will be transported to port for export or to domestic markets by rail via this new rail spur and loop.

Hume Coal is a wholly-owned subsidiary of POSCO Australia Pty Limited (POSA), the Australian subsidiary of POSCO. POSCO is a leading multinational steel manufacturer and one of the largest buyers of Australian coal and iron ore. The Hume Coal Project and Berrima Rail Project have evolved progressively since Hume Coal began exploration drilling in the Hume Coal Project area in May 2011 and following detailed geological, engineering, environmental, financial and other technical investigations to define the mineable resource, and to address identified environmental and technical constraints. The two projects have been designed to extract coal efficiently and transport the coal to market within these identified constraints, while minimising adverse environmental impacts.

1.2 Approval process

Approval for both the Hume Coal Project and the Berrima Rail Project is being sought under Part 4 Division 4.1 (State significant development) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) for the two projects were issued by the NSW Department of Planning and Environment (DPE) on 20 August 2015.

The development applications and accompanying environmental impact statements (EISs) for the Hume Coal Project and the Berrima Rail Project were submitted to the DPE and placed on public exhibition between 31 March 2017 and 30 June 2017.



KEY

- Hume Coal Project area
- Berrima Rail Project area
- Wingecarribee Shire LGA
- A349
- Main road
- Rail line
- Drainage line
- Waterbody
- NPWS reserve
- State forest

Source: EMM (2018); DFSI (2017); Hume Coal (2017)

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02_Maps\2017_RTS\ACHA001_SiteLocation_20180504_02.mxd 4/05/2018

Regional context of the Hume Coal and Berrima Rail project areas

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 1.1

HUMECOAL PROJECT

EMM

1.3 Purpose and objectives

EMM have prepared a response to submissions report (RTS) addressing submissions received on both the Hume Coal Project EIS and the Berrima Rail Project EIS.

This Aboriginal heritage archaeological test excavation report (test excavation report) has been prepared to respond to a submission received from the Office of Environment and Heritage (OEH 2017). The submission recommended additional archaeological test excavation in area of potential archaeological deposit (PAD), registered as HC_179, which was identified during survey within the Hume Coal Project disturbance footprint (OEH 2017, p.4). The submission recommended that the test excavation be completed prior to project approval. Additionally, OEH raised that another PAD (HC_146) should be considered for test excavation to "add rigour to the archaeological sensitivity model presented by EMM and also to mitigate the loss of the sites through contributions to further research" (OEH 2017, p.3). Site HC_146 was recorded as an area of PAD during survey for the Berrima Rail Project ACHA and predicted to have low archaeological potential.

In response to OEH's submission, EMM has undertaken a test excavation program covering the PADs HC_179 and HC_146, which is documented in this report. The overall aims of the test excavation program and reporting were to:

- determine whether Aboriginal objects occur at sites HC_179 and HC_146;
- characterise the archaeological deposits with reference to previous excavations completed for the ACHAs;
- revise the assessments of significance for each site;
- revise the impact assessment for each site; and
- determine whether the previously proposed management measures presented in the ACHA were still appropriate for each site.

This report should be read in conjunction with the Hume Coal Project and Berrima Rail Project ACHAs (EMM 2017a; 2017b).

1.4 Consultation for this report

EMM consulted with the registered Aboriginal parties (RAPs) for the Hume Coal Project and Berrima Rail Project prior to the test excavation program. This involved providing a letter detailing the proposed test excavation program and assessment method on 18 September 2017 and allowing a 28 day review period for RAP feedback. A list of registered parties are shown in Table 1.1.

Table 1.1 List of RAPs

Organisation	Date of registration
Gundungurra Aboriginal Heritage Association Inc.(GAHA)	07-Sep-12
Cubbitch Barta Native Title Claimants Aboriginal Corporation (Cubbitch Barta)	18-Sep-12
Illawarra Local Aboriginal Land Council (ILALC)	11-Dec-12
Peter Falk Consultancy	01-Aug-13
Northern Illawarra Aboriginal Collective Inc. (NIAC)	08-Aug-13
Koomurri Ngunawal Aboriginal Corporation (KNAC)	20-Aug-13
Buru Ngunawal Aboriginal Corporation (BNAC)	26-Aug-13
Yamanda Aboriginal Association (Yamanda)	11-Sep-13

Two responses were received specifically about the methodology, one from Duncan Falk Consultancy and one by Koomurri Ngunawal Aboriginal Corporation (KNAC). Duncan Falk Consultancy agreed with the proposed method but with two recommendations regarding test pit spit depths and the use of wet sieving, both of which were adopted for the test excavation program.

KNAC raised no issues with the test excavation methodology. The RAP responses are attached in Appendix B.

A draft of this report was sent to RAPs on 20 December 2017 allowing for a 41 day review period to allow for the Christmas holiday break. RAPs were emailed again on 1 February to extend the review period further to 5 February 2018 to provide one last opportunity to provide comments.

One registered party, Cubbitch Barta Native Title Claimants, commented on the test excavation report. Their comments are provided in Table 1.2 and an original copy is provided in Appendix B.

Table 1.2 Cubbitch Barta Native Title Claimants comments on the test excavation report

Comment	EMM response
Thank you for the opportunity to participate in this test excavation for the Hume Coal project. I have read the report and would like to make a few comments as follows:	
1. The site recorded as HC_179 that was part of this test excavation, should be included in any future salvage program, as well as the others that are mentioned in this report.	HC_179 will be subject to salvage excavation as described in Section 6.2.2 of this report and in Section 11.2.5 of the Hume Coal Project ACHA (EMM 2017a, p.189).

Table 1.2 Cubbitch Barta Native Title Claimants comments on the test excavation report

Comment	EMM response
2. All of our sites are culturally significant, one site is connected to the other in one way or another, and it always makes me feel sad when one if referred to as of low significance in an archaeological sense. They co- exist in the landscape, which is where they were left by our grandfathers many years ago. People whose lives depended upon that land and its resources to be able to live in that landscape are telling us their story today.	EMM acknowledge Cubbitch Barta's perspective about Aboriginal sites. When defining significance levels, our intention is not to detract from the value of a site. The primary use of defining significance is to guide the level of management appropriate in response to potential impacts, including measures such as conservation. If all sites were rated to be of high significance, it could also devalue certain sites that warrant more attention over others (eg those deserving conservation or salvage). This is particularly important given that there are finite resources available for Aboriginal heritage management in a commercial industry. In summary, EMM understands that the connotations behind the words 'low significance' can be perceived negatively and that they may not be the best words to use when defining significance. However, the terms 'low' 'moderate' and 'high' are broadly used for heritage assessments and provide a basis for comparison across NSW and Australia. EMM are open to discussing possibly more appropriate terminology with Aboriginal groups.
3. Being a part of destroying these places is not a perfect world, but I am continually amazed at the skills that were used to be able to make "tools" which we call artefacts today. Some of them are simply "beautiful" objects, used for everyday living purposes in the past.	Acknowledged: no response needed.
4. So when a site is just left to the bulldozer without any attempt to salvage, I think of the waste, not about the scientific low significance, which does not warrant salvage.	It is acknowledged that Aboriginal objects will be harmed through project construction (primarily referring to siteHC_146). This response is linked to EMM's response to Comment 2, whereby it is important to determine which sites warrant more attention over others given that there are finite resources available for Aboriginal heritage management. HC_146 is an example of a subsurface site with very low artefact frequencies (refer Section 3.5). As such, any attempt to salvage this site would be met with little gain. As indicated by the results, further excavation is likely offer results of nil or very low artefact frequencies in each additional excavation square. As such, it is more appropriate to dedicate resources to salvaging areas that can provide more valuable information. Note that artefact collection (salvage) is proposed for all surface artefact scatters within the Hume Coal and Berrima Rail Project disturbance footprints. However, the sites that were identified purely through excavation but with very limited archaeological results (such as HC_146) were not proposed for salvage; as the only method would be further excavation which is a costly exercise and involves extensive manual labour. Accordingly, salvage excavation is typically only proposed in areas that have considerable archaeological material.

1.5 Authorship and acknowledgements

This report was prepared by EMM Senior Archaeologist Ryan Desic (BA Hons Prehistoric and Historical Archaeology) and reviewed by Heritage Services Manager Pamela Kottaras BA Hons Prehistoric and Historical Archaeology). The test excavation was directed by Ryan Desic and artefact analysis was undertaken by Ryan Desic with the assistance of EMM Archaeologist Kerryn Armstrong. EMM would like to thank the fieldwork team involved in the test excavation, comprising:

- Glenda Chalker (Cubbitch Barta Native Title Claimants);
- Duncan Falk (Duncan Falk Consultancy);
- Chris Halls (Gundungurra Aboriginal Heritage Association);
- Leanne Tungai (Illawarra Local Aboriginal Land Council);
- Ebony Chalker (Cubbitch Barta Native Title Claimants);
- Martin Raukawa Wright (EMM);
- Nikolajs Svede (EMM); and
- Anthony Dakhoul (EMM).

2 Archaeological context

2.1 Previous work for the projects

2.1.1 Archaeological survey

As part of the Hume Coal Project and Berrima Rail Project ACHAs, EMM archaeologists, accompanied by Aboriginal site officers and Hume Coal representatives, surveyed the project areas and its surrounds in four stages (Stage 1 to Stage 4) between May 2014 and September 2015. The survey was undertaken over 16 days. Stages 1 and 2 sampled the underground mine area of the Hume Coal Project area and Stages 3 and 4 sampled the Hume Coal Project surface infrastructure area the Berrima Rail Project area. Additionally, EMM archaeologists inspected minor project changes on 19 and 20 April 2016.

The survey team covered approximately 124 km and recorded 181 sites made up of:

- 166 newly recorded sites in the Hume Coal Project area;
- 11 newly recorded sites in the Berrima Rail Project area;
- two newly recorded sites outside both project areas; and
- two sites previously recorded on AHIMS (grinding groove site 'International House' AHIMS# 52-4-0098 and rock shelter with art 'Compartment 157' AHIMS#52-4-0097) that were re-recorded by EMM.

A variety of Aboriginal sites were recorded including rock shelters (some with art, artefacts and potential archaeological deposit), grinding grooves, open stone artefact sites, areas of PAD and potentially scarred trees. The survey also identified areas warranting further investigation through test excavation.

2.1.2 Archaeological test excavation

An archaeological test excavation program was conducted over three weeks from October to November 2015. The aim of the archaeological test excavation was to understand the archaeological landscape of the project area.

The program involved digging 160 50 cm x 50 cm test pits across 16 linear transects in the Hume Coal project area (n=10) and in the Berrima Rail Project area (n=6).

A total of 281 artefacts were recovered from the test pits (overall average artefact density of 7 artefacts/m^2). The distribution of artefacts was very uneven with almost half (45%) being found in one transect (Transect 6), which was attributed to site HC_135 next to Oldbury Creek. The excavation identified that soil types vary throughout the landscape and the upper soil profile is generally mixed from historic ploughing and bioturbation. The upper soil profile was the artefact bearing layer and no stratigraphically intact deposits were identified.

The excavation results were grouped into two categories to identify if artefact concentrations where higher next to perennial streams rather than ephemeral streams. The findings from this approach suggest that:

- suitably elevated level, to gently inclined, land within 150 m of ephemeral streams is likely to contain a very low density subsurface deposit with an average density of up to 2.7 artefacts/m^2; and

- suitable elevated level to gently inclined land within 200 m of perennial streams and prominent hill crests are likely to contain a moderate density subsurface deposit with an average density of up to 14 artefacts/m^2.

The results of the survey and test excavation helped to develop a model for "archaeological sensitivity" (EMM 2017a, Section 8.4). The model is a visual guide for identifying the predicted distribution of sites and artefact densities across the landscape. It also serves as a refinement of the original predictive model for site location that was developed before fieldwork. The model predicts the location of rock shelters, grinding groove sites, open stone artefact sites and other archaeological deposits.

2.2 Background of sites HC_179 and HC_146

2.2.1 Location

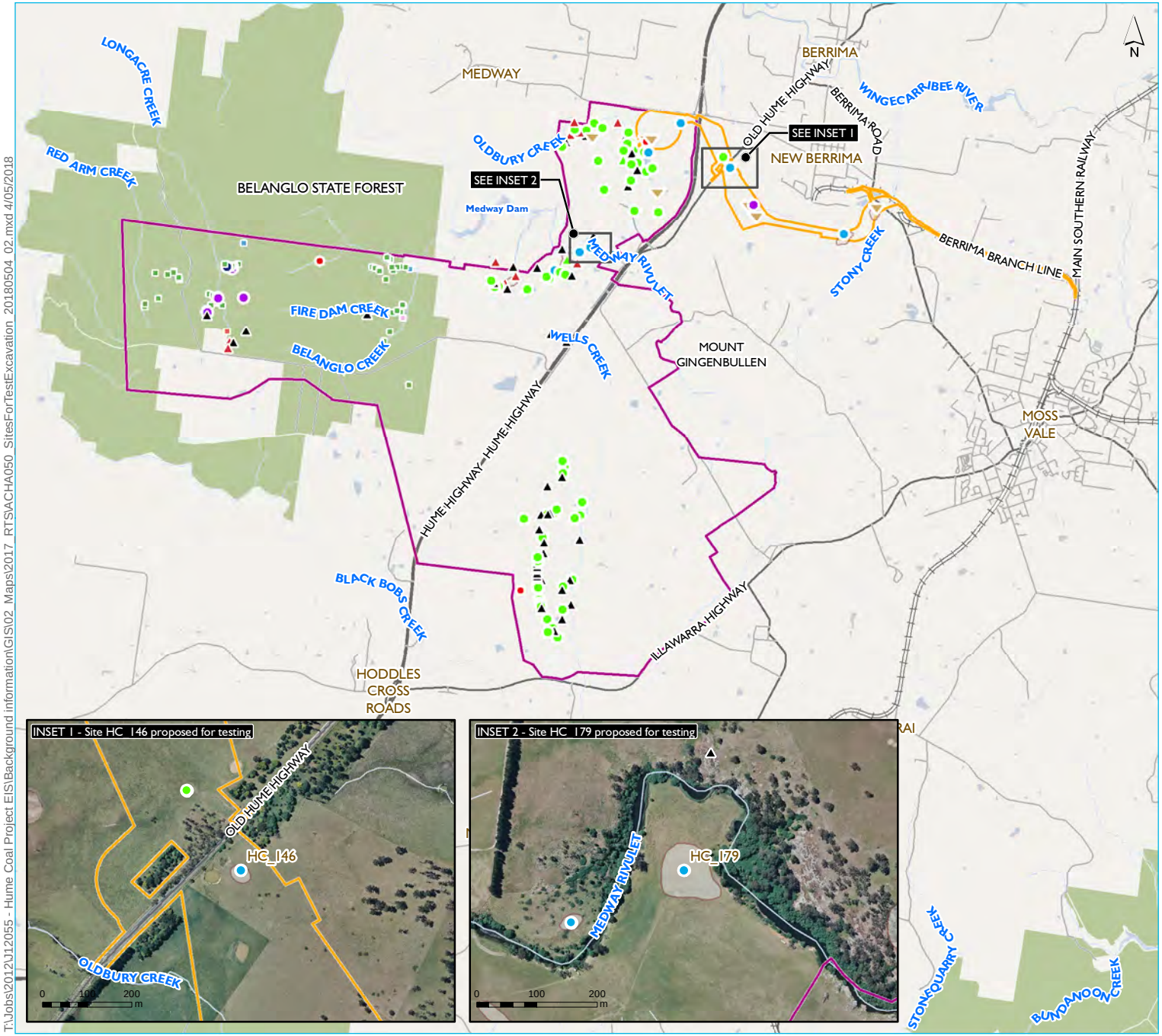
Site HC_179 is located on the southern side of Medway Rivulet on the western side of the Hume Highway. Site HC_146 is directly adjacent and to the west of the Old Hume Highway and north of Oldbury Creek. Sites HC_179 and HC_146 are shown on Figure 2.1.

2.2.2 Site HC_179

HC_179 was recorded in May 2016 during an additional day of survey subsequent to survey stages 1 to 4 and the 2015 test excavation program. The additional survey was in response to a layout change in the Hume Coal Project footprint, which moved the alignment of the overland conveyor to cross Medway Rivulet at a different location than previously surveyed and sampled through test excavation (the previous alignment is indicated by the layout of Transect 2 and 3 of the 2015 excavation, shown on Figure in the Hume Coal Project ACHA (EMM 2017a, Fig 7.1).

HC_179 was recorded as an area of PAD located on a crest landform extending north from a plain and sloping towards Medway Rivulet. The area of PAD initially demarcated on figures was confined to the crest landform and side slopes but not the section of low-lying floodplain extending to the north towards Medway Rivulet as it was predicted that the floodplain would have been subject to regular inundation. The predictive model and the results of the 2015 test excavation program indicated that HC_179 would contain a subsurface archaeological deposit with a moderate stone artefact density similar to other elevated sites that are next to perennial water (eg HC_135 near Oldbury Creek and HC_154 nearby to the west next to Medway Rivulet).

Subsequently, because another phase of test excavation was unfeasible during the ACHA, EMM proposed that HC_179 receive test excavation and salvage subsequent to project approval (EMM 2017a, p.189). However, the test excavation of HC_179 was brought forward into the RTS phase in response to OEH's submission (refer to Section 1.3 of this report).



KEY

Project area (Hume Coal Project)

Project area (Berrima Rail Project)

Site type

- Grinding grooves
- Grinding grooves with rock pools
- Grinding grooves with open stone artefact site and PAD
- Isolated find
- PAD
- Potential scar tree
- Rock pool
- Open stone artefact site
- Open stone artefact site with PAD
- Open stone artefact site with subsurface deposit
- Subsurface artefact deposit
- Rock shelter with art
- Rock shelter with PAD
- Rock shelter with art and PAD
- Rock shelter with art, deposit and PAD
- Rock shelter with deposit and PAD

PAD area

Aboriginal site area

Existing and natural features

- Rail line
- Watercourse
- Main road
- Local road
- Existing rail line
- Waterbody
- State forest

Source: EMM (2017); DFSI (2017); LPI (2015); Hume Coal (2016)

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02_Maps\2017_RTS\ACHA050_SitesForTestExcavation_20180504_02.mxd 4/05/2018

Local context of HC_146 and HC_179

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 2.1

HUMECOAL PROJECT

EMM

2.2.3 Site HC_146

HC_146 was originally recorded in February 2015 during Stage 3 of the archaeological survey. HC_146 was recorded as an area of PAD located on an elevated and rounded knoll adjacent to an ephemeral tributary of Oldbury Creek. There was no ground surface visibility during inspection of the site because there was knee high grass covering the paddocks. However, the predictive model developed before the survey indicated that Aboriginal objects might occur in the area as subsurface stone artefacts.

The area of PAD initially demarcated on figures was confined to the crest of the knoll (and not its side slopes) as it was identified as the area most likely to contain Aboriginal objects.

HC_146 was not chosen for further investigation during the initial test excavation program because the program aimed to focus on areas predicted to have higher archaeological potential. Sites within a similar landscape context nearby to HC_146 (HC_147 and HC_148) were included in the test excavation program because they were closer to Oldbury Creek and were considered to provide a representative sample of the tested landform.

After the initial 2015 test excavation program, the archaeological potential of HC_146 was re-evaluated to have low archaeological potential. This was primarily because of the very low artefact frequencies found throughout the Hume Coal Project area and the Berrima Rail Project area on similar landforms. As such, further investigation was not recommended for the site and unmitigated impacts to the site were considered the most appropriate measure in relation to the development of the Berrima Rail Project. Notwithstanding, EMM agree with OEH that testing of this area is beneficial to test the predictions of archaeological sensitivity proposed in the ACHAs.

3 Test excavation

3.1 Test excavation method

The test excavation method generally followed that used for the first excavation program completed in 2015 for the ACHA. The test excavation involved the following method:

- A series of 50 cm x 50 cm test pits were set out along transects at HC_179 and HC_146, focusing on the land within the project disturbance footprint.
- The test pits were spaced at 10 m intervals across the PADs but also extended beyond the previously demarcated PAD area in an attempt to establish artefact concentrations and drop-off in artefact frequencies.
- The first test pits in each tested area were dug manually with hand tools in 10 cm levels termed 'spits' to identify the nature of the soils and to identify if a stratigraphic sequence existed. It was originally planned to excavate in 20 cm spits, but instead 10 cm spits were used to better gauge the depth of the artefact-bearing deposit.
- Each pit was excavated until basal clay or impenetrable parent rock (eg shale) was reached, or to 10 cm below the artefact bearing level identified at each transect.
- All excavated soil was sieved on site using a wet sieving technique. The soil was sieved through a mix of 3 mm and 5 mm aperture mesh.
- All test pits were backfilled by the excavation team at the end of the program.

General photos of the excavation are shown in Plate 3.1 to Plate 3.4.

3.2 Test excavation results: HC_179

3.2.1 Test pit layout and depth

Two linear transects were placed across HC_179 perpendicular to each other (Figure 3.1).

Transect 1 was set out on a north-south axis, along the centre of a rounded crest that forms at the southern end of the transect and continues for approximately 60 m before sloping down onto a floodplain bordering on Medway Rivulet. Transect 2 was placed across the crest which is approximately 50 m wide before dropping to a slope on either side.

A total of 16 test locations were set out along Transect 1 and eight along Transect 2 (24 locations total, spaced 10 m apart). Three of the test locations were expanded into 1 m x 1 m pits with the aim to better characterise the deposit that contained higher artefact frequencies. Overall, the team excavated 33 individual 50 cm x 50 cm test pits, amounting to 8.25 m^2.

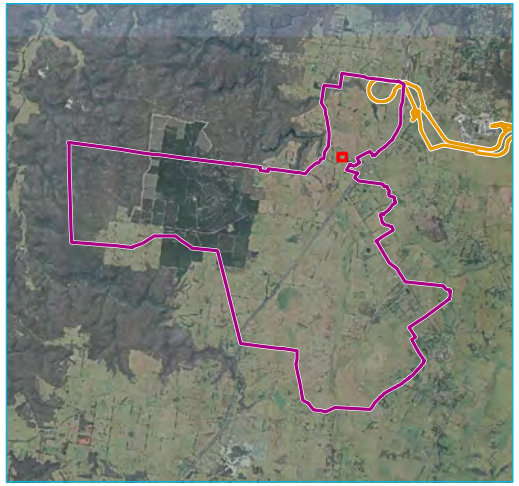
As no basal clay (B horizon) soil layer was identified, the excavated depth of each test pit was determined by digging one 10 cm spit below the archaeological deposit. This generally involved excavating to 40 cm depth (apart from the first test pit that was dug to 60 cm depth) and only excavating deeper if artefacts were identified in spit 4 (30–40 cm depth).

Plate 3.1 Wet sieving at HC_179 (view south-west)

Plate 3.2 View north from the crest of HC_179 onto the flood plain below and Medway Rivulet

Plate 3.3 Example of 1 m x 1 m test pit (Transect 2, test pit 034E 133N)

Plate 3.4 Site HC_146 view south-east at Transect 1



KEY

- Hume Coal project area
- Berrima Rail project area
- Artefact concentration on crest
- Topographic contour

Artefact frequency in 50 cm x 50 cm test pit

- 0
- 1
- 2-3
- 4-5
- 6-10
- 11-15
- 16-20
- 21

HC_179 excavation layout and results

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 3.1

HUMECOAL PROJECT

EMM

Source: EMM (2018); DFSI (2017); Hume Coal (2017)

0 25 50 m

GDA 1994 MGA Zone 56

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02 Maps\2017 RTS\ACHA019A TestExcResults HC179 20180405 04.mxd 4/05/2018

3.2.2 Soils

HC_179 is mapped as part of the Soapy Flat Soil Landscape (DECCW 2008), which occurs on a landform pattern of rises and low hills overlying Hawkesbury Sandstone geology.

Soil across HC_146 is generally described as loamy silt with a diffuse boundary between the A1 and A2 soil horizons. There was a gradual increase in clay content with depth, however true basal clay (B horizon) was not reached despite the first test pit being dug to 60 cm depth (). The test pits dug on side slopes generally had a higher ironstone nodule content than those dug on crests, which started at approximately 20 cm and increased with depth.

The test pits dug on the floodplain at the northern end of HC_179 had featured loamy silt but with a more distinctive ironstone layer starting from 20 cm–30 cm depth.

Despite the signs of ploughing on the ground surface, there was no distinct plough layer shown in the soil profiles. The upper 40 cm of soil was generally homogenous which extends past the potential depth of plough equipment (which is typically 10-15 cm depth).

Plate 3.5 Soil profile of test pit 034E 133N

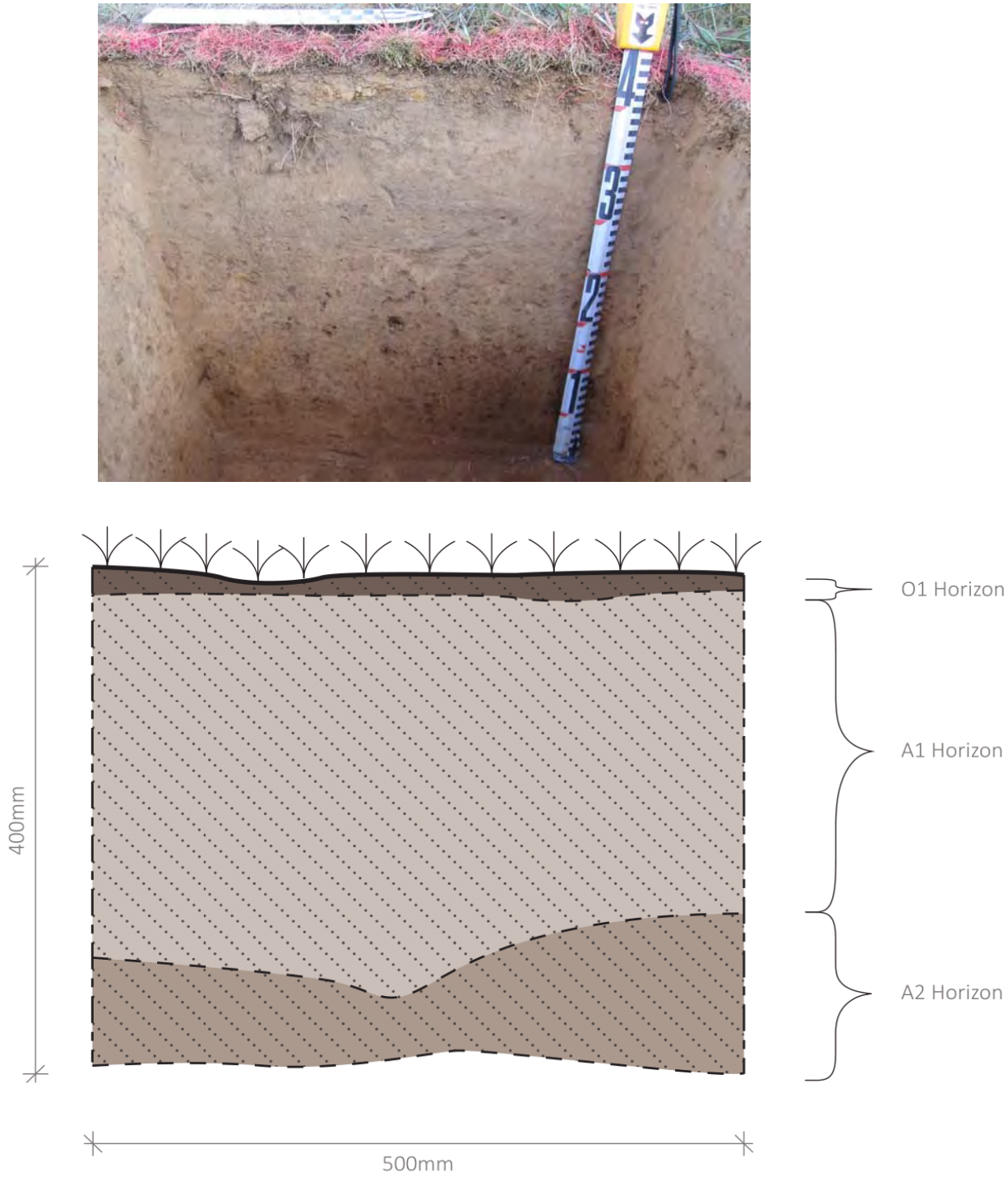


Plate 3.6 Soil profile of test pit 044E 173N

3.2.3 Artefact frequency and distribution

A total of 161 stone artefacts were recovered from the test excavation of HC_179. Stone artefacts were recovered from 24 of the 33 50 cm x 50 cm test pits. Artefact frequencies per test pit ranged from 1 to 21 for the pits that contained artefacts. Figure 3.1 illustrates the artefact frequencies across the site.

If all pits across HC_179 are calculated on an artefact density per square metre, the average artefact density is 19 artefacts/m^2. However, this calculation alone distorts the results because it includes the artefact frequencies from the expanded 1 m x 1 m areas; but these pits were specifically chosen to be expanded as a result of their higher than average results. Therefore, if the calculation is based on the artefact frequencies from only one 50 cm x 50 cm pit at each of the 24 test location, the average artefact density for HC_179 is 13 artefacts/m^2.

There is a notable concentration of artefacts centred on the crest landform of the PAD at HC_179. The boundary of this crest feature is shown on Figure 3.1. There is a distinct drop-off in artefacts as the land slopes down onto the floodplain to the north and the crest side slopes to east and west. Artefact frequencies were very low on the floodplain in the northern portion of Transect 1, with the exception of one pit (044E 2103N) that had 9 artefacts. However, most of the artefacts from this pit were small quartz fragments from a poor quality material, which are not likely to represent a more intensive activity area.

Artefact frequencies per spit level are shown in Plate 3.7. Most artefacts were recovered from spits 1 and 2 where they occurred in similar frequencies (n=53 from spit 1 and n=62 from spit 2). There was a distinct drop-off in artefact frequencies from spit 3 (n=34) and spit 4 (n=12). No artefacts were recovered from beyond 40 cm depth. Overall, the results indicate that stone artefacts are concentrated within the upper 20 cm of the soil profile (typically A1 horizon) and dissipate in frequency until approximately 40 cm depth. As there are no distinct soil horizon boundaries, the artefacts may occur at different levels because they were deposited at different times, but it also could simply be the result of soil mixing from bioturbation and ploughing.

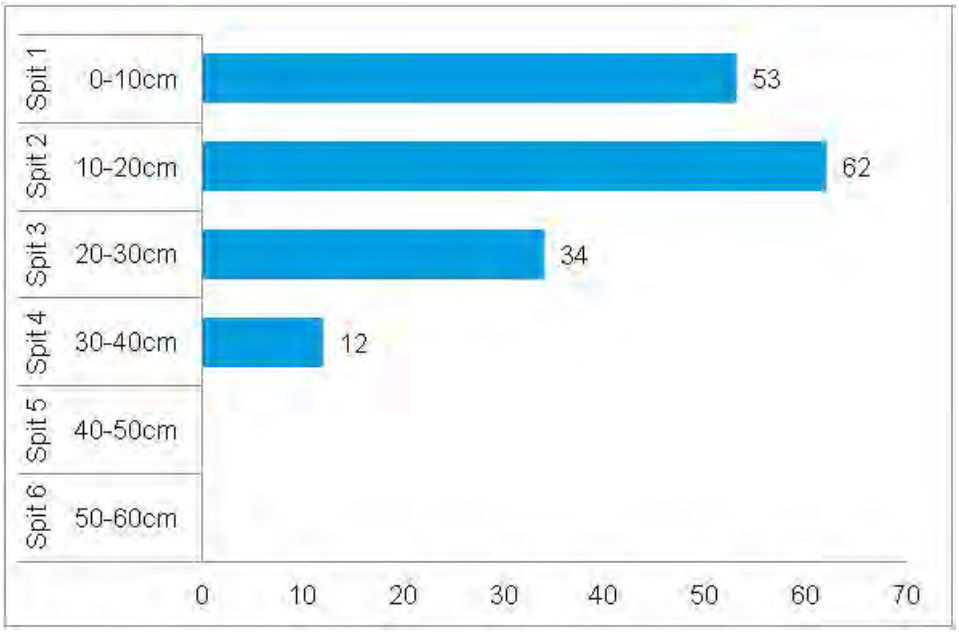


Plate 3.7 Artefact frequency per spit level showing number of artefacts recovered from each spit across HC_179

3.3 Raw materials

A sample of the various raw materials from HC_179 is presented in Plate 3.8. A summary of the raw materials and their percentage of the site assemblage are shown in Plate 3.9. The dominant material types are silcrete (52%) followed by quartz (35%).

A number of other material types were represented but in much smaller frequencies, these included chert (4%), quartzite (4%), volcanic material (2%), chalcedony (1%), IMT (1%) and petrified wood (1%).

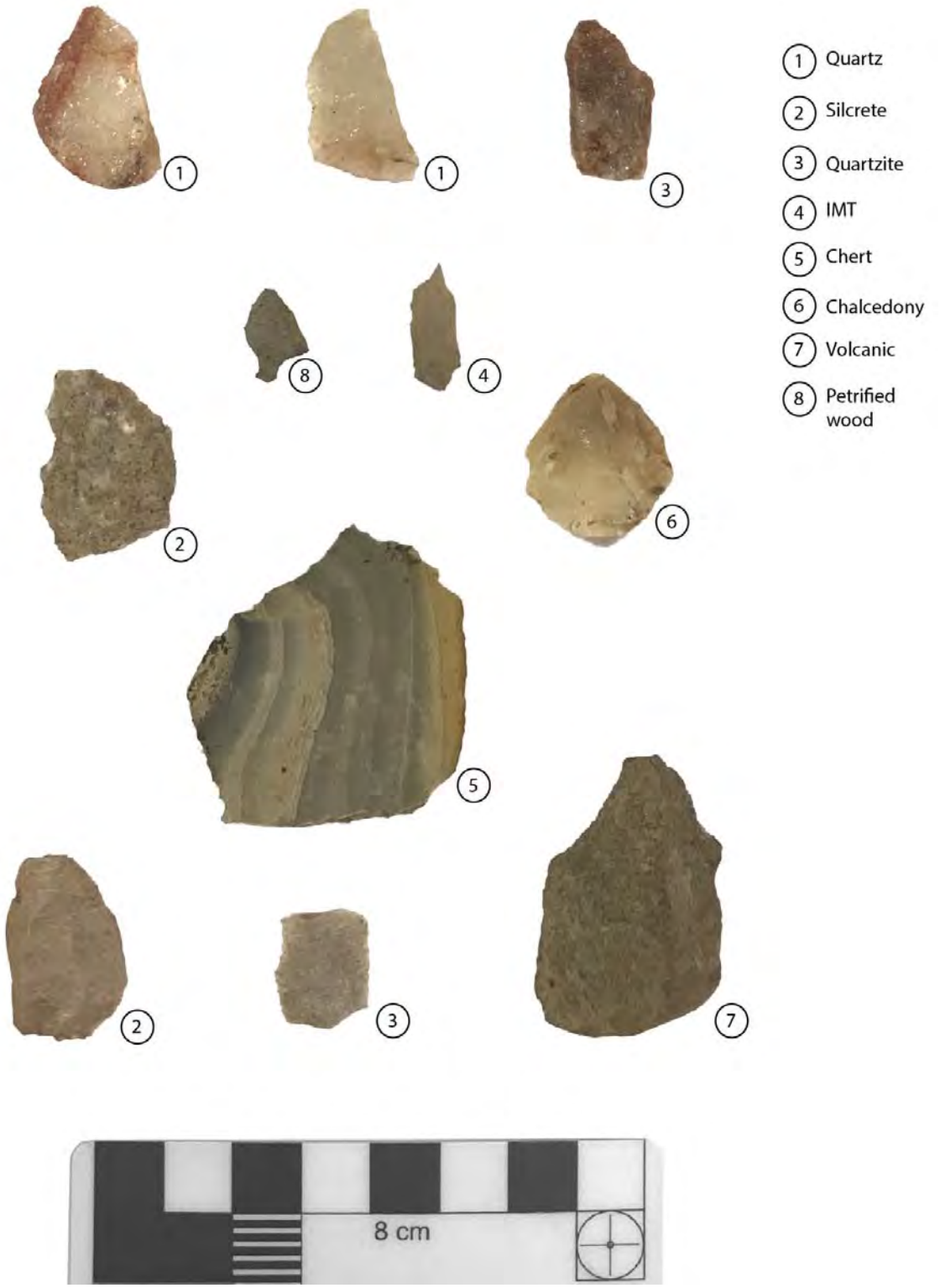


Plate 3.8 A sample of raw material types

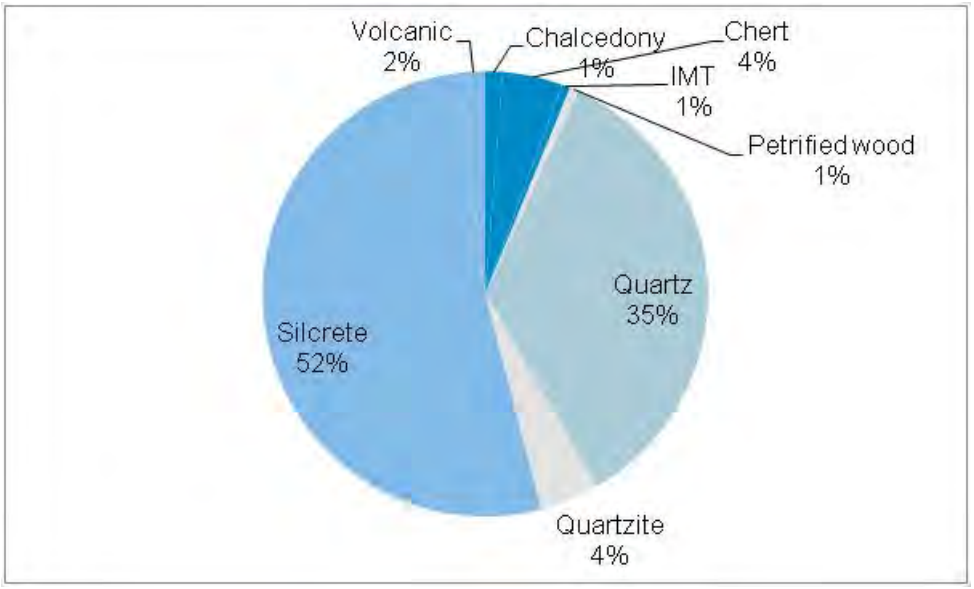


Plate 3.9 Raw material types and their percentages

3.4 Artefact types

The 161 artefacts recovered from HC_179 were divided into nine artefact types, which are represented in Plate 3.11. The highest percentage of artefacts are classed as completed flakes (n=59, 37%). Flakes are unbroken stone artefacts with clear conchoidal fracture characteristics (resembling the rippling, gradual curves of a mussel shell) including a ring crack, bulb of percussion, and termination. Flakes ranged in size from 5 mm to 50 mm and weighed from 0.3 g to 33 g. The flakes have an average length of 15.3 mm and weight of 1.9 g. Some examples of flakes are shown in Plate 3.10.

Broken fragments of flakes (including proximal, medial and distal portions) accounted for 32% of the assemblage. This indicates that a relatively high level of breakage has occurred either initially soon after deposition or by more recent events such as ploughing or trampling by cattle.

Three cores were recovered made up of two quartz cores and one chalcedony core (2% of the assemblage) (Plate 3.12). These ranged in size from 15–32 mm in length and 1 g to 11 g in weight.

Plate 3.10 A sample of flakes from HC_179

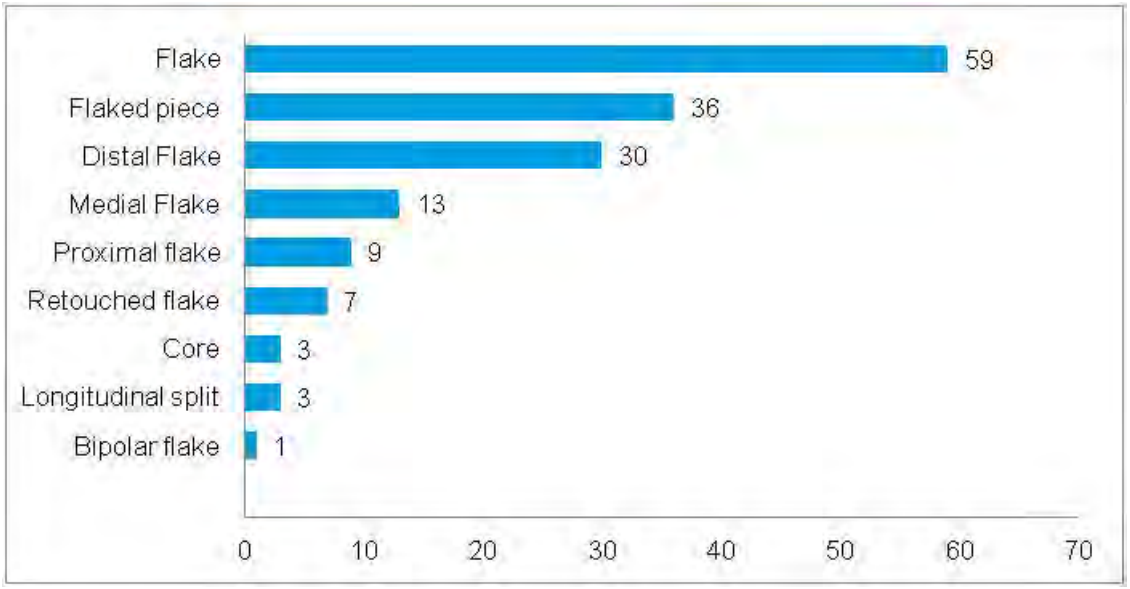


Plate 3.11 Artefact types and their frequencies

Plate 3.12 **Cores from HC_179 including quartz core (top left), a chalcedony core (top right) and a small quartz core fragment (bottom).**

A total of seven implements comprising 4% of the assemblage (shown as retouched flakes in Plate 3.11) were recovered from HC_179. This comprises four backed artefacts made up of three Bondi Points and one geometric microlith, two thumbnail scrapers and one unifacial point. The implements from HC_179 are shown in Plate 3.13.

Plate 3.13 Implements from HC_179 showing a unifacial point (top), two thumbnail scrapers (middle row) and two Bondi Points (two bottom left), a geometric microlith (bottom centre right) and a Bondi Point (bottom Right).

3.5 Test excavation results: HC_146

3.5.1 Test pit layout and depth

Testing at HC_146 focused on the crest and side slopes of a small knoll landform adjacent to a tributary of Oldbury Creek. Transect 1 was orientated on a north-east axis in alignment with the crest of the landform and its relationship to the nearby waterway. The initial plan was to place a transect across the knoll perpendicular to Transect 1, but a nearby Telstra utility cable prevented testing to the west of Transect 1. As such, two smaller transects (Transect 2 and Transect 3) were placed perpendicular to Transect 1 on a gently inclined slope.

A total of 16 50 cm x 50 cm test pits were set out on HC_146, totalling 4 m^2. Soils were highly compacted and shale was reached at varying depths. By 30 cm depth the shale had become impenetrable or clay was reached, and therefore test excavation did not extend beyond this point.

3.5.2 Soils

HC_146 is mapped as part of Moss Vale Soil landscape which occurs on Wianamatta Group Shale geology.

The soils across HC_146 are highly compacted, clayey loam with frequent ironstone nodules and shale fragments. The depth of layered shale varied across the test pits but was invariably identified by 30 cm depth. Clay content also increases significantly at 30 cm. Examples of the varying shale occurrence at HC_146 are shown in Plate 3.15 and Plate 3.16.

3.5.3 Artefact frequency and distribution

A total of 11 stone artefacts were recovered from the test excavation. Stone artefacts were recovered from 5 of the 16 50 cm x 50 cm test pits. Artefact frequencies per test pit ranged from one to five for those pits that contained artefacts. The average artefact density is 2.7 artefacts/m^2 across HC_146.

Although the results were very sparse, the artefacts appear to be concentrated on the crest of HC_146 and almost absent on the surrounding side slopes, except for two artefacts identified in one pit at the southern end of Transect 1. All but one artefact was confined to the upper 20 cm of the soil profile (Plate 3.14). However, this is expected considering that a thick shale boundary often occurs around 20 cm deep that would prevented artefacts mixing deeper into the soil.

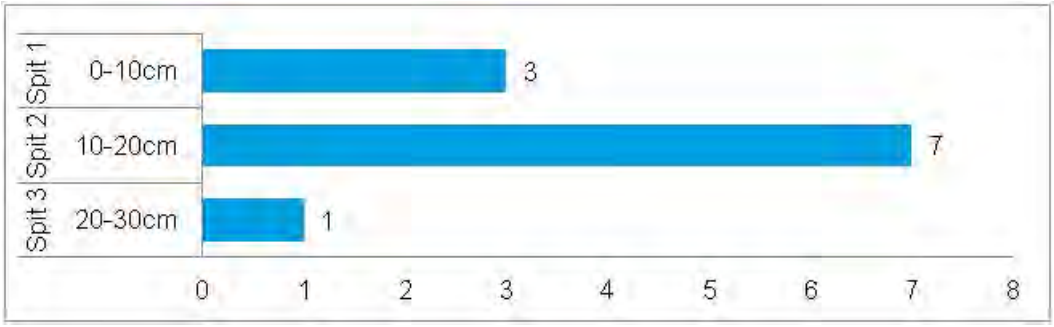
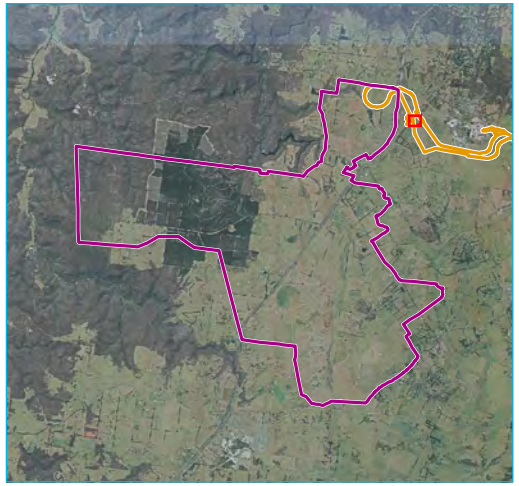


Plate 3.14 Artefact frequency per spit level at HC_146



KEY

- Project area
- Berrima Rail project area
- Topographic contour

Artefact frequency in 50 cm x 50 cm test pit

- 0
- 1
- 2-3
- 4-5

Source: EMM (2018); DFSI (2017); Hume Coal (2017)

0 25 50 m

GDA 1994 MGA Zone 56

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02 Maps\2017 RTS\ACHA019B TestExcResults HC146 20180504 05.mxd 4/05/2018

HC_146 excavation layout and results

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 3.2

HUMECOAL PROJECT

EMM

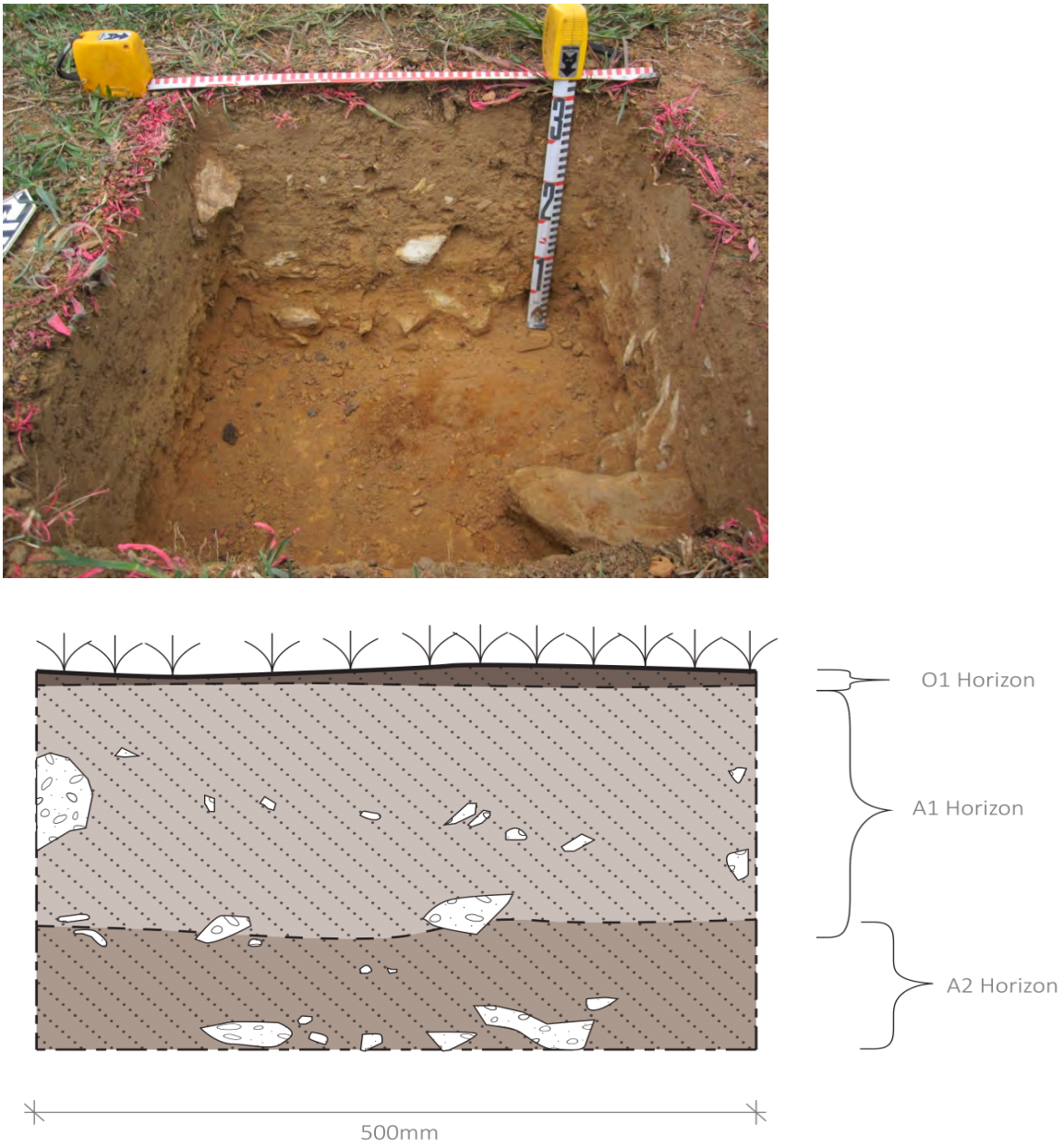


Plate 3.15 Test pit 486E 610N showing large shale inclusions

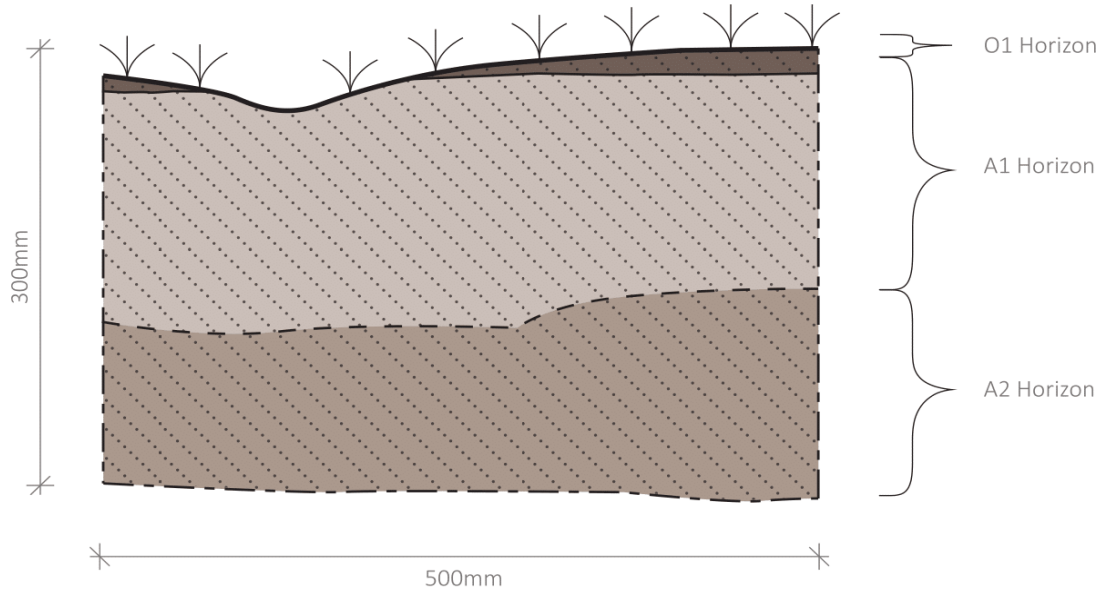


Plate 3.16 Test pit 486E 570N showing minimal shale inclusions

3.6 Artefact attributes

Only quartz and silcrete were recovered from HC_146 in almost equal measure (quartz n=6, silcrete n=5). The artefacts were recorded as four flakes, three flaked pieces, three distal flakes and one retouched flake. The retouched flake was further categorised as a geometric microlith and was made from a relatively uncommon black silcrete material. The artefacts recovered from HC_146 are shown on Plate 3.17.

Plate 3.17 **All artefacts recovered from HC_146 including one geometric microlith identified from test pit 486E 610N (top row centre)**

4 Discussion

The test excavation results at HC_146 and HC_179 are characteristic of the wider results from the 2015 test excavation with respect to their individual landscape contexts. The results also fit very closely to their predicted average artefact densities as set out in the archaeological sensitivity model for the ACHA (refer EMM 2017a, Section 8.4). HC_179 is within an area of moderate archaeological sensitivity that was predicted to have an average artefact density of up to 14 artefacts/m^2, whereby the actual results was an average artefact density of 13 artefacts/m^2. HC_146 is within an area of low archaeological sensitivity that was predicted to have an average artefact density of up to 2.7 artefacts/m^2, whereby the actual results identified an average of 2.7 artefacts/m^2. These results are summarised in Table 4.1.

Table 4.1 Predicted artefact density and actual results

Site	Predicted artefact density	Actual results
HC_179	14 artefacts/m^2	13 artefacts/m^2
HC_146	2.7 artefacts/m^2	2.7 artefacts/m^2

HC_179 has very similar characteristics to the higher density sites tested in 2015, such as HC_135 (just north of Oldbury Creek), as it features same range of raw material types and in similar ratios (EMM 2017a Section 7.6.2). Furthermore, implements make up the same percentage of the artefacts recovered from HC_135 and HC_179 (4%). However, one marked difference is the almost absent representation of cores at HC_179 (n=3, 2% of the assemblage) whereas the cores at HC_135 made up 6% of the assemblage. Overall, cores are generally small and in low frequencies throughout the Hume Coal and Berrima Rail Project area which further suggests that raw materials were not necessarily abundant and were therefore intensively knapped to fully utilise the resource.

HC_146 is characteristic of the test excavation results recovered from areas of low archaeological sensitivity as defined in section 8.4 of the ACHA (EMM 2015). The results are characterised by sporadic occurrences of stone artefacts (ie artefacts less often occurring in test pits than occurring) along transects in very low frequencies. Such results are comparable to excavations completed in sites throughout the project area such as HC_139, HC_147, HC_148, HC_171 and HC_165. HC_146 features common material types and basic artefact types. Notwithstanding there is some evidence of implement manufacture shown by the presence of a geometric microlith.

Overall, the additional test excavation has contributed to the ACHA by strengthening the archaeological sensitivity model for the Hume Coal and Berrima Project area. It has also allowed previously untested areas to be characterised so that a more precise management strategy can be developed when preparing the AHMP. As described in the 2017 ACHA, the excavation results across all of the tested areas represents the material traces of open camp sites of varying sizes. Most of the archaeological material represents the by-products of stone tool manufacture with a much smaller percentage of finished or partially worked implements. The widespread occurrence of 'backed' tools is typical of mid- to late- Holocene assemblages.

5 Significance assessment

5.1 Overview

The sites HC_179 and HC_146 were given a predicted assessment of significance during the EIS phase of the Hume Coal Project and Berrima Rail Project ACHAs. The assessment of significance for each site has been revised based on the outcomes of the recent test excavation.

5.2 Socio-cultural and historical value: significance for the Aboriginal community

Cultural values associated with Aboriginal sites are discussed in the significance assessment chapters of the Hume Coal and Berrima Rail Project ACHAs. The ACHAs identified that the natural landscape (including but not limited to the project areas) is of importance to the Aboriginal community along with the archaeological evidence found within. No specific socio-cultural or historical values were identified specifically for the sites HC_179 and HC_146. Accordingly, no declared Aboriginal places (as defined by the NPW Act) or areas that fulfil the criteria to be an Aboriginal place have been identified.

5.3 Scientific value

5.3.1 Overview

The following scientific (or archaeological) values are identified as 'low', 'moderate' or 'high' for each identified Aboriginal site with an overall rating identified based on the results of each individual assessment. The significance criteria are outlined below:

- *Research potential:* the potential of a site to the present understanding of society and the human past.
- *Rarity and representativeness*: the frequency of a site type and how the sites relate to wider archaeological record. The results may be due to sites being uncommon because of the related activity or preservation, or they are uncommon now because of ongoing site destruction from more recent development.
- *Integrity*: the level of disturbance or intactness of a site and how this may affect research potential.
- *Education potential*: the potential of a site to be used as an educational tool. This usually includes sites with easily identifiable and accessible characteristics that are good representative examples.

5.3.2 Scientific values

The original and revised scientific values for each site are shown in Table 5.1 and Table 5.2.

Table 5.1 Assessment of significance HC_179

Significance criteria	Original assessment of significance	Revised assessment of significance
Research potential:	Moderate: The site is a potential deposit associated with Medway Rivulet	Moderate: The site is of a common type with a moderate frequency of subsurface artefacts. The site features a concentration of artefacts on the crest of the PAD which may represent discrete knapping floors. The presence of stone implements may also add to local archaeological knowledge.
Rarity and representativeness:	Undetermined	Moderate: The archaeological deposit has relatively high artefact frequencies for the local area. The site type is very common on a local and regional level.
Integrity:	Low: The site is moderately disturbed from clearing and ploughing.	Moderate: The site is moderately disturbed from clearing and ploughing. No stratigraphic layers or opportunities for absolute dating would be available. Notwithstanding, the artefact concentrations on the crest of HC_179 may indicate that the distribution of artefacts are somewhat horizontally intact (but not vertically intact within the soil profile).
Research themes	Undetermined	Moderate: Associated deposit has an assemblage that could further characterise the archaeology of the area, especially with the presence of stone implements.
Education potential:	Undetermined	Moderate: The physical site alone has low educational potential as its contents are subsurface, however the assemblage contains stone implements that are good examples of their type.
Overall significance	Moderate: PAD on slightly disturbed context.	Higher moderate: The subsurface deposit has a relatively high frequency of artefacts for the local area and is of similar significance to site HC_135 north of Oldbury Creek.

Table 5.2 Assessment of significance HC_146

Significance criteria	Original assessment of significance	Revised assessment of significance
Research potential:	Low: Area of PAD was re-evaluated based on nearby test excavations. Near 1st order stream and unlikely to contain deposit	Low: Subsurface site is a sparse assemblage of common stone artefact debitage. Further excavation would provide very limited further information in comparison to the effort that would be required for further excavation.
Rarity and representativeness:	Undetermined	Low: The site comprises common material and artefact types locally and regionally.
Integrity:	Low: The site is moderately disturbed from clearing and ploughing.	Low: The site is moderately disturbed from clearing and ploughing.
Research themes	Undetermined	Low: Despite containing one backed implement indicating Holocene occupation, the site is unlikely to contribute further to issues of chronology or tool manufacture.
Education potential:	Undetermined	Low: The site is sparse and its contents are not easily identifiable.
Overall significance	Low: Unlikely to be PAD based on reassessment, that is, the site is unlikely to be distinguishable from the surrounding landscape of low archaeological sensitivity.	Low: Subsurface deposit is sparse assemblage on a landform typically associated with this type of deposit and within a moderately disturbed context.

6 Impact assessment, management measures and conclusion

6.1 Impact assessment

6.1.1 Overview

The impact assessment for HC_146 and HC_179 was previously completed during the EIS phase of the Hume Coal Project and Berrima Rail Project ACHAs; however, it has been revised based on the test excavation results. The project footprint in relation to the test excavation results is shown on Figure 6.1.

6.1.2 HC_179

HC_179 will be impacted by the construction of the conveyor and storm management earthworks as previously stated in the Hume Coal Project ACHA (EMM 2017a, Table 11.2).

The project footprint will impact the crest of HC_179 and the floodplain to the north. The test excavation results indicate that the archaeological deposit is concentrated across the whole of the crest landform, which is in the disturbance footprint but also extends beyond the footprint (Figure 6.1). The proposed conveyor that extends north onto the floodplain will impact a sporadic occurrence of artefacts. This part of the floodplain is indistinguishable from the surrounding floodplain and therefore similar archaeological material is likely to extend beyond the disturbance footprint.

In summary, the Hume Coal Project impacts will result in the partial loss of HC_179.

6.1.3 HC_146

HC_146 will be impacted by the construction of the rail temporary construction facility as previously stated in the Berrima Rail Project ACHA (EMM 2017b, Table 7.1). The entire landform feature of HC_146 including the crest and side slopes will be impacted by the project.

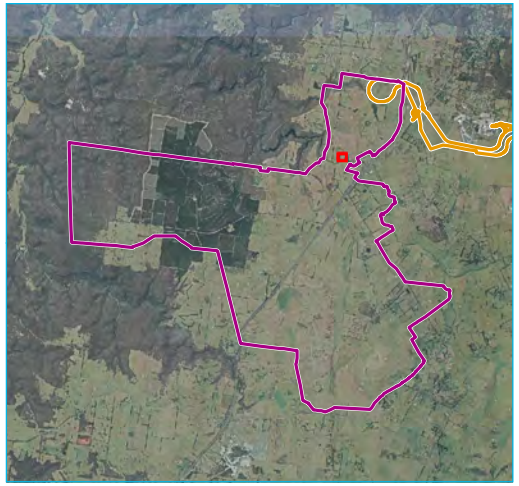
In summary, the Berrima Rail Project will result in the total loss of HC_146.

6.2 Management measures

6.2.1 Overview

The proposed Aboriginal heritage management framework and Aboriginal heritage management measures for the Hume Coal and Berrima Rail projects are presented in their respective ACHAs (EMM 2017a; 2017b). The management measures for HC_179 and HC_146 have been developed to be consistent with sites with similar characteristics and levels of significance.

The management measures for HC_179 and HC_146 outlined in this section will be further refined in an Aboriginal cultural heritage management plan (ACHMP) as proposed in Hume Coal and Berrima Rail project ACHAs (EMM 20176a; 2017b).



KEY

- Hume Coal project area
- Berrima Rail project area
- Surface infrastructure area disturbance footprint
- Artefact concentration on crest
- Topographic contour

Artefact frequency in 50 cm x 50 cm test pit

- 0
- 1
- 2-3
- 4-5
- 6-10
- 11-15
- 16-20
- 21

Impact assessment - HC_179

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 6.1

HUMECOAL PROJECT

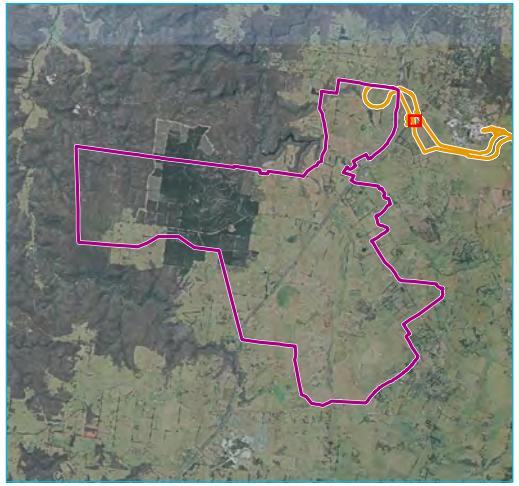
EMM

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02 Maps\2017 RTS\ACHA051A Impacts HC179 20180504 03.mxd 4/05/2018

Source: EMM (2018); DFSI (2017); Hume Coal (2017)

0 25 50 m

GDA 1994 MGA Zone 56



KEY

- Project area
- Berrima Rail project area
- Direct disturbance footprint
- Topographic contour

Artefact frequency in 50 cm x 50 cm test pit

- 0
- 1
- 2-3
- 4-5

Impact assessment - HC_146

Hume Coal Project and Berrima Rail Project
Aboriginal heritage archaeological
test excavation report for
Response to submissions
Figure 6.2

HUMECOAL PROJECT

EMM

Source: EMM (2018); DFSI (2017); Hume Coal (2017)

T:\Jobs\2012\J12055 - Hume Coal Project EIS\Background information\GIS\02 Maps\2017 RTS\ACHA051B Impacts HC146 20180504 04.mxd 4/05/2018

Overall, the management measures for HC_179 and HC_146 will remain the same as that presented in the Hume Coal and Berrima Rail project ACHAs (EMM 2017a, Chapter 11; 2017b, Chapter 7). This is primarily because:

- the test excavation results were generally as predicted;
- the management measures previously proposed are commensurate with the revised significance of the sites; and
- the management measures for HC_179 and HC_146 are consistent with those proposed for sites of similar types and significance in the Hume Coal and Berrima Rail Project boundaries.

6.2.2 Management measures for HC_179

HC_179 was originally identified in the EIS as one of the four sites in the Hume Coal Project area to receive salvage excavation as a mitigation strategy. The rationale is explained in the following extract from the Hume Coal Project ACHA:

> "Four sites of moderate significance will be archaeologically excavated. The four sites are two open artefact sites with subsurface deposit (HC_135 and HC_154) and two PADs (HC_151 and HC_179 respectively). The established subsurface sites have been confirmed to contain the highest artefact densities in the surface infrastructure area through test excavation and the PADs are anticipated to have similar contents. These sites are likely to provide a good representative sample of stone artefacts, including implements, and raw materials used in the local area. However, these sites do not warrant outright conservation as they lack archaeological integrity due to the widespread disturbance from historic clearing and ploughing, leaving a mixed artefact deposit and low potential for other features such as hearths" (EMM 2017a, p.189).

The rationale for salvage excavation at HC_179 remains valid. As such, HC_179 will be subject to salvage excavation according to the same method as described in Section 11.2.5 of the Hume Coal Project ACHA (EMM 2017a, p.189). Notwithstanding, the test excavation program has identified that additional sampling and salvage measures should be confined to the crest of the landform (refer Figure 3.1 and Figure 6.1) which represents the area of higher archaeological potential.

6.2.3 Management measures for HC_146

The Berrima Rail Project ACHA proposed that unmitigated impacts would apply to HC_146 amongst the other subsurface sites HC_137, HC_139, HC_147 and HC_148. This was proposed because the sites were all subsurface sites of low significance that do not warrant further investigation or salvage. The excavation results indicate that although stone artefacts do occur at HC_146, the site remains of low scientific significance and does not warrant further investigation or salvage. Accordingly, HC_146 will receive unmitigated impacts.

6.3 Site summaries

A summary of the HC_179 and HC_146, their significance and management measures is provided in Table 6.1.

Table 6.1 Site summaries

Site	Site type	Significance (scientific)	Management measures
HC_179	Subsurface artefact deposit	Higher moderate	Salvage excavation
HC_146	Subsurface artefact deposit	Low	Unmitigated impacts

References

EMM Consulting Pty Limited (EMM) 2017a, *Hume Coal Project Environmental Impact Statement, Appendix S, Aboriginal Cultural Heritage Assessment Report*¸ prepared for Hume Coal Pty limited.

- 2017b, Berrima Rail Project Environmental Impact Statement, Appendix H, Aboriginal Cultural Heritage Assessment Report¸ prepared for Hume Coal Pty limited.

Office of Environment and Heritage (OEH) 11 July 2017, *RE: Hume Coal and Berrima Rail Projects EIS Exhibition (SSD 7172 & SSD 7171)*.

Appendix A

OEH submission

NSW GOVERNMENT | Office of Environment & Heritage

Date: 11 July 2017
Your reference: SSD 7171 & 7112
Our reference: DOC17/326528
Contact: Calvin Houlison
4224 4179

Paul Freeman
Team Leader, Resource Assessments
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001
E-mail: paul.freeman@planning.nsw.gov.au

Dear Mr Freeman

RE: HUME COAL & BERRIMA RAIL PROJECTS EIS EXHIBITION (SSD 7172 & SSD 7171)

Thank you for consulting the Office of Environment & Heritage regarding the above project. Our response addresses both the Hume Coal project (SSD 7172) and the associated Berrima Rail project (SSD 7171).

Our key issues are summarised below, and detailed comments are provided at Attachment A. Further detailed comments and analysis supporting our advice can be provided upon request.

- With regard to water management, we consider that further assessment is warranted on the issue of groundwater drawdown and subsequent baseflow loss, and water quality impacts upon streams and associated ecosystems.
- We have not identified any major issues with the proposal's direct impact upon biodiversity. However, some aspects of the biodiversity assessment against the NSW Framework for Biodiversity Assessment (FBA) require rectification. This primarily involves identification of vegetation types and will have implications for the proponent's biodiversity offset requirements.
- The Aboriginal cultural heritage assessment has complied with OEH guidelines. While many of the recorded Aboriginal cultural heritage sites within the impact area have been avoided, impacts to Aboriginal objects will still occur so mitigation is required. An Aboriginal Heritage Management Plan (AHMP) needs to be developed in consultation with Registered Aboriginal Parties (RAPs).
- We recommend the surface water assessment be updated to consider floodplain risk matters for the Berrima Rail Project.

Please contact Calvin Houlison, Senior Conservation Planning Officer on 4224 4179 or via e-mail calvin.houlison@environment.nsw.gov.au should you have any further queries.

Yours sincerely

11/07/17

MICHAEL SAXON
Director, South East Branch
Regional Operations Division

Enclosure: Attachment A OEH Detailed Comments, Hume Coal & Berrima Rail Projects

PO Box 513 Wollongong NSW 2520
84 Crown Street Wollongong NSW 2500
www.environment.nsw.gov.au

ATTACHMENT A – OEH DETAILED COMMENTS – HUME COAL & BERRIMA RAIL PROJECTS EIS – SSD 7172 & 7171

1. Terrestrial Biodiversity

Impact assessment

Overall, the design of the project avoids the majority of potential impacts upon biodiversity in what is now a largely cleared rural landscape. Where unavoidable biodiversity loss arises, residual impacts have been mitigated and offset requirements outlined. The layout of the project has led to minimal direct impacts upon native vegetation, and has restricted the impacts to degraded patches of vegetation. The remaining impacts on terrestrial biodiversity are proposed to be offset through the retirement of Biobanking credits from a nearby proposed offset site.

While it is considered there are no major issues with the proposal's direct impact upon biodiversity, there are some aspects of the biodiversity assessment against the NSW Framework for Biodiversity Assessment (FBA) that require rectification. These key issues are identified below, and will result in minor modifications to the information submitted in the EIS. Following these revisions, we would be in a position to assist with the drafting of any relevant offsetting conditions of consent if required.

Separate comments on impacts resulting subsidence and groundwater dependent ecosystems are discussed separately in later sections.

Recommendations:

1) OEH acknowledges there are difficulties in determining the best fit plant community type due to the highly cleared nature of the vegetation, however our opinion, the vegetation mapping for the Hume Coal project does not reflect the best fit plant community type (PCT). We suggest modifying to PCT 731 for Patches 1 & 2 and PCT 1191 for Patch 3 as identified at Figure 5.2 of the BAR (Appendix H, EMM 2017, p113). This is the same as vegetation mapping presented for the Berrima Rail project boundary.
2) We are of the opinion that the areas of PCT 1191 are representative of the "Tablelands Snow Gum, Black Sallee, Candlebark, and Ribbon Gum Grassy Woodland" Endangered Ecological Community (EEC) under the NSW Threatened Species Conservation Act 1995. We acknowledge that although in a degraded state, this vegetation is still representative of the EEC and we suggest that the BAR and FBA assessment be amended to rectify this.
3) There are some other minor and miscellaneous inputs into the FBA and associated online biodiversity credit calculator that should be rectified. These changes will have subtle implications for the final offset requirement. We can provide further details directly to the proponent upon request.
4) It should be clarified whether the BAR has considered clearing associated with a ventilation down-shaft in Belanglo State Forest. If not, the biodiversity impacts will need to be addressed.
5) We recommend a Statement of Commitment (SOC) for implementation of offsets identified in the Biodiversity Offset Strategy (BOS) within 12 months of approval.

2. Aboriginal Cultural Heritage

Archaeological assessment

Impacts to areas of high archaeological and cultural significance along Oldbury Creek have largely been avoided by moving much of the surface infrastructure away from this area. We note that direct impact to

identified grinding groove sites and a potential scarred tree will also be avoided. Test excavation has not been conducted at HC_179, which is within the finalised impact footprint (Hume Coal Project, Figure 7.1). It is important that testing is conducted where potential archaeological deposits (PADs) are recorded in the impact footprint to allow the impact of both projects on Aboriginal cultural heritage to be accurately assessed. This test excavation should occur as soon as possible and before project approval.

Test excavation in transects, in general, provides indication only of site extent on a single plane. Additional test excavation is required to determine the extent of the sites identified, especially those that appear to be larger artefact scatters or larger PAD areas, for example Transect 12. It is not accurate to argue that the site will be partially conserved when there is no evidence that the site extends to the mapped PAD.

Test excavation at HC_146 was also not conducted, after the location was re-evaluated and determined to have low archaeological potential. Excavation of this location could help determine the accuracy of the predictive model for site location. For example, test excavation at HC_146 or at other "non-PAD" locations could be considered when developing management protocols as a means of adding rigour to the modelling and mitigating the loss of sites through contributions to further research.

We are aware that no subsidence is predicted to occur. However, as this is only a prediction, the rock shelter sites above the underground mining area should be monitored. We recommend that baseline recording of all rock shelter sites is completed, and a monitoring program is developed as referred to by EMM. It is important that this occurs so that any unanticipated subsidence impacts on these significant sites can be identified and managed as required.

The proposed salvage excavations in alternative Option 2 north of Berrima Road require additional information. EMM has not conducted either survey or test excavation of this alternative option. This needs be conducted prior to salvage excavation. Recent archaeological investigations by Wingecarribee Shire Council and Associates Archaeology (Oliver Brown, 2017) has identified this area has having a low level of archaeological potential, however, the Associates Archaeology survey and report was prepared before the EMM report was available. EMM should consider these findings in a revision to the EIS.

Aboriginal heritage management plan

OEH supports the proposal to develop an Aboriginal Heritage Management Plan (AHMP). We suggest the AHMP includes:

- Detailed consultation protocol setting out how and when the registered Aboriginal parties (RAPs) will be consulted in both the construction and operational phases of the projects
- Detailed archaeological salvage excavation methodology
- Detailed methodology for monitoring rock shelter sites within the area of underground mining
- Detailed methodology for community collection of surface artefacts within the impact footprint.
- Detail of the mitigation and site protection works required
- Procedure for updating AHIMS site cards throughout the project
- Procedure to manage any newly identified Aboriginal cultural heritage sites
- Detail of the long term management of recovered Aboriginal objects
- Research into testing the predictive model of site location, for example through testing at HC_146.

For consistency and future reference, the AHMP should use AHIMS site numbers as well as site names to refer to sites. OEH requests that the draft AHMP is referred to us for comment before being adopted.

Long term management of Aboriginal objects

One of the registered Aboriginal parties (RAPs), Yamanda, has requested the long term management of the excavated Aboriginal objects. We support this request, provided that Yamanda submits a Transfer of Aboriginal Objects application to OEH, available at:

http://www.environment.nsw.gov.au/resources/cultureheritage/20110914TransferObject.pdf

The Transfer of Aboriginal objects to Yamanda, as recommended by EMM (2017), should be the first step taken in managing the Aboriginal objects found during the archaeological investigations. This should occur as soon as possible. Transfer of the Aboriginal objects to Yamanda does not prevent any future development of a keeping place as indicated in the Hume Coal Aboriginal Cultural Heritage Assessment Report (the ACHAR, EMM 2017, Appendix S, pp.22, 181 and 191). The ACHAR, however, is unclear on the nature of the proposed keeping place.

Recommendations:

1) Develop an Aboriginal Heritage Management Plan (AHMP) as noted above and reviewed by OEH before being finalised.
2) Archaeological test excavation occur at site HC_179 prior to project approval.
3) Review the recommendations for salvage excavation north of Berrima Road in alternate alignment Option 2 of the Berrima Rail Project. Conduct test excavation at this location before developing a salvage methodology.
4) Baseline recording of all rock shelter sites is completed, and a monitoring program is developed.
5) Submit a *Transfer of Aboriginal Objects* application form to OEH to allow Yamanda RAP to take care and control of the excavated Aboriginal objects. This should occur as soon as possible.
6) Clarification as to the proposed keeping place be provided.
7) Proponent to confirm that there are no further ancillary impact areas, temporary vehicle tracks, service installations, stockpile locations and lay down areas (as well as any new machine access routes required) to be assessed for Aboriginal cultural heritage impacts.

3. Water Resources

Impacts upon streams & watercourses

The project area is traversed by several drainage lines including Medway Rivulet and its tributaries, Oldbury Creek, Wells Creek, Wells Creek Tributary and Belanglo Creek. Long Acre Creek and Red Arm Creek originate from the north-west corner of the project area and are tributaries of Black Bobs Creek. Medway Rivulet and Black Bobs Creek discharge to the Wingecarribee River, located around 2km north of the project area.

The characterisation of Black Bobs Creek as an *ephemeral* stream is not supported by adequate flow data and is likely to be incorrect. According to early explorers in the area, Medway Rivulet was originally a "chain-of-ponds" system. Much of the vegetation has subsequently been cleared and Medway Rivulet now receives a continuous STP discharge via Whites Creek.

The Bulli Seam Planning Assessment Commission (PAC) (2010) recommended the following traits should be considered when characterising the significance of impacts on streams:

- Importance to catchment yield;
- Significance to water supply;
- Scale of the watercourse;
- Permanence of flow;

- Water quality;
- Ecological importance;
- Environmental quality (pristine, modified, severely modified);
- Visual amenity (eg cascades runs, pools etc);
- Community value (value the community attributes to protection);
- Regional significance

The EIS gives limited attention to these traits and their significance.

Groundwater drawdown and baseflow loss

The assumptions linking predicted groundwater drawdown and subsequent baseflow loss are not adequately described/explained in the EIS. It is noted that there has been no detailed assessment of the impact of baseflow losses on the majority of affected streams, particularly those in forested areas. Flow monitoring is also inadequate in many of these areas to assess how baseflow losses will affect flow exceedance and cease to flow probabilities for the affected streams (and their resulting ecological consequence).

The EIS has not defined either "*an appropriate reference system*" or systematically applied "*default regional trigger values*" as specified in ANZECC/ARMCANZ (2000). Assessment of water quality impacts and appropriate levels of treatment appear to be based largely on the water quality in Medway Rivulet and Oldbury Creek after they have already been impacted by STP discharges. This does not conform to the ANZECC/ARMCANZ (2000) approach to determining site specific guidelines using *"appropriate reference systems"*.

Ascertaining what are appropriate background levels in streams affected by the proposal needs far greater consideration than that provided in the EIS. A number of the "Guideline" values provided in Table 5.13 of the Water Assessment are not appropriate for the area. There are a number of uncertainties in the water management assessment and a clear reliance on untested assumptions about water make and volumes to be managed. The water treatment plant needs to be given greater status in the project infrastructure than a *provisional item,* as it needs to be capable of managing any unforeseen need to discharge waste water to the environment.

It is unclear what water extraction rules will be applied to the Hume Coal mine, given the existing embargo on processing groundwater licences in this area and the large amount of groundwater (and surface water) proposed to be extracted/lost from the catchment.

Recommendations:

1) The EIS be updated to provide predicted linkages between groundwater drawdown and subsequent baseflow loss.
2) Further assessment of appropriate background levels in streams affected by the proposal is required, having specific regard to the standards contained in ANZECC/ARMCANZ (2000).
3) The EIS include reference to the traits raised by the Bulli Seam PAC with regard to characterising impacts upon streams.
4) Medway Rivulet be re-categorised recognising that there is now a permanent flow.
5) We recommend that an appropriately sized water treatment plant be constructed.

4. Subsidence & groundwater dependent ecosystems (GDE's)

Subsidence

The proposed mining method as outlined in the EIS is first workings only, also known as a 'pine feather' system. Predicted subsidence for the project is much lower than what would occur with longwall mining configurations and this is considered important. Maximum subsidence is predicted to be less than 20mm across the project area using this method.

With this level of subsidence, it is anticipated that perceptible surface impacts are unlikely, however, one of the implicit caveats in these predictions is that mining around faults and geological structures will not lead to anomalous subsidence results. The subsidence assessment identified a number of inferred faults across the area of the proposed mine.

Impact on groundwater dependent ecosystems (GDE's)

We note that the EIS identifies a potential effect on threatened ecological communities and habitat for threatened species along Belanglo Creek and Wells Creek, due to groundwater drawdown in times of prolonged drought. If a greater than predicted drawdown in these areas occurs, noting there is no specified threshold level to quantify this, the management measure triggered is to *"assess ecosystem health, assess time for recovery of shallow groundwater, consider irrigating these areas".*

The proponent states that there will be monitoring and response if impact from groundwater drawdown is observed attributable to mining. A rigorous before-after control-impact (BACI) experimental design, including baseline monitoring of vegetation health for at least two years before a greater than predicted groundwater drawdown occurs, will be required at both control and impact sites to detect such a change relative to background environmental variation.

Monitoring of terrestrial vegetation along Belanglo Creek and south of Wells Creek needs to be commenced at the time of approval (or within 12 months) to establish baseline conditions for the "ecosystem health". Monitoring will also need to identify recovery following the cessation of drought. The details of the proposed monitoring design need to be carefully considered, yet we note they are not expected to be developed until a post-approval Water Management Plan.

There has not been an assessment of the ecological impacts of water loss/groundwater drawdown to the streams of the area. It is noted that while there are "*make good*" provisions for landholder bores, there are no "*make good*" provisions for any of the streams in the area. Depressurisation of shallow aquifers and subsequent baseflow loss is likely to have the greatest impact on surface water resources.

Recommendations:

1) Further detailed assessment of the effects of groundwater drawdown and baseflow loss on streams and Groundwater Dependent Ecosystems (GDEs) be provided.
2) A onitoring program be put in place to verify the predicted shallow groundwater drawdown and baseflow loss.
3) A subsidence monitoring program be put in place for mining in the vicinity of faults.

5. Floodplain Risk Management

Policy & Context

OEH consulted the Wingecarribee River Flood Study (2014) and formed the view that the Hume Coal proposal did not appear to occupy flood prone land. However the Berrima Rail Project does.

The implications of this are not assessed sufficiently. The degree or frequency of flooding that the rail infrastructure will experience is unclear. It is also not known what inconvenience or serviceability implications will arise for the rail project from the flooding regime. The implications of the rail infrastructure on flood behaviour are also not apparent.

Recommendations:

1) The following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) are mapped: (a) extent of probable maximum flood for the unnamed creek at Berrima Junction and the Wingecarribee River, (b) the area below the flood planning level for all watercourses, and (c) the hydraulic categorisation (floodways and flood storage areas) for all watercourses.
2) For all watercourses, a description of the 1 in 10 year design flood level is provided.
3) The effect of the Rail Project (including any fill) on the flood behaviour under the 1 in 200 and 1 in 500 year flood events for all watercourses as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change is assessed.
4) The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood and impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land be modelling for the unnamed creek at Berrima Junction and the Wingecarribee River.
5) An assessment of the impacts of the Rail Project on flood behaviour be provided for all watercourses. We recommend that this include: (a) whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure (b) compatibility with the flood hazard of the land, (c) compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land, (d) whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site and (e) whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
6) That emergency management and contingency measures be fully considered including addressing risk to life, public amenities, property and infrastructure a consequence of flooding. It is recommended that this be based on consultation with the SES and Council.

Appendix B

Aboriginal consultation

Extraordinary meeting with GAHA			
Organisation	**Contact type**	**Date of meeting**	**Comments**
Gundungurra Aboriginal Heritage Association Inc.	Meeting	18-Jul-17	• Venue – Hume Coal office Moss Vale, Mereworth House, Berrima. • Attendees – Sharyn Halls, Meryl, Chris Halls ('Jim') • Hume Coal – Luke Edminson, Ben Anderson, Ryan Desic (EMM) • Attachment – ILUA extract and link below to the ILUA register. The purpose of the meeting was to provide GAHA with information about the project and the associated Aboriginal heritage values. Meeting minutes in job folder

Stage 5 - RTS consultation, Additional test excavation method			
Organisation	**Contact type**	**Date Sent**	**Comments**
Peter Falk Consultancy	Email	18-Sep-17	
Northern Illawarra Aboriginal Collective Inc (NIAC)	Email	18-Sep-17	
Gundungurra Aboriginal Heritage Association Inc.	Email	18-Sep-17	
Cubbitch Barta Native Title Claimants Aboriginal Corporation	Email	18-Sep-17	
Yamanda Aboriginal Association	Email	18-Sep-17	
Buru Ngunawal Aboriginal Corporation (BNAC)	Email	18-Sep-17	
Koomurri Ngunawal Aboriginal Corporation	Email	18-Sep-17	
Illawarra LALC	Email	18-Sep-17	
Moyengully Natural Resource Management Group	Email	18-Sep-17	
Koori Kulcha Experience	Email	18-Sep-17	
Duncan Falk	Email	18-Sep-17	
Joanne Goulding	Email	18-Sep-17	

Stage 5 - RTS consultation_Draft test excavation report			Review period of 41 days to allow for christmas break
Organisation	**Contact type**	**Date Sent**	**Comments**
Peter Falk Consultancy	Email	20-Dec-17	
Northern Illawarra Aboriginal Collective Inc (NIAC)	Email	20-Dec-17	
Gundungurra Aboriginal Heritage Association Inc.	Email	20-Dec-17	
Cubbitch Barta Native Title Claimants Aboriginal Corporation	Email	20-Dec-17	
Yamanda Aboriginal Association	Email	20-Dec-17	
Buru Ngunawal Aboriginal Corporation (BNAC)	Email	20-Dec-17	
Koomurri Ngunawal Aboriginal Corporation	Email	20-Dec-17	
Illawarra LALC	Email	20-Dec-17	
Moyengully Natural Resource Management Group	Email	20-Dec-17	
Koori Kulcha Experience	Email	20-Dec-17	
Duncan Falk	Email	20-Dec-17	
Joanne Goulding	Email	20-Dec-17	

Stage 5 - RTS consultation_Notification of additional site HC_181			
Organisation	**Contact type**	**Date Sent**	**Comments**
~~Peter Falk Consultancy~~	Email	01-Mar-18	Peter withdrew from consultation as stated in email dated 18 September 2017. As such, no email was sent to Peter Falk about the new site.
Northern Illawarra Aboriginal Collective Inc (NIAC)	Email	01-Mar-18	
Gundungurra Aboriginal Heritage Association Inc.	Email	01-Mar-18	
Cubbitch Barta Native Title Claimants Aboriginal Corporation	Email	01-Mar-18	
Yamanda Aboriginal Association	Email	01-Mar-18	
Buru Ngunawal Aboriginal Corporation (BNAC)	Email	01-Mar-18	
Koomurri Ngunawal Aboriginal Corporation	Email	01-Mar-18	Response received 12.03.2018 from Glen Freeman stating "I have no issues with the management measures".
Illawarra LALC	Email	01-Mar-18	
Moyengully Natural Resource Management Group	Email	01-Mar-18	
Koori Kulcha Experience	Email	01-Mar-18	
Duncan Falk	Email	01-Mar-18	
Joanne Goulding	Email	01-Mar-18	

Cubbitch Barta Native Title Claimants
Aboriginal Corporation
55 Nightingale Road,
PHEASANTS NEST. N.S.W. 2574
18th January, 2018.

EMM
Suite 01, 20 Chandos Street,
ST. LEONARDS. N.S.W. 2065.

Dear Ryan,

RE; HUME COAL PROJECT

Thank you for the opportunity to participate in this test excavation for the Hume Coal project. I have read the report and would like to make a few comments as follows;

1. The site recorded as HC179 that was part of this test excavation, should be included in any future salvage program, as well as the others that are mentioned in this report.
2. All of our sites are culturally significant, one site is connected to the other in one way or another, and it always makes me feel sad when one if referred to as of low significance in an archaeological sense. They co- exist in the landscape, which is where they were left by our grandfathers many years ago. People whose lives depended upon that land and its resources to be able to live in that landscape are telling us their story today.
3. Being a part of destroying these places is not a perfect world, but I am continually amazed at the skills that were used to be able to make "tools" which we call artefacts today. Some of them are simply "beautiful" objects, used for everyday living purposes in the past.
4. So when a site is just left to the bulldozer without any attempt to salvage, I think of the waste, not about the scientific low significance, which does not warrant a salvage.

Yours faithfully,

G. Chalker

Glenda Chalker
Phone/Fa 0246841129 0427218425
kgchalker@bigpond.com

Appendix C

Test excavation artefact data

Site	Square	Depth (Actual)	Level	ARTEFACT ID	Type	Implement	Raw material	Length	Weight	Colour
HC_146: Transect 1	486E 550N	10-20cm	Spit 2	1874	xFlaked piece		Quartz	6	0.5	Milky
HC_146: Transect 1	486E 550N	10-20cm	Spit 2	1875	xFlaked piece		Quartz	6	0.5	Milky
HC_146: Transect 1	486E 590N	0-10cm	Spit 1	1869	Flake		Silcrete	30	9	Grey
HC_146: Transect 1	486E 590N	10-20cm	Spit 2	1870	xFlaked piece		Silcrete	20	3	Light Grey
HC_146: Transect 1	486E 590N	10-20cm	Spit 2	1871	Distal Flake		Silcrete	18	1	Light Grey
HC_146: Transect 1	486E 590N	10-20cm	Spit 2	1872	Distal Flake		Silcrete	19	1	Light Grey
HC_146: Transect 1	486E 590N	10-20cm	Spit 2	1873	Distal Flake		Silcrete	13	1	Light Grey
HC_146: Transect 1	486E 610N	0-10cm	Spit 1	1868	Retouched flake	Geometric microlith	Quartz	10	1	Black
HC_146: Transect 1	486E 620N	0-10cm	Spit 1	1866	Flake		Quartz	29	3	Milky
HC_146: Transect 1	486E 620N	20-30cm	Spit 3	1867	Flake		Quartz	33	10	Crystal
HC_146: Transect 1	486E 630N	10-20cm	Spit 2	1865	Flake		Quartz	30	4	Crystal
HC_179: Transect 1	044E 103N	10-20cm	Spit 2	1889	Distal Flake		Silcrete	16	1	Dark grey
HC_179: Transect 1	044E 103N	0-10cm	Spit 1	1887	Flake		Silcrete	26	3	Grey/pink
HC_179: Transect 1	044E 103N	0-10cm	Spit 1	1888	Flake		Silcrete	17	1	Grey/pink
HC_179: Transect 1	044E 113N NE	10-20cm	Spit 2	1805	Distal Flake		Quartz	7	0.5	Crystal
HC_179: Transect 1	044E 113N NE	10-20cm	Spit 2	1806	Flake		Quartz	10	0.5	Smokey quartz
HC_179: Transect 1	044E 113N NE	20-30cm	Spit 3	1807	Flake		Silcrete	18	2	Dark grey
HC_179: Transect 1	044E 113N NE	20-30cm	Spit 3	1808	Flake		Silcrete	12	1	Red/white/blue-black
HC_179: Transect 1	044E 113N NE	20-30cm	Spit 3	1809	Flake		Quartz	8	0.5	Milky
HC_179: Transect 1	044E 113N NE	20-30cm	Spit 3	1810	Distal Flake		Silcrete	9	0.5	Red-brown
HC_179: Transect 1	044E 113N NE	20-30cm	Spit 3	1857	Flaked piece		Quartz	9	0.5	Milky
HC_179: Transect 1	044E 113N NW	0-10cm	Spit 1	1811	Flake		Silcrete	24	2	Red/brown
HC_179: Transect 1	044E 113N NW	0-10cm	Spit 1	1812	Flake		Quartz	11	0.5	Crystal
HC_179: Transect 1	044E 113N NW	0-10cm	Spit 1	1813	Flaked piece		Quartz	7	0.5	Milky
HC_179: Transect 1	044E 113N NW	0-10cm	Spit 1	1814	Flaked piece		Chert	16	1	Dark grey
HC_179: Transect 1	044E 113N NW	0-10cm	Spit 1	1815	Distal Flake		Chert	13	0.5	Light Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1796	Flake		Silcrete	22	2	Light Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1797	Flaked piece		Volcanic	18	0.5	Dark grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1798	Flaked piece		Chert	12	1	Dark grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1799	Flaked piece		Quartzite	9	0.5	Grey/pink
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1800	Flaked piece		Silcrete	6	0.5	Pink/Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1801	Proximal flake		Silcrete	13	1	Pink/Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1802	Distal Flake		Silcrete	10	0.5	Crystal
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1803	Distal Flake		Silcrete	19	1	Pink/Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1804	Retouched flake	Bondi Point	Silcrete	13	0.5	Light Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1816	Flake		Silcrete	21	3	Red/brown
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1817	Flake		Silcrete	11	0.5	Light Grey/white
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1818	Flake		Chert	10	0.5	Grey
HC_179: Transect 1	044E 113N SE	0-10cm	Spit 1	1819	Core		Quartz	25	9	White/pink/milky
HC_179: Transect 1	044E 113N SE	20-30cm	Spit 3	1822	Flake		Quartz	8	0.5	Crystal
HC_179: Transect 1	044E 113N SE	20-30cm	Spit 3	1823	Distal Flake		Silcrete	9	0.5	Pink/grey
HC_179: Transect 1	044E 113N SE	10-20cm	Spit 2	1820	Core	Bipolar core	Quartz	15	1	Milky quartz
HC_179: Transect 1	044E 113N SE	10-20cm	Spit 2	1821	Flaked piece		Quartz	8	0.5	Milky quartz
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1905	Retouched flake	Geometric microlith	Silcrete	9	0.5	Pink/grey
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1906	Distal Flake		Silcrete	10	0.5	Grey
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1907	Medial Flake		Silcrete	9	0.5	Black
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1912	Distal Flake		Quartz	18	1	Milky
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1913	Medial Flake		Quartz	12	0.5	Milky
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1914	Flaked piece		Quartz	9	1	Quartz
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1915	Flaked piece		Quartz	9	1	Quartz
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1908	Flake		Quartz	13	0.5	Milky
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1909	Flaked piece		Quartz	5	0.5	Milky
HC_179: Transect 1	044E 113N SW	10-20cm	Spit 2	1911	Medial Flake		Quartz	9	0.5	Smokey
HC_179: Transect 1	044E 113N SW	0-10cm	Spit 1	1903	Retouched flake	Thumbnail scraper	Chalcedony	24	5	Yellow tinge
HC_179: Transect 1	044E 113N SW	0-10cm	Spit 1	1904	Flake		Quartz	7	0.5	White
HC_179: Transect 1	044E 123N	10-20cm	Spit 2	1893	Retouched flake	Bondi Point	Quartz	15	1	Milky
HC_179: Transect 1	044E 123N	10-20cm	Spit 2	1894	Distal Flake		Quartz	12	0.5	Milky
HC_179: Transect 1	044E 123N	0-10cm	Spit 1	1890	Retouched flake	Unifacial point	IMT	47	24	Banded
HC_179: Transect 1	044E 123N	0-10cm	Spit 1	1891	Proximal flake		Silcrete	12	0.5	Dark grey
HC_179: Transect 1	044E 123N	0-10cm	Spit 1	1892	Distal Flake		Quartz	11	0.5	Milky
HC_179: Transect 1	044E 133N	20-30cm	Spit 3	1917	Flaked piece		Quartz	9	0.5	Milky
HC_179: Transect 1	044E 133N	20-30cm	Spit 3	1918	Flaked piece		Quartz	9	0.5	Milky
HC_179: Transect 1	044E 153N NW	10-20cm	Spit 2	1826	Flake		Quartz	17	1	Milky quartz
HC_179: Transect 1	044E 153N NW	20-30cm	Spit 3	1827	Proximal flake		Silcrete	14	0.5	Silcrete
HC_179: Transect 1	044E 153N SE	10-20cm	Spit 2	1824	Longitudinal split		Quartz	14	0.5	Rose quartz

Site	Square	Depth (Actual)	Level	ARTEFACT ID	Type	Implement	Raw material	Length	Weight	Colour
HC_179: Transect 1	044E 153N SE	10-20cm	Spit 2	1825	Flaked piece		Quartz	6	0.5	Mily quartz
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1895	Flake		Silcrete	18	1	Grey/pink
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1896	Flake		Silcrete	16	1	Black
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1897	Flake		Silcrete	18	1	Grey
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1898	Flake		Silcrete	12	0.5	Red
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1899	Medial Flake		Silcrete	14	1	Grey
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1900	Distal Flake		Silcrete	44	8	Grey
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1901	Flaked piece		Quartz	7	0.5	Milky
HC_179: Transect 1	044E 153N SW	0-10cm	Spit 1	1902	Flaked piece		Quartzite	8	0.5	Brown
HC_179: Transect 1	044E 163N	20-30cm	Spit 3	1916	Flake		Quartz	18	1	Milky
HC_179: Transect 1	044E 163N	0-10cm	Spit 1	1910	Flake		Quartz	14	0.5	Brown
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1878	Flake		Quartz	14	1	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1879	Flake		Quartz	10	1	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1880	Flake		Quartz	10	1	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1881	Flake		Quartz	5	0.5	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1882	Flake		Quartz	5	0.5	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1883	Flaked piece		Quartz	5	0.5	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1884	Flake		Quartz	17	2	Milky
HC_179: Transect 1	044E 2103N	20-30cm	Spit 3	1885	Proximal flake		Quartz	8	0.5	Crystal
HC_179: Transect 1	044E 2103N	0-10cm	Spit 1	1886	Flake		Silcrete	16	1	Brown/red
HC_179: Transect 1	044E 2133N	0-10cm	Spit 1	1858	Flake		Quartz	6	0.3	Milky
HC_179: Transect 1	044E 2143N	10-20cm	Spit 2	1876	Flake		Silcrete	31	4	Grey
HC_179: Transect 1	044E 2143N	10-20cm	Spit 2	1877	Flaked piece		Quartz	10	0.5	Milky
HC_179: Transect 2	004E 133N	0-10cm	Spit 1	1853	Flake		Chert	18	0.5	Grey
HC_179: Transect 2	014E 133N	20-30cm	Spit 3	1828	Flake		Volcanic	50	33	Dark grey
HC_179: Transect 2	014E 133N	20-30cm	Spit 3	1829	Flake		Volcanic	37	16	Dark grey
HC_179: Transect 2	024E 133N	0-10cm	Spit 1	1859	Flaked piece		Quartz	9	0.2	Milky
HC_179: Transect 2	024E 133N	0-10cm	Spit 1	1860	Flaked piece		Quartz	7	0.2	Milky
HC_179: Transect 2	024E 133N	10-20cm	Spit 2	1861	Flake		Silcrete	35	3	White/light grey
HC_179: Transect 2	024E 133N	20-30cm	Spit 3	1862	Longitudinal split		Quartz	25	2	Crystal
HC_179: Transect 2	024E 133N	20-30cm	Spit 3	1863	Proximal flake		Quartz	26	3	Crystal
HC_179: Transect 2	024E 133N	20-30cm	Spit 3	1864	Flake		Silcrete	23	1.4	Red/brown
HC_179: Transect 2	034E 133N NE	30-40cm	Spit 4	1777	Retouched flake	Bondi Point	Silcrete	18	0.5	Pink/grey
HC_179: Transect 2	034E 133N NE	30-40cm	Spit 4	1778	Distal Flake		Petrified wood	14	0.5	Dark grey
HC_179: Transect 2	034E 133N NE	30-40cm	Spit 4	1779	Flaked piece		Quartz	7	0.5	Crystal
HC_179: Transect 2	034E 133N NE	30-40cm	Spit 4	1780	Flaked piece		Quartzite	7	0.5	Grey
HC_179: Transect 2	034E 133N NE	20-30cm	Spit 3	1774	Flake		Silcrete	21	1	Dark grey
HC_179: Transect 2	034E 133N NE	20-30cm	Spit 3	1775	Flake		Quartzite	19	1	Light Grey
HC_179: Transect 2	034E 133N NE	20-30cm	Spit 3	1776	Distal Flake		Silcrete	11	0.5	Red
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1781	Flake		Silcrete	15	1	Grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1782	Flake		Silcrete	11	1	Pink
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1783	Flaked piece		Silcrete	15	1	Grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1784	Flaked piece		Silcrete	8	0.5	Grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1785	Flaked piece		Silcrete	8	0.5	Grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1786	Flaked piece		Silcrete	10	0.5	Grey/Pink
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1787	Flaked piece		Quartz	7	0.5	Crystal
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1788	Flaked piece		Silcrete	7	0.5	Light Grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1789	Distal Flake		Silcrete	14	0.5	White/pink
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1790	Distal Flake		Silcrete	12	0.5	Grey/pink
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1791	Distal Flake		Quartzite	12	0.5	Dark grey
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1792	Distal Flake		Silcrete	8	0.5	Brown/Red
HC_179: Transect 2	034E 133N NE	10-20cm	Spit 2	1793	Distal Flake		Silcrete	7	0.5	Grey/pink
HC_179: Transect 2	034E 133N NE	0-10cm	Spit 1	1794	Distal Flake		Quartz	8	0.5	Milky
HC_179: Transect 2	034E 133N NW	20-30cm	Spit 3	1845	Retouched flake	Scraper	Silcrete	16	2	Red/brown
HC_179: Transect 2	034E 133N NW	20-30cm	Spit 3	1846	Proximal flake		Silcrete	11	1	Pink Grey
HC_179: Transect 2	034E 133N NW	20-30cm	Spit 3	1847	Flaked piece		Silcrete	12	0.5	Pink/grey
HC_179: Transect 2	034E 133N NW	20-30cm	Spit 3	1848	Distal Flake		Silcrete	16	1	Light Grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1835	Flake		Silcrete	15	1	Light Grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1836	Flake		Silcrete	13	1	Light Grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1837	Flaked piece		Quartz	16	1	Milky
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1838	Flaked piece		Silcrete	14	0.5	Red/brown
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1839	Medial Flake		Silcrete	10	0.5	Light Grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1840	Medial Flake		Silcrete	11	0.5	Pink/Grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1841	Proximal flake		Silcrete	10	1	Red/brown
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1842	Proximal flake		Quartz	10	0.5	Crystal
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1843	Distal Flake		Silcrete	16	0.5	Pink/grey
HC_179: Transect 2	034E 133N NW	10-20cm	Spit 2	1844	Flake		Quartz	12	0.5	White/light grey
HC_179: Transect 2	034E 133N NW	30-40cm	Spit 4	1849	Flake		Silcrete	11	0.5	Light Grey
HC_179: Transect 2	034E 133N NW	30-40cm	Spit 4	1850	Flake		Silcrete	10	0.5	Light Grey/pink
HC_179: Transect 2	034E 133N NW	30-40cm	Spit 4	1851	Flaked piece		Silcrete	12	1	Red/brown
HC_179: Transect 2	034E 133N NW	30-40cm	Spit 4	1852	Distal Flake		Silcrete	15	1	Light Grey
HC_179: Transect 2	034E 133N SE	20-30cm	Spit 3	1795	Flake		Silcrete	13	0.5	Grey/white

Site	Square	Depth (Actual)	Level	ARTEFACT ID	Type	Implement	Raw material	Length	Weight	Colour
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1764	Flake		Quartzite	26	3	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1765	Flake		Silcrete	9	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1766	Flake		Silcrete	7	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1767	Medial Flake		Silcrete	13	1	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1768	Medial Flake		Silcrete	14	1	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1769	Medial Flake		Silcrete	13	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1770	Proximal flake		Silcrete	12	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1771	Distal Flake		Silcrete	9	0.5	Light Grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1772	Distal Flake		Silcrete	20	1	Light Grey
HC_179: Transect 2	034E 133N SE	10-20cm	Spit 2	1773	Distal Flake		Silcrete	19	1	Light Grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1754	Medial Flake		Silcrete	15	1	Dark grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1755	Medial Flake		Silcrete	16	1	Dark grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1756	Medial Flake		Silcrete	11	0.5	Grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1757	Medial Flake		Quartz	11	0.5	Grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1758	Flake		Quartz	6	0.5	White
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1759	Flake		Silcrete	6	0.5	Brown
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1760	Flaked piece		Silcrete	11	0.5	Pink
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1761	Distal Flake		Silcrete	8	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1762	Distal Flake		Silcrete	7	0.5	Dark grey
HC_179: Transect 2	034E 133N SE	0-10cm	Spit 1	1763	Longitudinal split		Quartzite	18	1	Smokey grey
HC_179: Transect 2	034E 133N SW	10-20cm	Spit 2	1748	Flake		Silcrete	20	1	Pink
HC_179: Transect 2	034E 133N SW	10-20cm	Spit 2	1749	Flake		Silcrete	9	0.5	Light Grey
HC_179: Transect 2	034E 133N SW	10-20cm	Spit 2	1750	Flake		Silcrete	15	1	Pink
HC_179: Transect 2	034E 133N SW	30-40cm	Spit 4	1747	Flake		Silcrete	10	1	Black
HC_179: Transect 2	034E 133N SW	30-40cm	Spit 4	1751	Flake		Silcrete	22	1	Light Grey
HC_179: Transect 2	034E 133N SW	30-40cm	Spit 4	1752	Distal Flake		Chert	14	0.5	Dark grey
HC_179: Transect 2	034E 133N SW	30-40cm	Spit 4	1753	Flake		Chert	7	0.5	Dark grey
HC_179: Transect 2	054E 133N	0-10cm	Spit 1	1830	Bipolar flake		Quartz	18	1	Milky
HC_179: Transect 2	054E 133N	0-10cm	Spit 1	1831	Flaked piece		Quartz	10	0.5	Milky
HC_179: Transect 2	054E 133N	0-10cm	Spit 1	1832	Flaked piece		Quartz	4	0.5	Milky
HC_179: Transect 2	054E 133N	10-20cm	Spit 2	1833	Core		Chalcedony	32	11	
HC_179: Transect 2	054E 133N	20-30cm	Spit 3	1834	Flake		Silcrete	9	0.5	White/grey
HC_179: Transect 2	1084E 133N	10-20cm	Spit 2	1856	Flake		Silcrete	11	0.8	White silcrete
HC_179: Transect 2	1094E 133N	10-20cm	Spit 2	1854	Flaked piece		Quartz	7	0.5	Milky
HC_179: Transect 2	1094E 133N	20-30cm	Spit 3	1855	Distal Flake		Quartz	10	0.5	Milky

SYDNEY
Ground floor, Suite 01, 20 Chandos Street
St Leonards, New South Wales, 2065
T 02 9493 9500 F 02 9493 9599

NEWCASTLE
LeveL 1, Suite 6, 146 Hunter Street
Newcastle, New South Wales, 2300
T 02 4907 4800 F 02 4907 4899

BRISBANE
Level 4, Suite 01, 87 Wickham Terrace
Spring Hill, Queensland, 4000
T 07 3839 1800 F07 3839 1866

ADELAIDE
Level 1, 70 Pirie Street
Adelaide, South Australia 5000
T 08 8232 2253

Appendix 3.2

Notes from meeting with Gundungurra Aboriginal Heritage Association

Ryan Desic

Subject: RE: Meeting with Gundungurra Aboriginal Heritage Association.

Hi Ryan,

Please see notes from our meeting with the Gundungurra Aboriginal Heritage Association (GAHA) 11am 18/7/2017. Please add anything that I may have missed.

- Venue – Hume Coal office Moss Vale, Mereworth House, Berrima.
- Attendees – Sharyn Halls, Meryl ? Chris Halls ('Jim')
- Hume Coal – Luke Edminson, Ben Anderson, Ryan Desic (EMM)
- Attachment – ILUA extract and link below to the ILUA register.

1. Introductions were made.
2. Ryan Desic presented slides - same slides as those presented to the RAPs in October 2016.
3. A number of questions were asked surrounding the mine footprint, surface infrastructure, the mine details and engineering.
4. A number of questions were asked about the minimal subsidence, rock features, artefacts and test excavations. GAHA was particularly interested in the rock shelters with rock art. The rock art site 'Compartment 157' was discussed. Ryan informed GAHA that there were a number of hand stencils apparently from children and adults as opposed to the one stencil originally recorded. GAHA advised that this may have signified the same people returning to the area from childhood to adulthood. The figures recorded in rock shelter HC_002 were also discussed. GAHA informed that this art style was noticeably from the Gundungurra people and that such art styles are known in the Blue Mountains.

5. Sharyn was interested in other stakeholders and other interested Aboriginal groups. There was a discussion about the proposed Aboriginal 'keeping place' whereby GAHA stated that they would prefer all salvaged Aboriginal objects to be kept in a neutral location such as an on-site office on Hume Coal owned land. This would better control the access to the objects and prevent objects from being lost. Luke and Ryan agreed that this would be discussed further in consultation with project RAPs during the development of an Aboriginal heritage management plan. GAHA appeared satisfied that the details of the proposed management measures would be detailed further during the management plan phase.

6. Hume Coal asked for a copy of the full detailed ILUA – Sharyn said that it is a confidential document.
7. Sharyn said that the Hume Coal Project was an important stakeholder in the ILUA agreement area.
8. Luke explained that Hume Coal had submitted mining lease applications for MLA527, MLA528, MLA529.
9. Luke explained that during this submission period we had undergone the full consultation process as per the MLA guidelines
   and that no interested parties or stakeholders had come forward with regards to this application.
10. We all drove to Mereworth house to see Hume Coal's exhibition.
11. Luke explained each information section of the project and the photomontage.

The meeting ended at 15:30

http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/ILUA_details.aspx?NNTT_Fileno=NI2014/001

Regards,

Luke Edminson | Manager – Environmental Planning
Hume Coal Project

Hume Coal Pty Limited

www.humecoal.com.au

Appendix 3.3

Additional Aboriginal site HC_181

1 March 2018

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065
PO Box 21
St Leonards, NSW, 1590

T +61 2 9493 9500
F +61 2 9493 9599
E info@emmconsulting.com.au

www.emmconsulting.com.au

Re: Hume Coal Project: Additional site recorded in Belanglo State Forest – Site HC_181

Dear registered party,

1 Introduction

This letter presents information about the identification of a new Aboriginal site in the Belanglo State Forest that is above the proposed underground mining area of the Hume Coal Project. It provides a description of the site, an assessment of significance and its proposed management measures.

2 Site description

In March 2017, a NSW Forestry employee identified a grinding groove site adjacent to a series of rock pools. This site was inspected by an EMM archaeologist the following month for verification and recording. The site is located on sandstone bedrock within the stream channel of Knapsack Gully in the Belanglo State Forest. This area was previously surveyed by EMM and project RAPs in 2015 but was not identified during that time. This may have been because of changes in ground coverage, as it was noted that recent rain and increased stream flow had exposed larger areas of sandstone that otherwise may be covered in leaf litter and moss in drier seasons.

The site was recorded as HC_181 and comprises a series of Aboriginal grinding grooves and nearby circular (some misshapen) waterhole features. The site features are in a number of small exposures approximately 2 m^2 in size, amongst surrounding ground coverage of moss, pine needles, small shrubs and leaf litter.

The site features extend over 10 m in length and contained within a 5 m corridor. The site features three prominent rock pools and four shallower and smaller depressions that may also be rock pools. Additionally, there are four grinding grooves distributed over the 10 m site length.

The AHIMS site card for HC_181 is attached to this letter.

3 Significance, impacts and management

HC_181 is assessed to have moderate archaeological significance. A statement of significance for HC_181 is provided in Table 1.1. Site HC_181 is above the underground mining area but no subsidence impacts are predicted for this area (refer to Section 10 of Appendix S to the EIS). Notwithstanding, this site will be monitored for subsidence in order to be consistent with the management measures proposed for sandstone type sites of moderate significance elsewhere above the underground mining footprint. A baseline recording of the site and its inclusion in a subsidence monitoring program will be completed when the project AHMP is prepared subsequent to project approval.

Table 3.1 Statement of significance for HC_181

Research potential	Moderate: Methods of collecting water in rock pools may be compared locally and regionally. Grinding grooves however are typical of the area
Rarity and representativeness	High: Grinding grooves and rock pools observed together are a rare site type locally.
Integrity	Moderate: Site features are good condition but are largely obscured by surrounding vegetation.
Research themes	Moderate: Site may contribute to understanding of rock pools used closely with grinding groove sites. The site alone can tell little further information, but may be of greater value if compared on a regional level.
Educational value	Moderate: Good example of various types of grinding methods to create different site features. Easily accessible and identifiable. Nearby International House site is more easily accessible and provides more easily identifiable features and in greater numbers
Overall significance	Moderate: The site is a relatively easy site to access and having a combination of features that make it rare for the local area, but there are limited site features and better examples nearby such as International House (52-4-0098)

4 Closing

If you would like to make any comments on the cultural significance of this site, or have comments about the management measures, please respond to this letter by 16 March 2018.

Yours sincerely,

Ryan Desic
Senior Archaeologist
rdesic@emmconsulting.com.au

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220

Office of Environment & Heritage

Office Use Only

Site Number _ _ _ _ _ _

Date received / / Date entered into system / / Date catalogued / /

Entered by (I.D.)

Information Access

☐ Gender/male ☐ Gender/female ☐ Location restriction ☐ General restriction ☐ No access

Office Use Only

For Further Information Contact:

☐ **Nominated Trustee**

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Client on system ☐

☐ **Knowledge Holder**

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Client on system ☐

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name HC_181

Easting 246750 Northing 6176929 AGD/GDA GDA

Mapsheet

Zone 56 Location Method Non-Differential GPS

Other Registration

Primary Recorder

Title | Surname | First Name | Initials

Mr | Ryan | Desic

Organisation EMM Consulting Pty Ltd

Address 20 Chandos St St Leonards

Phone number 94939541 Fax

Date recorded 24/04/2017

Client on system ☐

NPWS Aboriginal Site Recording Form - Site Information

OPEN/CLOSE SITE Open Site

Site Context

Landform

- [ ] Mountainous
- [ ] Plain
- [ ] Rolling hills
- [x] Steep hills
- [ ] Undulating plain

Slope

[ ] degrees

Landform Unit

- [ ] Beach
- [ ] Coastal rock platform
- [ ] Dune
- [ ] Intertidal flat
- [ ] Lagoon
- [ ] Tidal Creek
- [ ] Tidal Flat
- [ ] Cliff
- [ ] Crest
- [ ] Flat
- [ ] Lower slope
- [ ] Mid slope
- [ ] Upper slope
- [ ] Plain
- [ ] Ridge
- [ ] Tor
- [ ] Valley flat
- [ ] Levy
- [ ] Stream bank
- [x] Stream channel
- [ ] Swamp
- [ ] Terrace
- [ ] Terrace flat

Vegetation

- [ ] Closed forest
- [ ] Grasslands
- [ ] Isolated clumps of trees
- [x] Open forest
- [ ] Open woodland
- [ ] Scrub
- [ ] Woodland
- [ ] Cleared
- [ ] Revegetated
- [ ] N/A

Land use

- [ ] Conservation
- [ ] Established urban
- [ ] Farming-intensive
- [ ] Farming-low intensity
- [x] Forestry
- [ ] Industrial
- [ ] Mining
- [ ] Pastoral/grazing
- [ ] Recreation
- [ ] Semi-rural
- [ ] Service corridor
- [ ] Transport corridor
- [ ] Urban expansion
- [ ] Residential

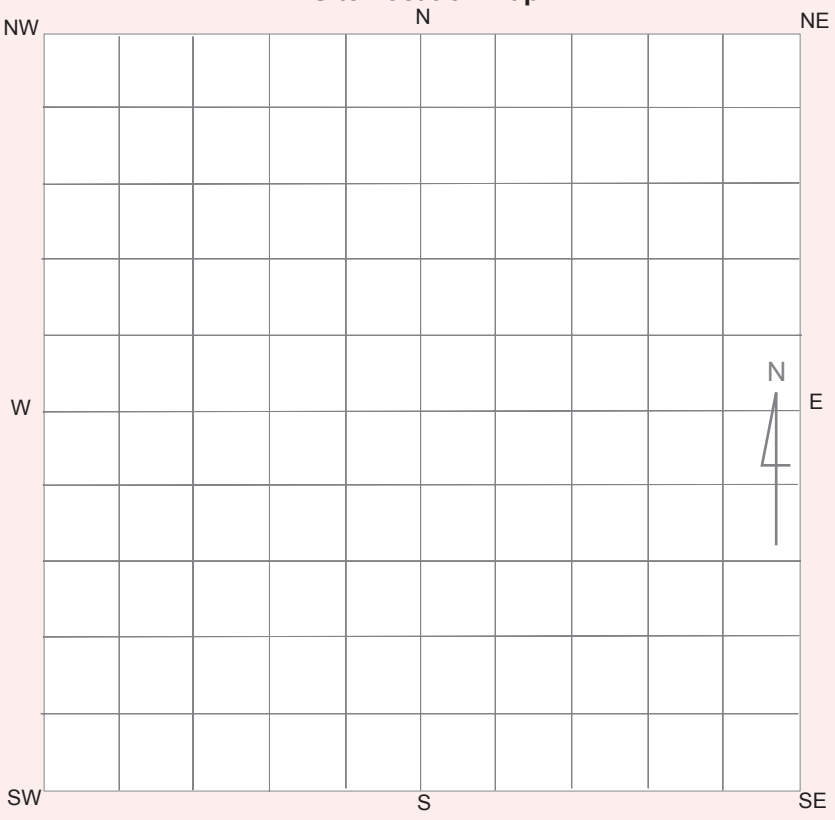
Water

Distance to permanent water source	2,000 metres
Distance to temporary water source	0 metres
Name of nearest permanent water source	Medway Rivulet
Name of nearest temporary water	Knapsack Gully

Directions for Relocation

Follow the stream channel of Knapsack Gully east from its intersection with Dalys Road for approximately 380 m. Site is within the exposed sandstone bedrock of the gully.

Site Location Map



Current Land Tenure

- [ ] Public
- [ ] Private

National Park / other Government Dept.

Primary report **I.D.** [ ] (I.D. Office Use only)

NPWS Aboriginal Site Recording Form - Site Information

General Site Information

Closed Site

Shelter/Cave Formation

- [ ] Boulder
- [ ] Wind erosion
- [ ] Water erosion
- [ ] Rock collapse

Rock Surface Condition

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Condition of Ceiling

- [ ] Boulder
- [ ] Sandstone platform
- [ ] Silica gloss
- [ ] Tessellated
- [ ] Weathered
- [ ] Other platform

Shelter Aspect

- [ ] North
- [ ] North East
- [ ] East
- [ ] South East
- [ ] South
- [ ] South West
- [ ] West
- [ ] North West

Open Site

Site Orientation

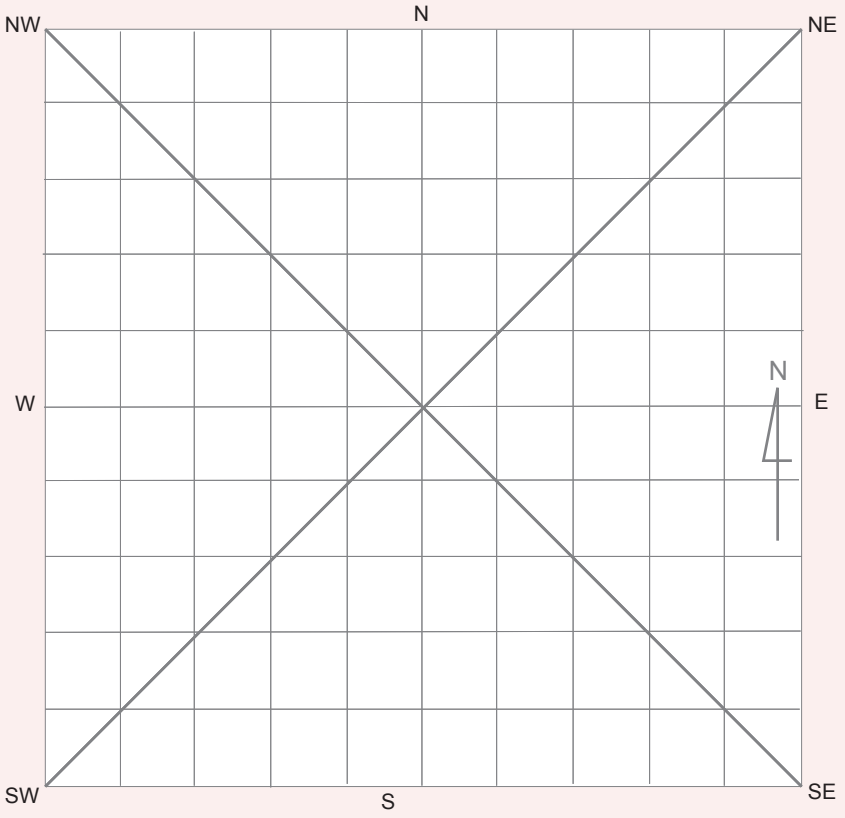
- [ ] N-S
- [ ] NE-SW
- [ ] E-W
- [ ] SE-NW
- [x] N/A

Features

- [ ] 1. Aboriginal Ceremony & Dreaming
- [ ] 2. Aboriginal Resource & Gathering
- [ ] 3. Art
- [ ] 4. Artefact
- [ ] 5. Burial
- [ ] 6. Ceremonial Ring
- [ ] 7. Conflict
- [ ] 8. Earth Mound
- [ ] 9. Fish Trap
- [x] 10. Grinding Groove
- [ ] 11. Habitation Structure
- [ ] 12. Hearth
- [ ] 13. Non Human Bone & Organic Material
- [ ] 14. Ochre quarry
- [ ] 15. Potential Archaeological Deposit
- [ ] 16. Stone Quarry
- [ ] 17. Shell
- [ ] 18. Stone Arrangement
- [ ] 19. Modified Tree
- [x] 20. Water Hole

Site Plan

Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

	Internal length
	Internal width
	Shelter height
	Shelter floor area

Open Site Dimensions (m)

10	Total length of visible site
5	Average width of visible site
25sq m	Estimated area of visible site
10	Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

The site comprises a series of Aboriginal grinding grooves and nearby circular (some misshapen) waterhole features. The site is located on exposed Hawkesbury Sandstone bedrock within an ephemeral stream channel. The site features are in a number of small exposures approximately 2 sq/m in size amongst surrounding the ground coverage of moss, pine needles, small shrubs and leaf litter.

The site features extend over 10 m length and within a 5 m corridor. The site features three prominent rock pools and four shallower and smaller depressions that may also be rock pools. Additionally, there are four grinding grooves distributed over the 10 m site length. The mud-map sketch of the site and photos show the site details.

This section should only be filled in by the Endorsees

Endorsed by: ☐ Knowledge Holder ☐ Nominated Trustee ☐ Native Title Holder ☐ Community Consensus

Title | Surname | First Name | Initials

Organisation

Address

Phone number | Fax

Attachments (No.)

- ☑ A4 location map
- ☐ B/W photographs
- ☑ Colour photographs
- ☐ Slides
- ☐ Aerial photographs
- ☑ Site plans, drawings
- ☐ Recording tables
- ☐ Other
- ☐ Feature inserts-No. ☐

Comments

NPWS FEATURE RECORDING FORM - GROOVE

Site I.D.

Site Name HC_181

First recorded date / /

Importance

Aboriginal Information Recorded?

No. of instances

Recorded by

Feature Description

Type of Grinding Feature

- [ ] Broad
- [x] Narrow/point
- [ ] Hollow
- [ ] Flat

Seed Species Present

Recording date / /

Groove Function

Probably hatchet sharpening

Profile Shape

- [x] 'U' shaped
- [ ] 'V' shaped
- [ ] Flat

Dimensions

	Smallest	Largest	
Length (mm)	300	310	Groove count 4
Width (mm)	70	100	Cluster count
Depth (mm)	20	30	

Feature Context & Condition

Easting Northing

Dimensions of Whole Feature 10 Length (m) 5 Width (m)

Feature Condition

- [ ] Very good
- [x] Good
- [ ] Poor

General Condition

- [x] Weathered
- [ ] Vandalised

General Condition ctd

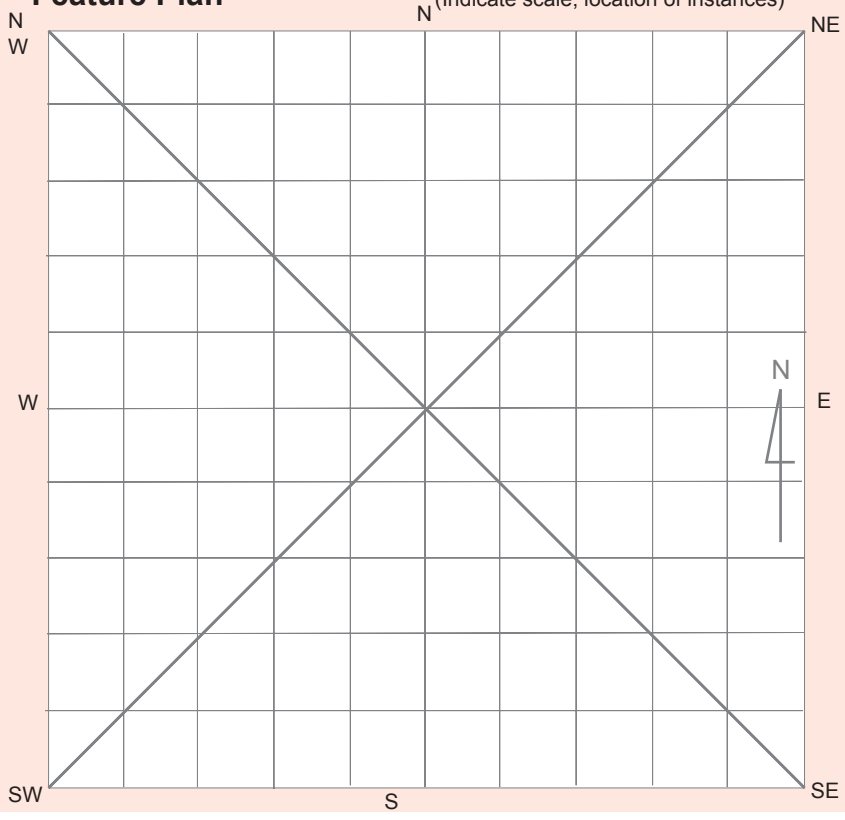
- [ ] Fire damage
- [ ] Surface water wash
- [ ] Graffiti
- [ ] Vehicle damage
- [x] Erosion
- [ ] Stock damage

Recommended Action

- [ ] Boardwalk
- [ ] Cage/barrier/fencing
- [ ] Closure to public
- [x] Continued inspection
- [ ] Expert assessment
- [ ] Graffiti removal
- [ ] Meeting with land manager
- [ ] Revegetation
- [ ] Rubbish removal
- [ ] Signage
- [ ] Erosion control
- [ ] Track closure/re-routing
- [ ] Additional recording

Feature Plan

(Indicate scale, location of instances)



Feature Environment

(Complete when *feature* environment differs to *site* environment, use attributes from cover card, p. 2)

- Land form
- Land form unit
- Slope
- Vegetation
- Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Site HC_181

Hume Coal Project

AHIMS Figure

Site HC_181
Site plan not to scale