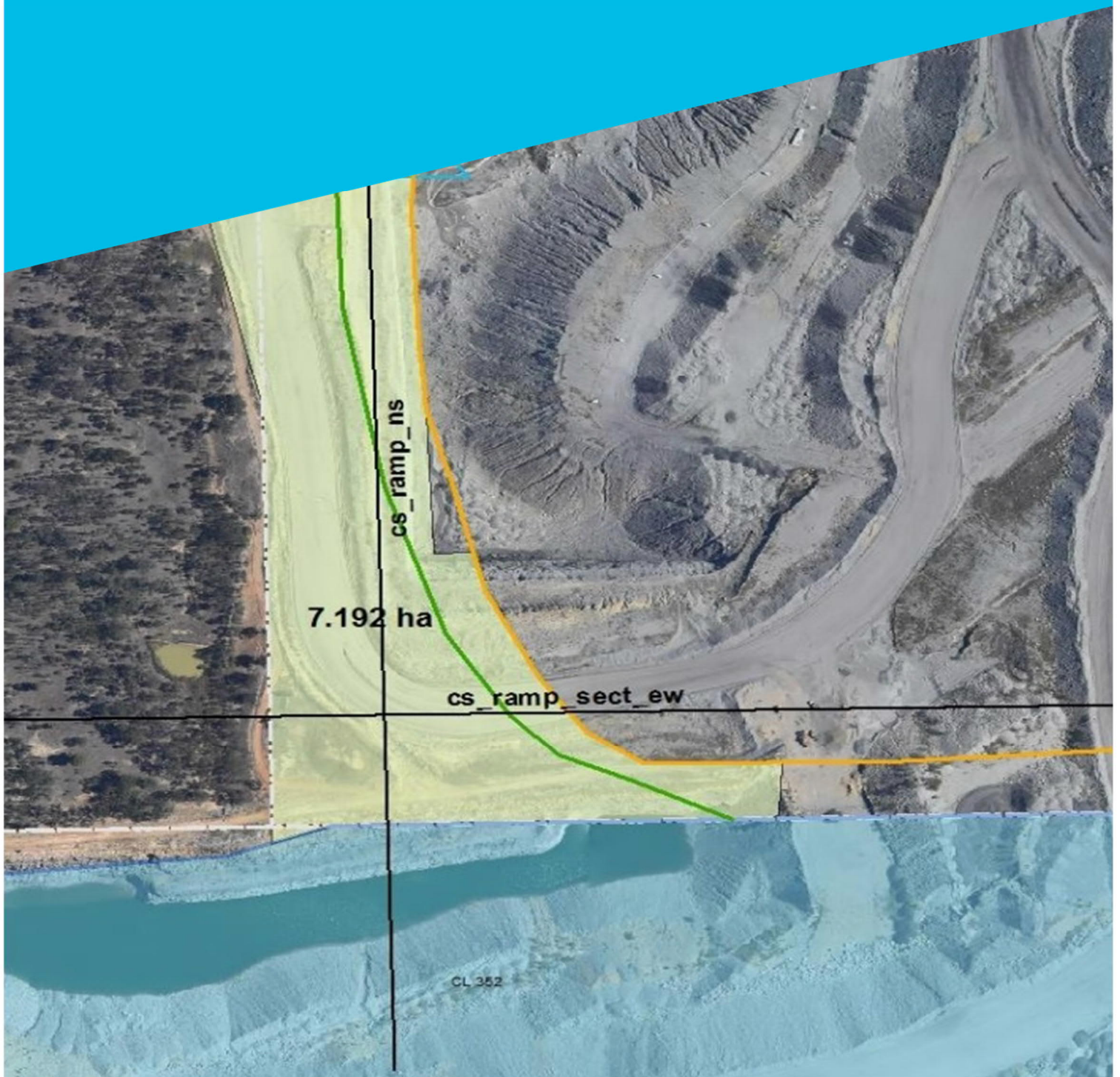


Response to Submissions Report

Rix's Creek North - Modification No. 8



Response to Submissions Report

Rix's Creek North - Modification No. 8

Client: Bloomfield Collieries Pty Limited

ABN: 76 000 106 972

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Reviewed by Catherine Brady

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			Name/Position	Signature
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B	10-Dec-2018	Draft	Simon Murphy Project Manager	
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1.0 Introduction

1.1 Project Overview

Bloomfield Collieries Pty Ltd (Bloomfield) is seeking a modification to the Project Approval 08_0102 for the Rix's Creek North (RCN) open cut coal mine. The modification was submitted to rectify a minor compliance issue and seek approval to mine by open cut methods, a 7.2 hectare portion of land that was not previously included within the approved mining footprint but had previously been disturbed by surface activities undertaken by others (the project).

1.2 Overview of Approval Process and Exhibition

RCN currently operates under Project Approval 08_0102, issued under Part 3A (repealed) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the purpose of coal mining. The original development was classified as a Major Project under the *State Environmental Planning Policy (Major Projects) 2005* which triggered the former Part 3A approval pathway.

While Part 3A of the EP&A Act was repealed in 2011, transitional arrangements set out in Schedule 6A of the EP&A Act had until recently meant that Part 3A continues to apply to approved Part 3A projects, and that section 75W of the EP&A Act continued to apply for the purpose of modifications to Project Approvals. Under the revised EP&A Act former Part 3A projects are subject to the modification process pursuant to section 4.55 of the EP&A Act and are subject to Schedule 2 clause 3BA(6) of the Transitional Regulation. In forming the opinion that the project can be modified pursuant to section 4.55 of the EP&A Act, the Department of Planning and Environment (DPE) considered that the proposed modification would be substantially the same development as that approved and modified under the former Part 3A and section 75W process and could be assessed by means of a Statement of Environmental Effects (SEE). The approval authority is the Minister for Planning.

Exhibition of the Statement of Environmental Effects (SEE) commenced on 12 July 2018 and was completed on 26 July 2018. The SEE was made available on the DPE web site (<http://majorprojects.planning.nsw.gov.au/>).

1.3 Purpose of this Report

Correspondence was received by Bloomfield from DPE providing copies of submissions received during the exhibition of the SEE and requesting responses to the matters raised by the submissions.

The purpose of this Response to Submissions (RTS) report is to:

- Detail and provide responses to issues raised in the submissions received during the SEE exhibition period;
- Note any changes to the project or additional management measures that have been recommended as a result of those submissions; and
- Enable the Minister for Planning or its delegate to determine the application.

1.4 Structure of this Report

This RTS Report addresses issues raised in the submissions received during the exhibition period and is structured as follows:

- **Section 1** provides an overview of the project, the EIS process and the RTS purpose and structure;
- **Section 2** provides a summary of the agency submissions received and responses;
- **Section 3** provides a summary of the non-government organisation and community member submissions received and responses; and
- **Section 4** Conclusion and next steps.

1.5 Summary of Submissions Received

The modification SEE was placed on exhibition between 12 July 2018 and 26 July 2018. Submissions were received from the following:

- Government agencies (refer **Section 2.0**):
 - NSW Environment Protection Authority (EPA);
 - DPE - Resources Assessments;
 - Office of Environment and Heritage; and (OEH); and
 - Department of Industry (DoI).
- Non-Government organisations and business (refer **Section 3.0**):
 - Doctors for the Environment Australia.
- Public submissions (refer **Section 3.2**):
 - Three submissions from community members.

Copies of all submissions received are attached at **Appendix A** (agency submissions) and **Appendix B** (organisations and public submissions).

2.0 Agency Submissions

2.1 Department of Planning and Environment – Resource Assessments

Comment

The Department of Planning and Environment – Resource Assessment has reviewed the information supplied in relation to the Project and advises that the Division has no further comments in relation to the Project at this time.

Subsequent to the formal exhibition and response process Resource Assessments requested that clearer versions of the cross section that formed Figures 6 and 7 in the SEE be provided. These are attached at Appendix C.

Response

The DPEs comments are noted.

2.2 NSW Environment Protection Authority

Comment

The Environmental Protection Authority (EPA) has reviewed the SEE report provided with the application and does not have any issues or comments to provide in relation to this project.

If approved the modification is not anticipated to require any variation to the existing Environment Protection License (EPL) 3391 for the premises. If the proponent determines that changes are required to the EPL resulting from this application, the licensee must apply to the EPA separately to vary the license.

Response

The EPAs comments are noted.

2.3 Office of Environment and Heritage

Comment

The Office of Environment & Heritage understands that the modification seeks to expand mining activities into a 7.2-hectare area. With regards to flooding and potential flood risk, OEH is satisfied the proposed modification will have no significant off-site flooding impacts and no further flooding assessment is required.

In regards to biodiversity and aboriginal heritage OEH made the following recommendations:

- OEH recommends that an assessment of the vegetation and habitat types likely to have been present in the modification 8 area prior to disturbance, is undertaken to determine the biodiversity credit offsetting requirement from the removal of vegetation and habitat areas; and
- OEH recommends that an Aboriginal cultural heritage assessment be undertaken in consultation with relevant Aboriginal parties, to adequately determine if there are, or were, any Aboriginal cultural heritage items or cultural values present within the modification footprint.

Response

It is noted that the OEH submission makes reference to the modification seeking to *expand* mining activities into the 7.2ha area. To clarify, the modification does not seek to expand any activities. Rather the intention of the modification is to update the approved disturbance area of the mine to include an area of land that was originally disturbed in 2002.

Biodiversity

OEH has recommended that an assessment of the vegetation and habitat types likely to have been present in the Mod 8 area prior to disturbance, be undertaken to determine the biodiversity credit offsetting requirement from the removal of vegetation and habitat areas. EMM Consulting Pty Ltd (EMM) were engaged by Bloomfield to calculate the biodiversity credit offsetting requirement, for the

previously cleared area. In August 2017, the NSW *Biodiversity Conservation Act 2016* (BC Act) commenced operation. The BC Act and associated Biodiversity Conservation Regulation 2017 (BC Regulation) introduced the Biodiversity Assessment Method (BAM, OEH 2017).

EMM undertook a desktop review of relevant reports including:

- Chapter 9 of the Integra Open Cut Project Environmental Assessment (URS 2007);
- Appendix E of the Integra Open Cut Project Biodiversity Assessment (URS 2009);
- Peake, TC. (2006) The Vegetation of the Central Hunter Valley, New South Wales. A report on the findings of the Hunter Remnant Vegetation Project. Hunter-Central Rivers Catchment Management Authority, Paterson; and
- Camberwell Coal Project, Camberwell Coal Joint Venture Environmental Impact Statement (EPPS & Associates 1989).

In addition EMM also undertook a field survey on 26 October 2018. As the modification area was cleared in 2002 there was no biodiversity to survey. Therefore EMM concentrated their survey effort on the immediately adjoining vegetation in an attempt to identify the type of vegetation that existed within the modification area prior to its clearing in 2002. This survey was undertaken in accordance with the Biodiversity Assessment Method (BAM) (OEH, 2017).

A single Plant Community Type (PCT) and condition zone, as defined by the BAM was recorded within the vegetated area adjoining the modification area. The description of this PCT is described in Table 1 and Table 2.

Table 1 Vegetation zone 1 description

Element	Zone 1 – 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter woodland
PCT ID	1603
Common name	Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter
Condition class	woodland
Extent within previously cleared area	Estimated at 7.19 ha
Description	This community occurs throughout the study area. Narrow-leaved Ironbark (<i>Eucalyptus crebra</i>) is the dominant canopy species with occasional Coastal Grey Box (<i>E. moluccana</i>) present. Bulloak (<i>Allocasuarina luehmannii</i>) is the dominant midstorey species, though its occurrence is patchy; occurring as dense stands in some areas, whilst sparse in others. Ground cover is dominated by Barbed-wire grass (<i>Cymbopogon refractus</i>) and Threeawn Speargrass (<i>Aristida ramosa</i>), with occasional Broom Bitter Pea (<i>Daviesia genistifolia</i>) and Kangaroo Thorn (<i>Acacia paradoxa</i>). Exotic species coverage was low, with recorded species including Prickly Pear (<i>Opuntia stricta</i>) and Narrow-leaved Cottonbush (<i>Gomphocarpus fruticosus</i>).
Survey effort	Three plots were conducted; Plot 1-3.

Table 2 Vegetation zone 1 description

Element	Zone 1 – 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland
Condition description	The community has historically been partially cleared for grazing, with evidence of old fence lines and tree stumps. Canopy trees now include occasional remnant large trees with a range of small to moderately sized regenerating trees. Though several exotic species were recorded within the groundcover, they occur in low densities and are not a dominant component of the community.
Characteristic species used for identification of PCT	This PCT is stated in the Bionet Vegetation Classification System (VIS, OEH 2018), as being characterised by a canopy dominated by Narrow-leaved Ironbark, with Coastal Grey Box as a subdominant and Bullock as the dominant midstorey species. This accurately describes the community within the study area. Coastal Grey Box was not recorded in the plots conducted but it was present in adjacent areas. In addition, many of the groundcover species match the characteristic species listed for the PCT, included Winter Apple (<i>Eremophila debilis</i>), Barbed-wire Grass and Many-flowered Mat-rush (<i>Lomandra multiflora</i>).
Justification of evidence used to identify the PCT	PCT 1603 occurs in the central and lower hunter, described as an open forest, with an open shrub layer and a predominately grassy groundcover with various grammoids. The position of the study area, structure and species composition is a best fit with PCT 1603.
Status	<u>Commonwealth EPBC Act</u> : Listed critically endangered ecological community - Central Hunter Valley eucalypt forest and woodland. <u>NSW BC Act</u> : Listed endangered ecological community - Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions
Estimate of percent cleared value of PCT	74 %

Having assessed what the vegetation in the modification area was likely to represent prior to clearing, EMM made an estimate of what the potential offsets credits that would be required to offset the modification area if it was cleared under an approval based on the BAM. The credit estimate is provided in Table 3.

Table 3 Summary of ecosystem credits

PCT	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland	7.19	52.6	0.0	52.6	189

It is noted that the above determination is based on nearby vegetation as a best estimate and not on the actual vegetation that had been cleared. Having estimated the likely offsetting requirement that the clearing of the modification area would have been under the BAM it is noted that this clearing took place in 2002 prior to the property being purchased by Bloomfield and prior to the implementation of the BAM. Bloomfield identified this legacy compliance matter and self-reported to DPE and Bloomfield considers that rather than applying retrospectively the offsetting requirements, it is more appropriate to continue its program of progressive rehabilitation of disturbed areas as a means to continue to improve the mines biodiversity footprint.

A copy of the biodiversity credit estimate is attached at Appendix E.

Aboriginal Heritage

Bloomfield commissioned AECOM to carry out an Aboriginal Archaeological Due Diligence assessment in October 2018 to determine if any Aboriginal heritage values would, or have been, impacted by the modification. OEH's recommendation for an Aboriginal cultural heritage assessment undertaken in consultation with relevant Aboriginal parties is noted, however given the history of severe ground disturbance in the project area, a due diligence assessment pursuant to OEH's *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010* (DECCW, 2010) was undertaken to firstly determine the potential for cultural heritage to have been present prior to disturbance and therefore whether a full Aboriginal cultural heritage assessment is warranted.

The due diligence assessment included

- A review of the landscape context of the Modification area, with particular attention paid to its Aboriginal archaeological implications;
- A search of the Aboriginal Heritage Information Management System (AHIMS) database;
- A review of Aboriginal archaeological site data held by AECOM for the Rix's Creek mine complex;
- A review of the findings of previous Aboriginal archaeological investigations relevant to the Rix's Creek Mine complex; and
- Visual inspections of the Modification area by AECOM senior heritage specialist Dr Darran Jordan on 31 October 2018.

The database search results did not identify any previously recorded Aboriginal sites located within the project area and no Aboriginal objects were identified during the visual inspection of the project site.

A potentially archaeologically sensitive part of the project prior to disturbance was identified as being the creek line which ran through the site. This area was identified in the review of previous archaeological studies as being previously surveyed for Aboriginal objects prior to ground disturbance impacts in 1999. No Aboriginal objects were identified during pre-disturbance surveys. The due diligence assessment concluded that the project area is highly disturbed from mine-related activities and has negligible potential for Aboriginal objects to be present. Therefore, no further Aboriginal heritage assessment of the project area is required, precluding the need for an Aboriginal cultural heritage assessment to be carried out in consultation with relevant Aboriginal parties.

A copy of the due diligence assessment is attached at Appendix D.

2.4 Department of Industry

Comment

The DoI undertook a resource assessment which was included in its submission confirming the viability to the resource. DoI also made the following comment in relation to the project.

Crown land and Crown roads within a Mining Lease must be subject to a Compensation Agreement issued under Section 265 of the *Mining Act 1992*, to be agreed and executed prior to any mining activity taking place and within 12 months of Project / modification Approval. The Compensation Agreement may include conditions requiring the Mining Lease Holder to purchase any Crown land impacted on by mining activity.

Response

The Department's comments are noted.

2.5 Department of Industry Water (DoI Water)

Comment

DoI Water raised no major objections to the proposed modification subject to conditions of approval in line with previous approvals for Project MP08_0102.

The following points are recommended for the Department of Planning and Environment to consider in its updated consent:

- The proponent must update the Water Management Plan to reflect the proposed modification.
- Reference to “DPI Water” in the modified approval should be amended to “Dol Water” to ensure consistency.

Response

The Water Management Plan will be updated to reflect the proposed modification, in line with the Dol's recommendations. The Department will be abbreviated to “Dol” in all future correspondence and reporting.

3.0 Non-Government Organisations and Business

3.1 Doctors for the Environment Australia

Doctors for the Environment Australia (DEA) object to the proposed modification for the following reasons:

- Air quality impacts on communities;
- Lack of economic benefits.

Comment on air quality

DEAs believe modification to RCN mine should be rejected on the basis that it is causing continual breaches of air quality in the surrounding areas adding to the widespread effect on human health from coal mining. DEA believes the current dust management plans are “an abject failure” and the mine should not be allowed to continue due to impacts on respiratory health for nearby residents.

DEA refers to two air quality monitoring stations in proximity to the mine, Camberwell to the north west, and Singleton North West to the south east. DEA state that examining the OEH record for PM10 from the start of 2015 to July 2018, shows that in Camberwell there have been 76 exceedances of the daily standard for PM10 of 50 µg/m³, and in Singleton NW there have been 31 exceedances over this three-and-a-half-year period. For Camberwell this is 21.7 exceedances per year, and for Singleton NW this is 8.9 exceedances per year. Camberwell had a maximum 24-hour average value of 101.5 µg/m³.

DEA states that the air report by Todoroski Air Sciences dated 15 August 2017 provided by the proponent shows that the modification will lead to no decrease in dust emissions and will even cause a slight increase.

DEA is also critical that the report on air quality makes no mention of SO₂ and CO₂ emissions from spontaneous combustion of exposed coal.

Response

In its assessment, Todoroski Air Sciences estimated that the proposed modification will reduce the dust relative to the existing operation at the mine by approximately 0.8 to 1.1%. This means there is no forecast increase in exceedance and dust impacts as a result of the modification are unlikely to be noticeable at any off-site location. In its review of the SEE and accompanying air quality impact assessment, the EPA raised no concerns or comments in relation to the assessment methodology or outcomes and indicates that any particulate emissions generation associated with the modification are within the EPA air quality criteria requirements.

In relation to SO₂ and CO₂ the modification would result in a negligible change in generation of these pollutants relative to the existing operation and background emissions.

The modification would largely operate within the existing approvals as it does not seek to increase the amount of overburden or reject material handled annually for the operations or require additional material to be emplaced within the approved emplacement areas annually.

Comment on economic impact

DEA states that the application document titled *Modification 8 to DA 08_0102* clearly states that there will be no capital investment due to the modification and it will create no construction or operational jobs. On this basis, DEA believes there will be no local economic benefit from the modification.

Response

The recommencement of production at Rix's Creek North has resulted in substantial employment opportunities to the local area. While planned production levels are well below past production rates, Rix's Creek North now has 120 additional employees working on the combined site. The modification would support the ongoing employment of the existing workforce, contractors and supplies with ongoing direct and indirect economic benefits to the local and wider region.

3.2 Community Submissions

Submissions received from members of the general public are summarised in **Table 4**.

Table 4 Submissions from Community Members

Submitter	Comment	Response
John and Judith McInerney Camberwell NSW	Object to the modification application (PA 08_0102). Have experienced increased dust and noise pollution in our area and water collection tanks have to be cleaned more regularly to provide us with reasonably unpolluted water for our domestic use. The water filters have to be changed monthly. Roofs, solar panels and gutters have to be pressured cleaned bi monthly and sludge from our gutters removed What is the composition of this black sludge that is washed into our water tanks. Mine production noise can disturb sleep during the night with loud mechanical noises from mine vehicles and machinery used in the course of the excavation of coal and overburden. The intensity of this noise pollution depends on prevailing winds and inversions. Whilst being in such close proximity to Rix's Creek open cut, have had two newsletters and a phone conversation when we complained about the dust caused from a blast. Not kept in the loop enough with the happenings at Rix's Creek Open Cut.	The assessment undertaken by Todoroski Air Sciences estimates that the modification would reduce the dust relative to the existing operation of the mine by approximately 0.8 to 1.1%. This potential change in the dust generated due to the mine is unlikely to be noticeable at any off-site location. The modification would largely operate within the existing approvals as it does not seek to increase the amount of overburden or reject material handled for the operations or require additional material to be emplaced within the approved emplacement areas. The RCS and RCN mines would continue to operate with appropriate best practice controls and dust mitigation measures to ensure that dust levels are minimised where possible. The modification included a noise impact assessment which demonstrate the mine and modification could operate in accordance with the EPA's requirements. Bloomfield seeks to engage with its neighbours across its operations and would look to provide ongoing consultation opportunities for the community.
(Name withheld) Camberwell NSW	Under no circumstances am I condoning this mine while I live within 2500m of the blast zone. Live with wife and eldest son on property for 20+ years and can talk about the Noise, Dust, Water, Lights, Explosions. The property bought for retirement, and we love it. But the pain and anxiety that we have lived with, over the years, the mine is just taking us for granted, and is unacceptable. We had plans of spending money on the house to improve our quality of life, but living in fear of these mines just doing what they like. I cannot justify the cost. I will do what I can to stop it from happening.	The RCS and RCN mines would continue to operate with appropriate best practice controls and dust mitigation measures to ensure that dust levels are minimised where possible. The modification included a noise impact assessment which demonstrates that the mine and modification could operate in accordance with the EPA's requirements. Blast analysis also indicates that any resulting impacts would be within approved limits. Water use at the site is undertaken in accordance with licencing requirements and an approved

Submitter	Comment	Response
	Letter received was dated the 11-07-18 but we didn't receive it to the 23-07-18 leaving us three days' notice. This is also unacceptable as it wouldn't of taken 2 weeks to get here.	Water Management Plan. Night time operations are undertaken in a manner which aims to reduce the potential offsite impacts from light spill. The modification was shown to not significantly increase impacts in relation to these areas. Notification correspondence was issued in accordance with DPE requirements. Electronic version of the project documentation were also available
(Name withheld) Camberwell NSW	Object to the modification on these grounds, 1. The Department's failure to identify non-compliance lease zones in the last eight years and the failure of checking systems in place is now proven to be inadequate and below standard if in the last two years there has been two cases in the Singleton area of mining outside the mine lease boundary. 2. That all modification approvals to the Integra and Rixs Creek complex including the underground owned by Glencore have all the lease boundaries checked and approved by an independent specialist to ensure clear independence. 3. The non-compliance of the lease area is still being utilized as a haul road and the perceived perception from the landholders of the village of Camberwell that the department and the proponent believe this is acceptable behaviour to act in breach of the Act, which would be considered breach of the law. 3. The Landholders of the village of Camberwell have been exposed to poor air quality since 2010-2017 of 267 alerts initiated from Camberwell monitor of 24hour Pm10 rolling average of exceedances of national air quality standard and 135 days of daily exceedances of PM10. Which clearly indicates that the village of Camberwell is heavily impacted by cumulative air quality and the location of the premises relative to the village has contributed to the poor air quality. The landholders should be considered in the	An outcome of the meeting on the 10 May 2018 with the DPE, was to consult with Resources Regulator and to inform the Rix's Creek Community Consultative Committee of the existence of the non-compliance and the process to remedy the issue. (The CCC was informed of the non-compliance at the CCC meeting held on 22 May 2018). Bloomfield is seeking modification to DA 08_0102 to remedy this non-compliance that has been identified as a result of historical mining activity by the previous owners. As detailed above and in the SEE the intent of the modification is to remedy any non-compliance and apply the required environmental management to the area in question. The modification included an air quality impact assessment which demonstrate the mine and modification could operate in accordance with the EPA's requirements. If the landholders were identified as being within the acquisition zone due to impacts this would have been identified by DPE during the assessment in accordance with the acquisition policy.

Submitter	Comment	Response
	acquisition area and have the right of acquisition on request. 4. The landholders of the village of Camberwell have been exposed to noise levels from the haul road for the last eight years. This has contributed to the overall noise airshed including the highway, which was not part of the original EIS in 2010. The haul road and mining activities were not meant to be in that area and landholders endured impacts related to the operation which should have not been activated. 5. The area should now be rehabilitated and returned to the natural state before disturbed without consent. Ownership of the land as stated does not mean you can mine without consent. This action was a clear breach of trust and there is no cost analysis report of the impact on the village of Camberwell and the surrounding resident of the related infringement or breach of law. 6. As members of the Community of Camberwell are away on leave and the timeframe was so short to make a submission, a larger timeframe for submission response is requested.	The modification included a noise impact assessment which demonstrates the mine and modification could operate in accordance with the EPA's requirements. The area would be progressively rehabilitated in accordance with the RCN Rehabilitation Management Plans and Mine Closure Plans. These plans would be prepared in consultation with DPE and Resource Assessments. Bloomfield has complied with the required assessment and exhibition timeframes as directed by DPE. Bloomfield welcomes the opportunity to engage the community through its Community Consultative Committee or through direct consultation with community members when requested.

4.0 Conclusion

Bloomfield Collieries Pty Ltd (Bloomfield) is seeking a modification to the Project Approval 08_0102 for the Rix's Creek North (RCN) open cut coal mine. The modification was submitted to rectify a minor compliance issue and seek approval to mine by open cut methods, a 7.2 hectare portion of land that was not previously been included within the approved mining footprint but had previously been disturbed by surface activities undertaken by others.

The compliance issue was identified by Bloomfield following their acquisition of the mine in December 2015. Having identified this legacy compliance matter Bloomfield self-reported to DPE and has taken steps, including seeking this modification to remedy the matter. Notably the modification does not seek to amend mining activities at Rix's Creek North.

Following exhibition of the SEE for the modification, submissions were received from agencies and the public. Having fully considered the comments and issues raised in all submissions, responses have been prepared to address matters raised by submissions. No changes to the modification as presented in the SEE, or changes to the management measures identified in the SEE or existing mine management plans are considered necessary, following consideration of the submissions.

With these matters suitably addressed, it is considered that the project assessment can now be finalised and a determination made accordingly.

Appendix A

Agency Submissions

Appendix A Agency Submissions

OUT18/10774

Philip Nevill
Environmental Assessment Officer
Resource & Energy Assessments
NSW Department of Planning and Environment

philip.nevill@planning.nsw.gov.au

Dear Mr Nevill

**Rix's Creek North Open Cut Project (PA 08_0102) - Modification 8
Statement of Environmental Effects**

I refer to your email of 11 July 2018 to the Department of Industry (DoI) in respect to the above matter. Comment has been sought from relevant branches of Lands & Water and Department of Primary Industries. Any further referrals to Department of Industry can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

The department provides the following comments for consideration in assessment of the proposal. Please note that DoI Water will provide comments when available.

Comments

Crown land and Crown roads within a Mining Lease must be subject to a Compensation Agreement issued under Section 265 of the *Mining Act 1992*, to be agreed and executed prior to any mining activity taking place and within 12 months of Project/ Modification Approval. The Compensation Agreement may include conditions requiring the Mining Lease Holder to purchase of any Crown land impacted on by mining activity.

Yours sincerely



Alison Collaros
A/Manager, Assessment Advice
Lands and Water - Strategy and Policy
2 August 2018

OUT18/12498

Philip Nevill
Environmental Assessment Officer
Resource Assessments
NSW Department of Planning and Environment

Philip.Nevill@planning.nsw.gov.au

Dear Mr Nevill

**Rix's Creek North Open Cut Project (PA 08_0102) - Modification 8
Statement of Environmental Effects**

I refer to your email of 11 July 2018 to the Department of Industry (DoI) in respect to the above matter. Departmental comments were provided in our letter dated 9 July 2018, with recommendations from DoI Water provided in this letter.

DoI Water raises no major objection to the proposed modification subject to conditions of approval in line with previous approvals for Project MP08_0102. The following points are recommended for the Department of Planning and Environment to consider in their updated consent:

- The proponent must update the Water Management Plan to reflect the proposed modification.
- Reference to "DPI Water" in the modified approval should be amended to "DoI Water" to ensure consistency.

Any further referrals to Department of Industry can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

Yours sincerely



Alison Collaros
A/Manager, Assessment Advice
Lands and Water - Strategy and Policy
15 August 2018

Phillip Nevill
Environmental Assessment Officer
Resource Assessments - Planning Services Division
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Phillip.Nevill@planning.nsw.gov.au

Dear Phillip

**Rix's Creek North Open Cut Project (PA 08_0102) Modification 8
Statement of Environmental Effects (SEE)**

I refer to your email dated 11 July 2018 inviting the Division of Resources & Geoscience (the Division) to provide comments on the Rix's Creek North Open Cut Project (PA 08_0102) (the Project) submitted by Bloomfield Collieries Pty Limited (the Proponent).

The Division has reviewed the information supplied in relation to the abovementioned Project and advises that the Division has no further comments in relation to this Project at this time.

For further enquiries regarding this matter please contact:

Adam W. Banister, Principal Advisor Assessment Coordination,
(02) 4063 6601 or advisory.services@planning.nsw.gov.au.

Yours sincerely

Shirley Hibbs
On behalf of
Matthew Gagan
Manager Assessment Coordination
26 July 2018



DOC18/483129-02; EF13/3519

Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Philip Nevill

By email: Philip.nevill@planning.nsw.gov.au

26 July 2018

Dear Mr Nevill

**Rix's Creek North Open Cut Project (PA 08_0102) – Modification 8
Statement of Environmental Effects Review**

I refer to your email to the Environment Protection Authority (EPA), dated 11 July 2018, in relation to the Rix's Creek North Open Cut Coal Project modification application, reference PA 08_0102 Mod 8. The proposal seeks to amend the boundary of the Camberwell South Pit area to include an area of 7.2 hectares, and to continue mining operations in the area.

The EPA has reviewed the Statement of Environmental Effects report provided with the application and does not have any issues or comments to provide in relation to this proposal. If approved the modification is not anticipated to require any variation to the existing Environment Protection Licence (EPL) 3391 for the premises. If the proponent determines that changes are required to the EPL resulting from this application the licensee must apply to the EPA separately to vary the licence.

If you have any questions about this matter, please contact Michael Howat on (02) 4908 6819 or by email to hunter.region@epa.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'MB', followed by a stylized flourish.

MITCHELL BENNETT
Head Strategic Programs Unit – Hunter
Environment Protection Authority



Office of
Environment
& Heritage

DOC18/490558-2
PA 08_0102 MOD 8

Mr Philip Nevill
Environmental Assessment Officer
Resource Assessments – Planning Services
Department of Planning & Environment
philip.nevill@planning.nsw.gov.au

Dear Philip

Rix's Creek North Open Cut Project (PA 08_0102) Modification 8

I refer to your e-mail dated 11 July 2018 in which the Department of Planning and Environment invited the Office of Environment and Heritage (OEH) to review and provide comment on the Statement of Environmental Effects (SEE) for the proposed modification of the Rix's Creek North Open Cut project (PA 08_0102 MOD 8). OEH understands that this modification seeks to expand mining activities into a 7.2 hectare area.

OEH's recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B**. If you require any further information regarding this matter, please contact Steven Cox, Senior Team Leader Planning, on 4927 3140.

Yours sincerely

Sharon Molloy 17/8/2018

SHARON MOLLOY
Director Hunter Central Coast Branch
Regional Operations Division

Contact officer: STEVEN COX
02 4927 3140

Enclosure: Attachments A and B

Attachment A

OEH's recommendations**Rix's Creek North Open Cut Project (PA 08_0102) Modification 8**

1. OEH recommends that an assessment of the vegetation and habitat types likely to have been present in the modification 8 area prior to disturbance, is undertaken to determine the biodiversity credit offsetting requirement from the removal of vegetation and habitat areas.
2. OEH recommends that an Aboriginal cultural heritage assessment be undertaken in consultation with relevant Aboriginal parties, to adequately determine if there are, or were, any Aboriginal cultural heritage items or cultural values present within the modification footprint.
3. OEH is satisfied the proposed modification will have no significant off-site flooding impacts and no further flooding assessment is required.

OEH's detailed comments

Rix's Creek North Open Cut Project (PA 08_0102) Modification 8

Biodiversity

1. An assessment of the previous biodiversity values present has not been undertaken

The statement of environmental effects (SEE) does not include an assessment of the vegetation and habitat types likely to have been present in the modification 8 area prior to disturbance. Such an assessment should be undertaken to determine the biodiversity credit offsetting requirement of the clearing previous vegetation and habitat types. Vegetation and habitat types adjacent to the disturbance area could be used to determine the vegetation and habitat types likely to have been present prior to disturbance.

Recommendation 1

OEH recommends that an assessment of the vegetation and habitat types likely to have been present in the modification 8 area prior to disturbance, is undertaken to determine the biodiversity credit offsetting requirement from the removal of vegetation and habitat areas.

Aboriginal Cultural Heritage

2. An Aboriginal cultural heritage assessment should be provided

OEH has reviewed the information supplied with respect to Aboriginal cultural heritage for the Rix's Creek North Open Cut Project (PA 08_0102) Modification 8 and notes that a current assessment of Aboriginal cultural heritage items or cultural values has not been undertaken. OEH further notes that there has been no consultation undertaken with the Aboriginal community.

An assessment of the Aboriginal cultural heritage items and cultural values that may occur, or previously occurred, should be undertaken. Identifying Aboriginal cultural heritage values and consultation with Aboriginal people should be guided by the following OEH documents:

- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (DECCW, 2011) www.environment.nsw.gov.au/licences/investassessreport.htm
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) www.environment.nsw.gov.au/licences/consultation.htm, and
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH, 2010) www.environment.nsw.gov.au/licences/archinvestigations.htm

Recommendation 2

OEH recommends that an Aboriginal cultural heritage assessment be undertaken in consultation with relevant Aboriginal parties, to adequately determine if there are, or were, any Aboriginal cultural heritage items or cultural values present within the modification footprint.

Flooding and Flood Risk

3. OEH is satisfied the proposed modification will have no significant off-site flooding impacts

The SEE states that all disturbed areas in the MOD 8 proposal will be contained within the Rix's Creek Mine water catchment area and will be managed as part of the sites water management process.

Recommendation 3

OEH is satisfied the proposed modification will have no significant off-site flooding impacts and no further flooding assessment is required.

Appendix B

Public Submissions

Appendix B Public Submissions

Submission on the Rix's Creek North Mod 8

July 2018



67 Payneham Road
College Park SA 5069
P 0422 974 857
E admin@dea.org.au
W www.dea.org.au

Healthy planet, healthy people.

DEA Scientific Committee

Prof Peter Doherty AC
Prof Stephen Leeder AO
Prof Lidia Morawska
Prof Hugh Possingham
Dr Rosemary Stanton OAM

Prof Stephen Boyden AM
Prof Michael Kidd AM
Prof Ian Lowe AO
Prof Peter Newman AO
Prof Lawrie Powell AC
Dr Norman Swan

Prof Emeritus Chris Burrell AO
Prof David de Kretser AC
Prof Robyn McDermott
Prof Emeritus Sir Gustav Nossal AC
Prof Fiona Stanley AC

Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors in all Australian States and Territories. Our members work across all specialties in community, hospital and private practices. We work to minimise public health impacts and address the diseases local, national and global caused by damage to our natural environment.

The fundamental rationale of the EIS process is to assess the balance of positive and negative impacts upon which informed decisions can be made. The impacts may be environmental, health, social and economic. Whilst DEA addresses public health issues pertaining particularly to environmental causes of ill health, it is clear that good health exists within the wider context of sustainability and preservation of ecological support systems. On this basis we make this submission.

Summary finding

Due to the poor performance of the mine to date with regards to dust management, and the lack of economic benefit, this mine modification should be rejected.

Preamble

DEA makes this submission to highlight the harms from air pollution that will occur if this proposal proceeds.

Relevant to this submission is the *DEA Policy on air quality*² and several recent submissions on air quality, coal mining and coalfired power station pollution in the Hunter region:

Submission on the proposed amendment to prohibit open cut mining at Drayton South

<https://www.dea.org.au/wp-content/uploads/2017/12/Submission-to-the-open-cut-mining-prohibition-for-Drayton-South-12-17.pdf>

Clean Air for NSW Consultation Paper submission

<https://www.dea.org.au/wp-content/uploads/2017/02/Clean-Air-for-NSW-Consultation-Paper-submission-01-17.pdf>

Rix's Creek Continuation Project submission

https://www.dea.org.au/wp-content/uploads/2017/07/Rixs_Continuation_submission_12-15.pdf

Health effects: Local air quality

The modification to Rix's Creek mine should be rejected on the basis that it is causing continual breeches of air quality in the surrounding areas adding to the widespread effect on human health from coal mining.³

The current dust management plans are an abject failure and the mine should not be allowed to continue due to its adverse effects on respiratory health for nearby residents.

There are 2 air quality monitoring stations in proximity to the mine, Camberwell to the north west, and Singleton North West to the south east. These monitors are adjacent to residential areas and therefore record the exposure of the general population, including children and the elderly who are more sensitive to respiratory exposures.

Examining the NSW Office of Environment and Heritage record for PM₁₀ from the start of 2015 to July 2018, shows that in Camberwell there have been 76 exceedances of the daily standard for PM₁₀ of 50 µg/m³, and in Singleton NW there have been 31 exceedances over this three-and-a-half-year period. For Camberwell this is 21.7 exceedances per year, and for Singleton NW this is 8.9 exceedances per year. Camberwell had a maximum 24-hour average value of 101.5 µg/m³, more than double the standard.⁴

Exposure to particle pollution in the PM₁₀ size range has been associated with heart disease, stroke and respiratory disease including lung cancer.⁵ This level of exposure poses an unacceptable risk to the adjacent population and is sufficient grounds for the mine activities to be rejected.

The air report by Todoroski Air Sciences dated 15 August 2017 provided by the proponent shows that the modification will lead to no decrease in dust emissions and will even cause a slight increase. Coal mines in the Hunter Valley are supposed to operate with dust control measures under a program known as *Dust Stop*. These measures are clearly ineffective as the continued exceedances of air quality standards demonstrates.

Health effects: Regional air quality

The report on air quality makes no mention of SO₂ and CO₂ emissions from spontaneous combustion of exposed coal. This is a recognised problem when uneconomic coal is part of the overburden, and when there is residual coal in the wash plant rejects.⁶

Carbon dioxide from this source contributes to global climate change and is a source of major environmental damage. Sulphur dioxide from spontaneous combustion contributes to health effects directly as a respiratory irritant, and by formation of sulphate particles which are a component of fine particle pollution. Sulphate particles can travel hundreds of kilometres and contribute to poor health across the population of the Hunter and even Sydney.⁷

Without specific assessment of the coal component of the overburden and rejects, and the susceptibility to spontaneous combustion, the assessment of air quality effects is incomplete and hence inadequate to make a decision to approve the modification.

Employment effects

The application document titled *Modification 8 to DA 08_0102* clearly states that there will be no capital investment due to the modification and it will create no construction or operational jobs, so there is clearly no local economic benefit from the modification.

Conclusion

Due to the poor performance of the mine to date with regards to dust management, and the lack of economic benefit, this mine modification should be rejected.

References

¹ http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9459

² <https://www.dea.org.au/wp-content/uploads/2014/05/DEA-Policy-Ambient-Air-Pollution-June-2017.pdf>

³ https://www.dea.org.au/wp-content/uploads/2017/07/DEA-Health-Toll-of-Coal-Fact-Sheet_final.pdf

⁴ Data downloaded from <http://www.environment.nsw.gov.au/AQMS/search.htm> on 23 July 2018

⁵ Review of the health impacts of emission sources, types and levels of particulate matter air pollution in ambient air in NSW. Woolcock Institute of Medical Research, Centre for Air Quality and Health Research and Evaluation (CAR). Produced for NSW Environment Protection Authority and NSW Ministry of Health, Environmental Health Branch. Neil Hime Christine Cowie Guy Marks. December 2015.

⁶ Spontaneous Combustion in Open Cut Coal Mines — Recent Australian Research Carras, JN, Day, S, Saghafi, A and Roberts, OC, in Aziz, N (ed), Coal 2005: Coal Operators' Conference, University of Wollongong & the Australasian Institute of Mining and Metallurgy, 2005, 195-200.

⁷ Sydney Particle Characterisation Study PM2.5 Source Apportionment in the Sydney Region between 2000 and 2014 David D Cohen, Armand J Atanacio, Eduard Stelcer, David Garton Australian Nuclear Science and Technology Organisation. 2016, NSW EPA.

26th July 2018

Dear Department of planning

I object to the modification on these grounds,

1. The Department's failure to identify non-compliance lease zones in the last eight years and the failure of checking systems in place is now proven to be inadequate, below standard if in the last two years there has been two cases in the Singleton area of mining outside the mine lease boundary.
That all modification approvals to the Integra and Rixs creek complex including the underground owned by Glencore have all the lease boundaries checked and approved by independent specialist which the public has a direct link to the process to ensure clear independence.
2. The non-compliance of the lease area is still being utilized as a haul road and the perceived perception from the landholders of the village of Camberwell that the department and the proponent believe this is acceptable behaviour to act in breach of the Act, which would be considered breach of the law.
3. The Landholders of the village of Camberwell have been exposed to poor air quality since 2010-2017 of 267 alerts initiated from Camberwell monitor of 24hour Pm10 rolling average of exceedances of national air quality standard and 135 days of daily exceedances of PM10. Which clearly indicates that the village of Camberwell is heavily impacted by cumulative air quality and the location of the premise to the village has contributed to the poor air quality, therefore the landholders should be considered in the acquisition area and have the right of acquisition on request.
4. The landholders of the village of Camberwell have been exposed to noise levels from the haul road of the last eight years and has contributed to the overall noise airshed including the highway, which was not apart of the original EIS in 2010, which means the community of Camberwell have been ultimately lied to and the perceived perception of been mislead when making a complaint when the haul road and mining activities were not meant to be in that areas and endured impacts related to the operation which should have not been activated.
5. The area should now be rehabilitated and returned to the natural state before disturbed without consent, ownership of the land as stated does not mean you can mine without consent, this action was a clear breach of trust and there is no cost analysis report of the impact on the village of Camberwell and the surrounding resident of the related infringement or breach of law.
6. As members of the Community of Camberwell are away on leave and the timeframe was so short to make a submission, it would be deemed unfair to them the right to make a comment, so therefore this request a larger timeframe for submission response especially in
7. this case it is to cover an act of breach to make a comment and specially enlighten that the proponent has made a substantial benefit from the use of the haul road at cost to others.



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Status - All ▼

Decider - All ▼

Date Determined

From: to:

(Leave blank for any dates)

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John McInerney, of **Camberwell NSW**, made the following submission on the project:
Rix's Creek North MOD 8

Objects to this project

“

We, John and Judith McInerney of 76 McInerney Road Camberwell NSW 2330 strongly object to the modification application (PA 08_0102) from Bloomfield Collieries Pty Ltd.

We are experiencing increased dust and noise pollution in our area. Our water collection tanks have to be cleaned more regularly to provide us with reasonably unpolluted water for our domestic use. The water filters have to be changed monthly.

Roofs, solar panels and gutters have to be pressured cleaned bi monthly as is all the external of our home. The sludge from our gutters is removed from our lawn because it will kill the grass if left there and the question should be asked what is the composition of this black sludge that is also washed into our water tanks and that is then used inside our family home.

The mine production noise can disturb our sleep during the night with loud mechanical noises from mine vehicles and machinery used in the course of the excavation of coal and overburden. The intensity of this noise pollution depends on prevailing winds and inversions.

It is right in saying whilst being in such close proximity to Rix's Creek open cut we have had two newsletters and a phone conversation which we instigated when we complained about the dust caused from their blast. To us we are not kept in the loop enough with the happenings of Rix's Creek Open Cut.

We believe our objection to be a reasonable objection to any more modifications causing an increased risk to our health and our once rural lifestyle

Your Sincerely
John and Judith McInerney



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Search Projects

Project Title or Location Name

Local Government - All ▼

Site Type - All ▼

Assessment Type - All ▼

Status - All ▼

Decider - All ▼

Date Determined

From: to:
(Leave blank for any dates)

(Name withheld) , of **Camberwell NSW**, made the following submission on the project:
Rix's Creek North MOD 8

Objects to this project

“

Dear Sir/Madam

I'm writing to you about Rix's Creek North Open Cut Project and under no certain substances am I condoning this mine while I live within 2500m of the blast zone and if you take it to the edge of my property a lot closer.

I live with my wife and eldest son on property on the survey map.

I've lived on this property for 20+ years and yes, I can talk about the :

Noise

Dust

Water

Lights

Explosions

and I agree with all the comments that are made about these items from the land holders, but I want to talk about my life living with these mines.

This property I bought was going to be where we were going to retire, and we love it.

But the pain and anxiety that we have lived with, over the years, the mine is just taking us for granted, and is unacceptable.

We had plans of spending money on the house to improve our quality of life, but living in fear of these mines just doing what they like.

I cannot justify the cost.

I will do what I can to stop it from happening.

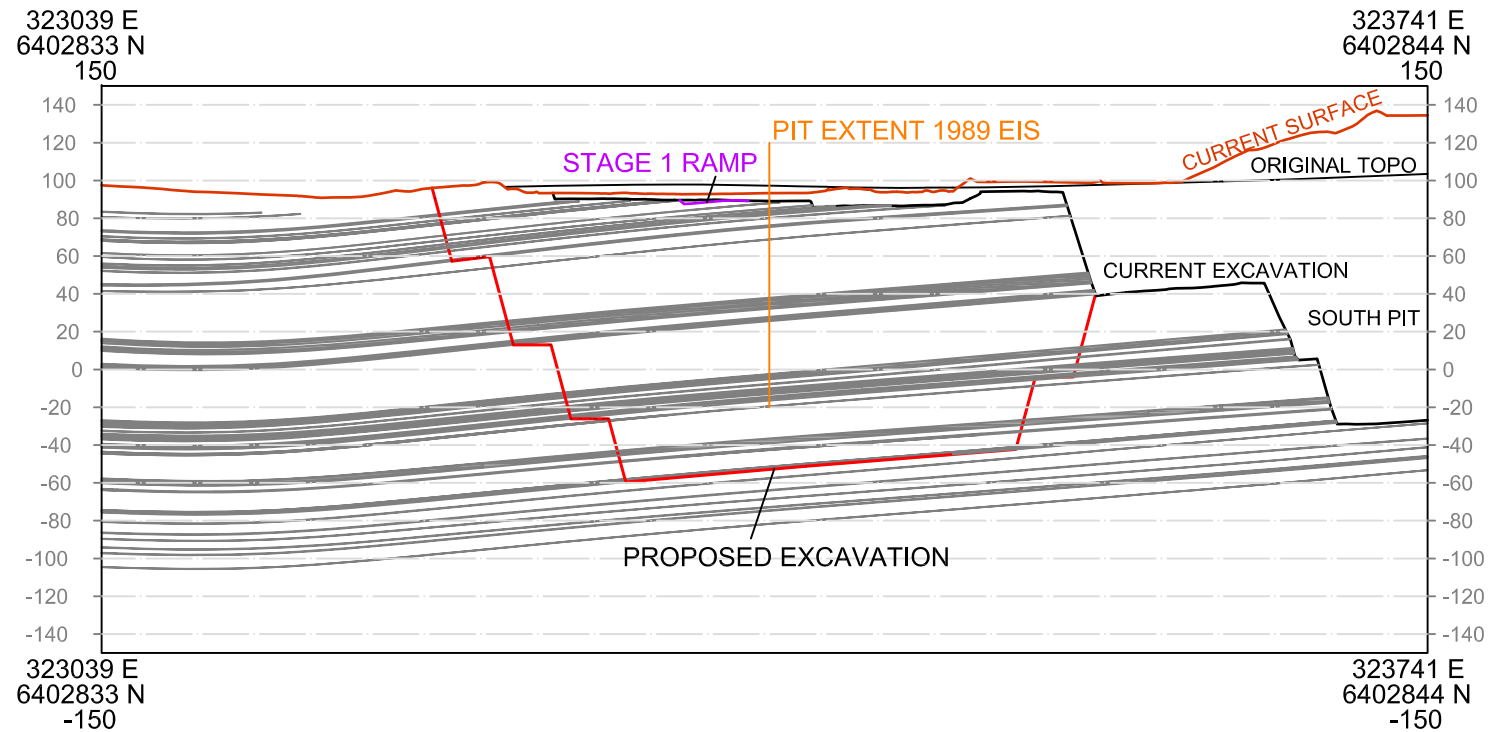
One other thing, this letter we received was dated the 11-07-18 but we didn't receive it to the 23-07-18 leaving us 3 days notice. this is also unacceptable as it wouldn't of taken 2 weeks to get here

Yours sincerely

Appendix C

Cross Sections

Appendix C Cross Sections



Rixs Creek Mine
PO Box 4, East Maitland
NSW 2323
Ph: 02 6578 8822

RIXS CREEK COLLIERY

RCN
Camberwell Pit
Proposed Extra Mining Area - Section EW

Dwg No:
cs_ramp_ew_2d

Plan No:
cs_ramp_ew_2d

Rev:

Date:
10.10.2018

Scale:
1:4,000

Drawn:
T. Gentle

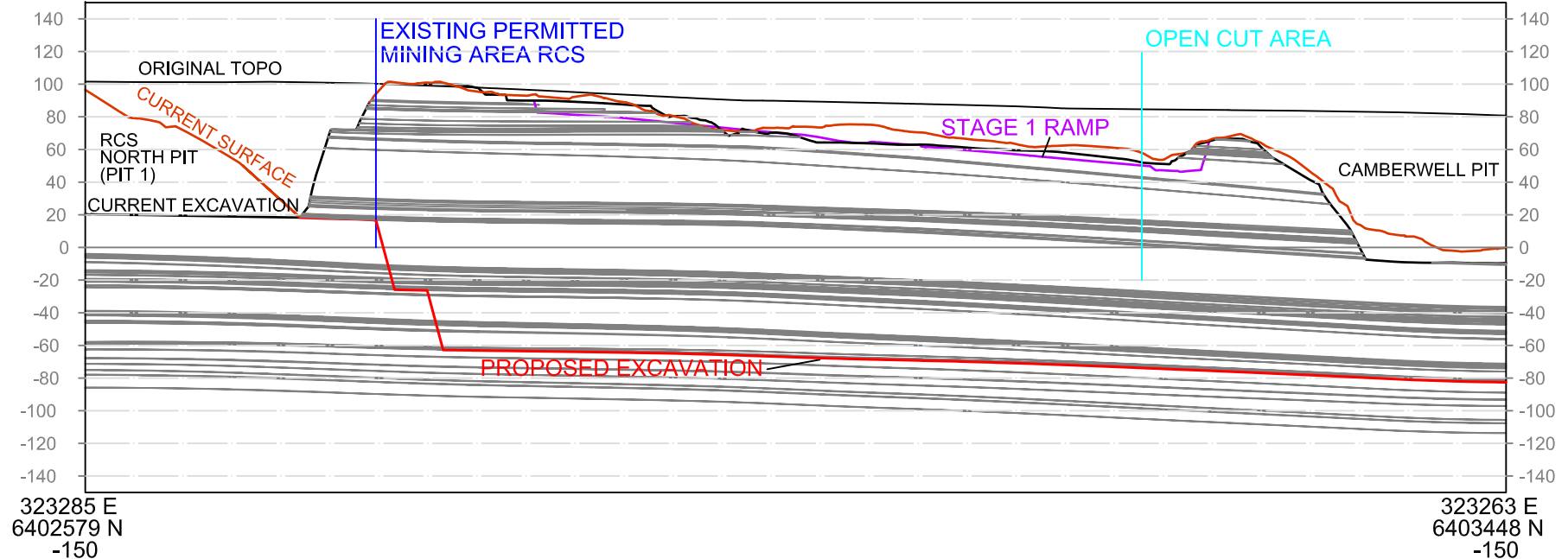
Checked:
T. Gentle

Approved:
—

Sheet:
A4

323285 E
6402579 N
150

323263 E
6403448 N
150



323285 E
6402579 N
-150

323263 E
6403448 N
-150



Rixs Creek Mine
PO Box 4, East Maitland
NSW 2323
Ph: 02 6578 8822

RIXS CREEK COLLIERY

RCN
Camberwell Pit
Proposed Extra Mining Area - Section NS

Dwg No:
cs_ramp_ns_2d

Plan No:
cs_ramp_ns_2d

Rev:

Date:
10.10.2018

Scale:
1:4,000

Drawn:
T. Gentle

Checked:
T. Gentle

Approved:
—

Sheet:
A4

Appendix D

Aboriginal Heritage Due Diligence Assessment

Appendix D Aboriginal Heritage Due Diligence Assessment

13 November 2018

Geoff Moore
Chief Development Officer
Rix's Creek North Mine
The Bloomfield Group
PO Box 4
East Maitland NSW 2323

Dear Geoff,

Re: Aboriginal Archaeological Due Diligence Assessment, Rixs Creek North Open Cut Project (PA 08_0102) Modification 8

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by The Bloomfield Group (TBG) to undertake an Aboriginal archaeological due diligence assessment in response to the Office of Environment's (OEH) submission to TBG's Statement of Environmental Effects (SEE) for the Rix's Creek North (RCN) Open Cut Project (PA 08_0102), Modification 8 (the Modification). AECOM understands that OEH requested that an Aboriginal cultural heritage assessment be prepared for the proposed Modification to determine if any Aboriginal heritage values would be impacted by the Modification. Given the condition of land within the Modification footprint, AECOM has prepared an Aboriginal due diligence assessment to address OEH's comments.

The purpose of this assessment is to identify Aboriginal heritage constraints for the proposed Modification, to provide RCN with appropriate management advice and to address OEH's response to submission for the Modification. The contents of this letter report have been compiled in accordance with the NSW OEH's *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010* (DECCW, 2010). This code has been developed to assist proponents in exercising due diligence when carrying out activities that may harm Aboriginal objects.

2.0 Proposed Activity

TBG is seeking approval for an expanded mining area for a 7.2 ha area of land located within the TBG landholding from the Camberwell South Pit mining area to the consent boundary. The Modification relates to remedying a minor compliance issue and seeks approval to mine by open cut means, a 7.2 hectare portion of land that was not previously included within the approved mining footprint but has been severely disturbed by mine-related ground disturbance activities.

3.0 Relevant Legislation

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by OEH, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Secretary of OEH responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- An *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains); and
- An *Aboriginal place* is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 80B of the *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* (NPW Regulation), and the demonstration of due diligence.

An Aboriginal Heritage Impact Permit (AHIP) issued under Section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal

objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. Applications for an AHIP must be accompanied by assessment reports compiled in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b). Applications must also provide evidence of consultation with the Aboriginal communities. Consultation is required under Part 8A of the NPW Regulation and is to be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons

Pursuant to Section 89J of the *Environmental Planning and Assessment Act 1979* (EP&A Act), AHIPs are not required for projects approved under Division 4.1 of Part 4 of the EP&A Act (formerly Part 3A). Impacts to Aboriginal heritage values associated with approved State Significant Development (SSD) projects are typically managed under Aboriginal Heritage Management Plans (AHMPs). AHMPs are statutorily binding once approved by the Department of Planning and Environment (DP&E).

Section 89A of the NPW Act requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances, including Division 4.1 projects.

4.0 Data Sources

As part of this due diligence assessment a review of available data and previous heritage reporting was undertaken for the 7.2 ha area of land. Information regarding the known and potential Aboriginal heritage resource of the proposed Modification area was obtained from:

- A review of the landscape context of the Modification area, with particular attention paid to its Aboriginal archaeological implications;
- A search of the Aboriginal Heritage Information Management System (AHIMS) database;
- A review of Aboriginal archaeological site data held by AECOM for the Rix's Creek mine complex;
- A review of the findings of previous Aboriginal archaeological investigations relevant to the Rix's Creek Mine complex. Refer to the reference list provided in Section 12.0; and
- Visual inspections of the Modification area by AECOM senior heritage specialist Dr Darran Jordan on 31 October 2018.

The results of the database review and previous archaeological reporting as they relate to the Modification area are discussed in the following sections.

5.0 Landscape Context

Consideration of the landscape context of the proposed Modification area is predicated on the now well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur. Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities will have played an important role in influencing how Aboriginal people moved within and utilised their respective Country. Among other things, such variables will have affected the availability of suitable camp sites, drinking water and raw materials for the production of stone and organic implements, as well as economic plant and animal resources. At the same time, an assessment of historical and current land use activities, as well as geomorphic processes such as soil erosion and bioturbation, is critical to understanding the formation and integrity of archaeological deposits. In regards to the landscape context the following observations are made in regards to the Modification area:

- Available topographic data and field observations indicate that the Modification area originally consisted of the north side of a moderately sloped hill including its lower, middle and upper portions, as well as an associated creek flats. However, the topography of the areas has been significantly modified as a result of mine-related activities and now comprises part of a haul road and overburden emplacement;
- As shown on Figure 1, the Modification area does not currently contain any watercourses. Prior to broad-scale disturbances from mine related activities, a south-north trending 2nd order tributary of Station Creek was partially located in the north-western portion of the Modification area and ran along its western boundary (approximately 30 m distant). In addition, part of a 1st order drainage depression was located in the south-eastern portion of the Modification area cutting through a middle slope. However, no remnant of either creek currently remains. Existing archaeological data for the Hunter Valley indicate a strong trend for the presence

of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e., flood/drainage plains), terraces and bordering slopes. Although this distribution pattern can be attributed in part to geomorphic dynamics and archaeological sampling bias, with extensive fluvial erosion activity along watercourses resulting in higher levels of surface visibility and, by extension, concentrated survey effort, an occupational emphasis on watercourses is supported by the results of several large scale subsurface salvage projects (e.g., Koettig, 1992, 1994; Kuskie & Clarke, 2004; Kuskie & Kamminga, 2000; MacDonald & Davidson, 1998; OzArk, 2013; Rich, 1992; Umwelt, 2006). Collectively, these projects have also shown that assemblage size and complexity tend to vary significantly in relation to both landform and stream order, with larger, more complex assemblages concentrated on elevated, low gradient landform elements adjacent to higher order streams;

- Topsoils across the Modification area have been completely removed and now comprise portions of overburden transported to the site to construct the haul road. However, prior to impacts, soils within the Modification area would have likely been consistent with those of the Roxburgh (rx) soil landscape, comprising duplex or texture-contrast soils. As highlighted by Dean-Jones & Mitchell (1993) and others (e.g., Balek, 2002; Johnson, 1989), excavated finds assemblages from archaeological sites with active biomantles are subject to a range of interpretive constraints, with intact depositional stratigraphy unlikely to be preserved and inset archaeological features (e.g., hearths and heat treatment pits) representing the only reliable means of dating (with any specificity) intercepted archaeological events (Mitchell, 2009: 4). Any stone artefacts discarded at the surface in landscapes with active biomantles are likely, over time, to have been incorporated into the soil profile through bioturbation, with depth of artefact burial ultimately corresponding to the base of major biological activity (i.e., the base of the biomantle). Where biomantles remain relatively undisturbed, horizontal patterns of artefact discard may be preserved. However, in heavily disturbed contexts, the preservation of such patterning is unlikely (Mitchell 2009: 4);
- Reference to the Hunter Coalfield Regional 1:100 000 Geology Map indicates that the surface geology of the Modification area has been mapped as part of the Vane Subgroup of the Wittingham Coal Measures. This unit has been described as consisting of coal seams, siltstone, lithic sandstone, shale and conglomerate. In common with the Hunter Valley as a whole, flaked stone artefact assemblages from the Rix's Creek Mine complex attest to an emphasis on the use of silcrete and silicified tuff. Alongside other, less commonly exploited raw materials (e.g., quartz, petrified wood, quartzite), both of these materials are available in gravel deposits associated with the nearby Hunter River (i.e., Holocene gravel banks and elevated palaeochannel remnants);
- Existing vegetation within and surrounding the Modification area has been completely removed; and
- Consistent with available aerial imagery, field observations indicate that all land within the Modification area has been grossly modified from mine related activities and retains no integrity.

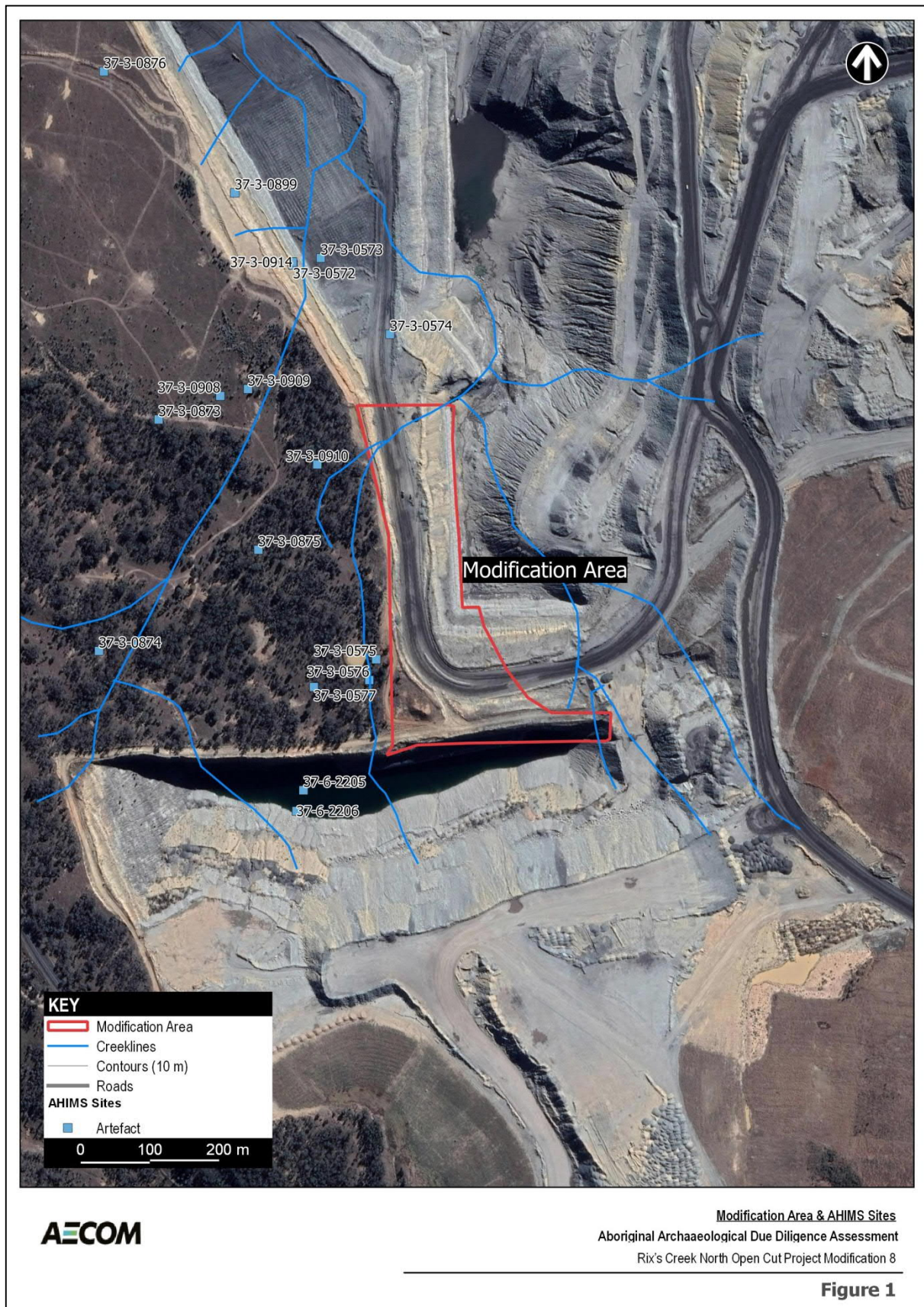


Figure 1 Modification Area & AHIMS Sites

6.0 AHIMS Database

The AHIMS database, administered by OEH, contains records of all Aboriginal objects reported to the Director General of the Department of Premier and Cabinet in accordance with Section 89A of the NPW Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

A search of the AHIMS database on 7 November 2018 for a 3 x 3 km area surrounding the Modification area returned 67 site entries (Table 1). As is typical for the Hunter Valley, open artefact sites are the most common site type represented within the AHIMS search area, accounting for 98.5% of registered sites (n = 66) with the remaining site being an Aboriginal art site.

Consideration of the location of previously identified AHIMS sites indicates that no sites are mapped within the Modification area, with the closest sites – open artefact site 'SC-15' (37-3-0575) located 20 m to the west and open artefact site 'SC-16' (37-3-0576) located 30 m to the west. Site details are provided in Table 2 below.

Table 1 AHIMS Search Results

Site type	AHIMS feature(s)	Number	%
Open artefact site	AFT	66	98.5
Art (Pigment or Engraved)	ART	1	1.5
Total	-	67	100

Table 2 AHIMS within 50 m of the Modification area

AHIMS Site ID	Site name	AHIMS Centroid Coordinates		Site type	AHIMS status	Reference
		MGAE	MGAN			
37-3-0575	SC-15	323185	6402879	Artefact	Valid	(HLA-Envirosciences Pty Ltd, 1999)
37-3-0576	SC-16	323175	6402849	Artefact	Valid	(HLA-Envirosciences Pty Ltd, 1999)

Regarding sites SC-15 (37-3-0575) and SC-16 (37-3-0576), a review of the associated site cards indicates that these are duplicates of sites 'Station Creek 15' (37-6-2205) and 'Station Creek 16' (37-6-2206) with the latter sites re-registered by Navin Officer Heritage Consultants in 2008 and subsequently mapped with an incorrect datum by AHIMS. No Aboriginal Heritage Impact Permits (AHIPs) are listed against the sites indicating they are currently 'Valid'.

7.0 Previous Aboriginal Heritage Assessments – Rixs Creek Mine Complex

The Aboriginal archaeological record of the Rix's Creek Mine complex has been the subject of numerous surface and subsurface archaeological investigations over the past four decades. Significant investigations include those undertaken by Brayshaw (1981, 1982, 1983, 1986), Koettig (1990a, 1990b; 1992a, 1992b), AECOM (2010, 2012, 2013, 2014), Navin Officer (2008), Insite Heritage (2009), Envirosciences (1994), ERM (2009) and HLA-Envirosciences (1999, 2007). Key observations to be drawn from a review of the results of these investigations are as follows:

- Open artefact sites (i.e., artefact scatters and isolated artefacts) are the most common site type across the complex;
- Existing archaeological survey data for the complex indicate a strong trend for the presence of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e., flood/drainage plains), terraces and bordering lower slopes. Although this distribution pattern can be attributed in part to geomorphic dynamics and archaeological sampling bias, with extensive fluvial erosion activity along watercourses resulting in higher levels of surface visibility and, by extension, concentrated survey effort, an occupational emphasis on watercourses is supported by the results of subsurface investigations (e.g., AECOM, 2012; Koettig, 1992a);
- Flaked stone artefacts dominate archaeological finds assemblages from recorded open artefact sites across the complex;

- Outside of 'knapping floors', a relatively common component of the open site record of the complex, associated archaeological features (e.g., hearths and heat treatment pits), have proven elusive;
- Unless severely affected by erosion, most areas, irrespective of the presence or absence of associated surface evidence, will contain subsurface archaeological deposits, albeit of highly variable character and extent;
- Assemblage size and complexity tend to vary significantly in relation to stream order and landform, with larger, more complex¹ assemblages concentrated on elevated, low gradient landform elements adjacent to higher order watercourses. Outside of these contexts, surface and subsurface artefact distributions have typically been found to be sparse and discontinuous and are often referred to as 'background scatter', being "artefactual material which is insufficient in number or in association with other material to suggest focussed activity in a particular location" (Douglas and McDonald, 1993);
- Where sampled through test and/or salvage excavation, artefact-bearing soil profiles have been shown to exhibit texture contrast or duplex properties, with loamy A soil horizons of variable depth overlying clay B horizons. Artefacts within texture contrast soil profiles will be restricted to the biomantle component of the profile (typically the A soil horizon);
- Available archaeological data indicates that most, if not all, of the Aboriginal archaeological materials identified within the complex to date are of mid-to-late Holocene antiquity. Materials of Late Pleistocene / early Holocene have yet to be identified but may be present in valley floor contexts (see, for example, Koettig, 1986b, 1992a, 1992b);
- Silcrete and silicified tuff were the dominant raw materials for flaked stone artefact production, with silcrete artefacts typically exhibiting evidence of deliberate thermal alteration;
- Flaked stone assemblages tend to be dominated by flake debitage (*sensu* Andrefsky, 2005), with formed objects (i.e., cores and retouched implements) comparatively poorly represented. Backed artefacts (i.e., Bondi points, geometric microliths and elouera) will dominate the retouched components of surface and excavated assemblages; and
- Knapping floors, where present, will exhibit evidence indicative of systematic backed artefact manufacture.

8.0 Previous Aboriginal Heritage Assessments – Modification Area

Two previously completed heritage assessments have been completed within or directly adjacent to the Modification area. These are summarised below.

Archaeological Survey of proposed Waste Rock Dump, Camberwell, NSW (HLA-Envirosciences Pty Limited, 1999)

In 1999, Camberwell Coal Pty Ltd investigated the possible use of the area west of its then current mining operations for waste rock storage. A one-day survey of the area was undertaken which included survey of the north-western portion of the Modification Area along the Modification area's previous creekline and adjacent to its western boundary (see Figure 2). HLA (1999) identified 19 Aboriginal sites (SC-1 to SC-19) comprising of 16 isolated artefacts and three open artefact scatters. The sites were all assessed as being of low significance, with the exception of SC-1 which was assigned medium significance. Sites SC-15 and SC-16 were identified during this survey adjacent to the Modification area's western boundary.

The Integra Open Cut Project (Navin Officer Heritage Consultants, 2008)

In 2008, Integra Coal Operations Pty Ltd proposed to extend its open cut operations to the north of its then current operations and to construct supporting infrastructure. The area proposed for the works and the focus of the archaeological survey was the area assessed by HLA in 1999 and included survey along the western boundary of the Modification area including revisiting sites SC-15 and SC-16 (see Figure 3). Fieldwork was undertaken over seven days with 47 Aboriginal sites consisting of 33 artefact scatters, 11 isolated artefacts, three potential scarred trees and six previously recorded sites. Navin Officer found a pattern of artefact distribution where the majority of artefacts, 51.7%, were identified on the valley floors, 26.6% on mid slopes, 15.8% on lower slopes and 5.9% on upper slopes. Artefactual material consisted of 77.1% tuff (likely to be mudstone) and 18.6% silcrete, with the

¹ Those containing a wider variety of raw materials and technological types and/or higher mean artefact densities and features such as knapping floors and hearths.

remainder being a mixture of quartz and volcanic rocks. Artefact types consisted of flakes, broken flakes, backed artefacts, cores and hand axes. As with numerous other studies undertaken in the Hunter Valley, Navin Officer found that the majority of sites were associated with creeklines and that many of these sites had a high potential for archaeological deposit.

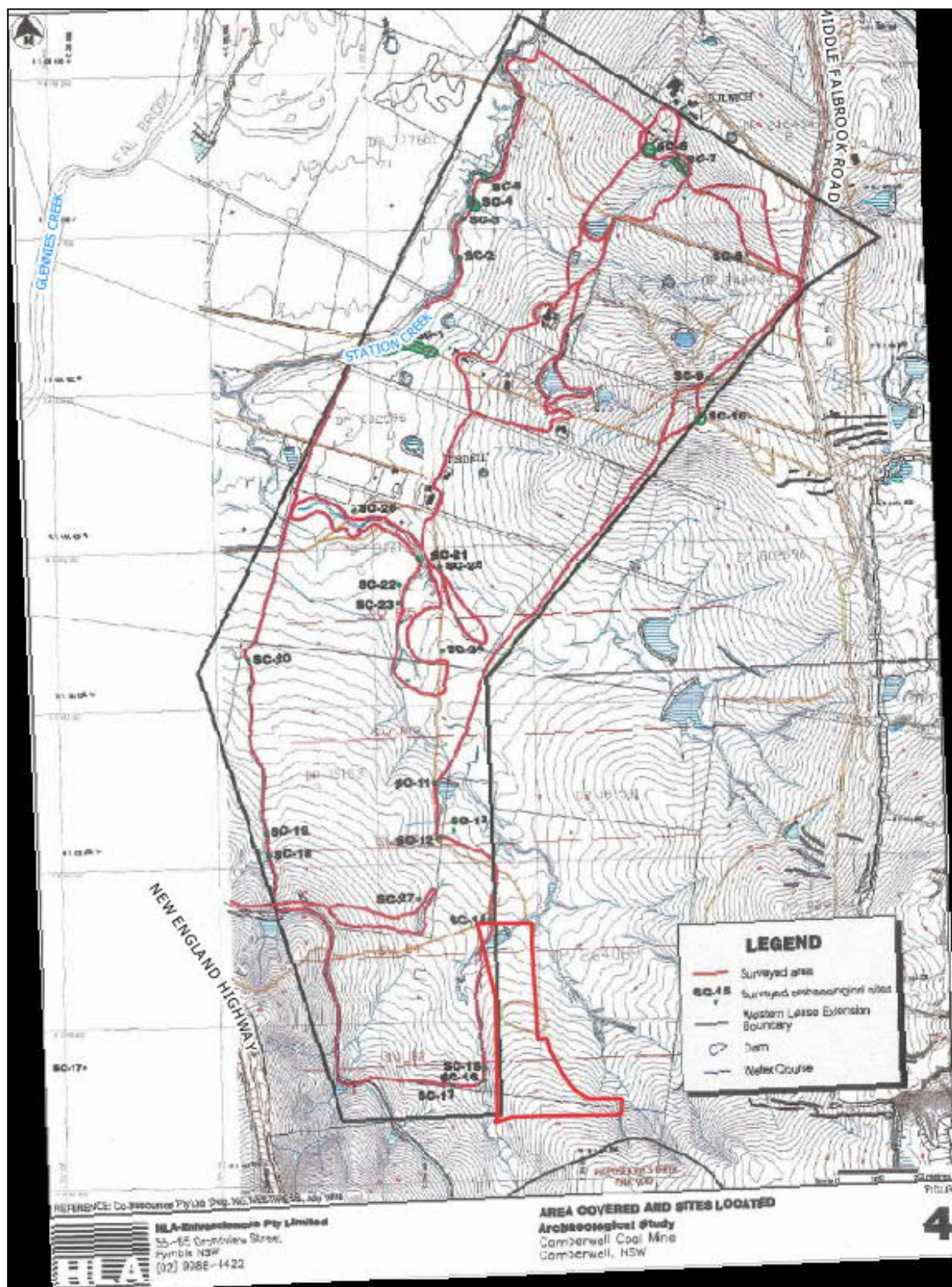


Figure 2 Location of sites recorded by HLA and survey transects (1999) (Source: HL,1999, Figure 4)

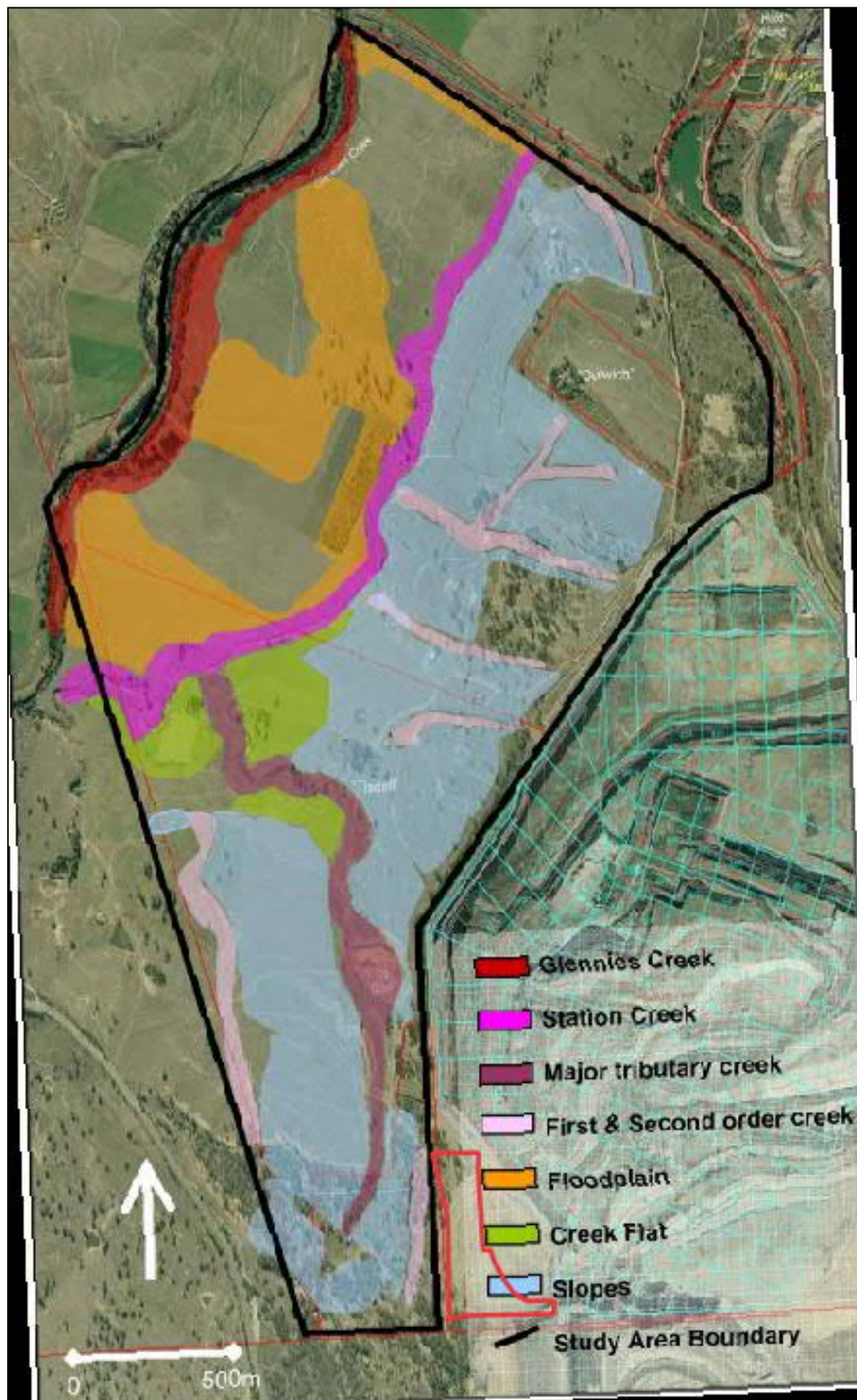


Figure 3 Location of sites recorded by Navin Officer (2008) (Source: Navin Officer, 2008, Figure 4)

9.0 Visual Inspection

A visual inspection of the Modification area was undertaken by AECOM senior heritage specialist Dr Darran Jordan on 31 October 2018. The purpose of this inspection was to help establish whether impacts have previously or will harm any Aboriginal objects. During the visual inspection notes were taken regarding Ground Surface Visibility (GSV), Ground Integrity (GI, i.e. land condition), archaeological sensitivity and impact risk. Impact risk was determined on the basis of archaeological sensitivity, as well as the nature of proposed Project-related impacts.

Consistent with examined historical aerials, a visual inspection of the Modification area indicates that land within it has been subject to high levels of disturbance with little or none of the original land surface remaining. Landscape impacts are the result of mine-related activities including the construction of a haul road and overburden dumping (Plates 1 -2).

During the inspection, no evidence of past Aboriginal occupation was observed nor were any naturally occurring deposits of stone suitable for flaked stone artefact manufacture. Taking into account the nature and extent of past ground disturbance activities across the Modification area, as well as the results of the previous Aboriginal archaeological assessments in the greater Rixs Creek Mine Complex, the Aboriginal archaeological sensitivity of land within the Modification area was assessed in the field as nil. The potential for impacts to Aboriginal objects within the Modification area was likewise assessed as negligible.



Plate 1 View north from western side of Modification area showing haul road and associated mine activities (Source: AECOM, 2018).



Plate 2 View south from western side of Modification area showing haul road and associated mine activities
(Source: AECOM, 2018).

10.0 Key Findings

The key findings of this Aboriginal archaeological due diligence assessment are as follows:

- A review of existing Aboriginal archaeological data for the Modification area, including the results of a search of the AHIMS database, indicates that no previously recorded Aboriginal sites are located within the Modification area;
- No Aboriginal objects were identified during the visual inspection component of this assessment;
- A review of the historical aerials and topographic maps indicate that prior to impacts (which occurred between the years 1999-2006) the majority of the Modification area comprised moderately inclined slope considered to be of low archaeological sensitivity. However, the north-western portion of the Modification area contained part of a 2nd order creek line and associated creek flats that are considered archaeologically sensitive;
- A review of previously completed Aboriginal heritage assessments indicates that the sensitive portion of the Modification area (i.e., creek line/creek flat) was surveyed for Aboriginal objects by HLA (1999) prior to impacts with no objects/sites identified; and
- Land within the Modification area is currently highly disturbed from mine-related activities with negligible potential for Aboriginal objects to be present.

11.0 Recommendations

On the basis of the above key findings, the following recommendations are made:

1. No further Aboriginal heritage works or reporting are considered warranted for the Modification area; and
2. In the event that Aboriginal objects, including possible human skeletal material (remains), are identified at any point during the proposed drilling program, the procedure outlined in Appendix A should be followed.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'G. Oakes'.

Geordie Oakes
Archaeologist
Geordie.Oakes@aecom.com
D +61 2 8934 0610

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Appendix A – Management of Previously Unrecorded Aboriginal Objects

Management of Previously Unrecorded Aboriginal Objects

Should a suspected Aboriginal site be identified at any point throughout the life of the drilling program, the following standard procedure should be adopted:

1. All works must cease immediately in the area to prevent any further impacts to the site;
2. Notify the Rixs Creek's Mine Environmental Officer;
3. Engage a suitably qualified archaeologist to determine the nature, extent and significance of the find and provide appropriate management advice. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts; and
4. Prepare and submit an AHIMS site card for the site.

Human Skeletal Remains

In the event that potential human skeletal remains are identified within the Project area at any point during the proposed activity, the following standard procedure should be followed:

1. All work in the vicinity of the remains should cease immediately;
2. The location should be cordoned off - work can continue outside of this area as long as there is no risk of interference to the remains or the assessment of the remains;
3. Where it is instantly obvious from the remains that they are human, the Project Manager (or a delegate) should inform the NSW Police by telephone (prior to seeking specialist advice)
4. Where uncertainty over the origin (i.e., human or non-human) of the remains exists, a physical or forensic anthropologist should be commissioned to inspect the exposed remains *in situ* and make a determination of origin, ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or modern):
 - a. If the remains are identified as modern and human, notify NSW Police;
 - b. If the remains are identified as pre-contact or historic Aboriginal, notify OEH using their Environment Line (131 555); and
 - c. If the remains are identified as historic (non-Aboriginal), notify the NSW Heritage Division.
5. An Aboriginal community representative must be present where it is reasonably suspected burials or human remains may be encountered. If human remains are unexpectedly encountered and they are thought to be Aboriginal, the Aboriginal community must be notified immediately.
6. Recording of Aboriginal ancestral remains must be undertaken by, or be conducted under the direct supervision of, a specialist physical anthropologist or other suitably qualified person.
7. Archaeological reporting of Aboriginal ancestral remains must be undertaken by, or reviewed by, a specialist physical anthropologist or other suitably qualified person, with the intent of using respectful and appropriate language and treating the ancestral remains as the remains of Aboriginal people rather than as scientific specimens.

Appendix E

Biodiversity Credit Estimate

Appendix E Biodiversity Credit Estimate

12 December 2018

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Geoff Moore
Chief Development Officer
The Bloomfield Group
PO Box 4
East Maitland, NSW, 2323

Re: Modification 8 - offset assessment of previously cleared area

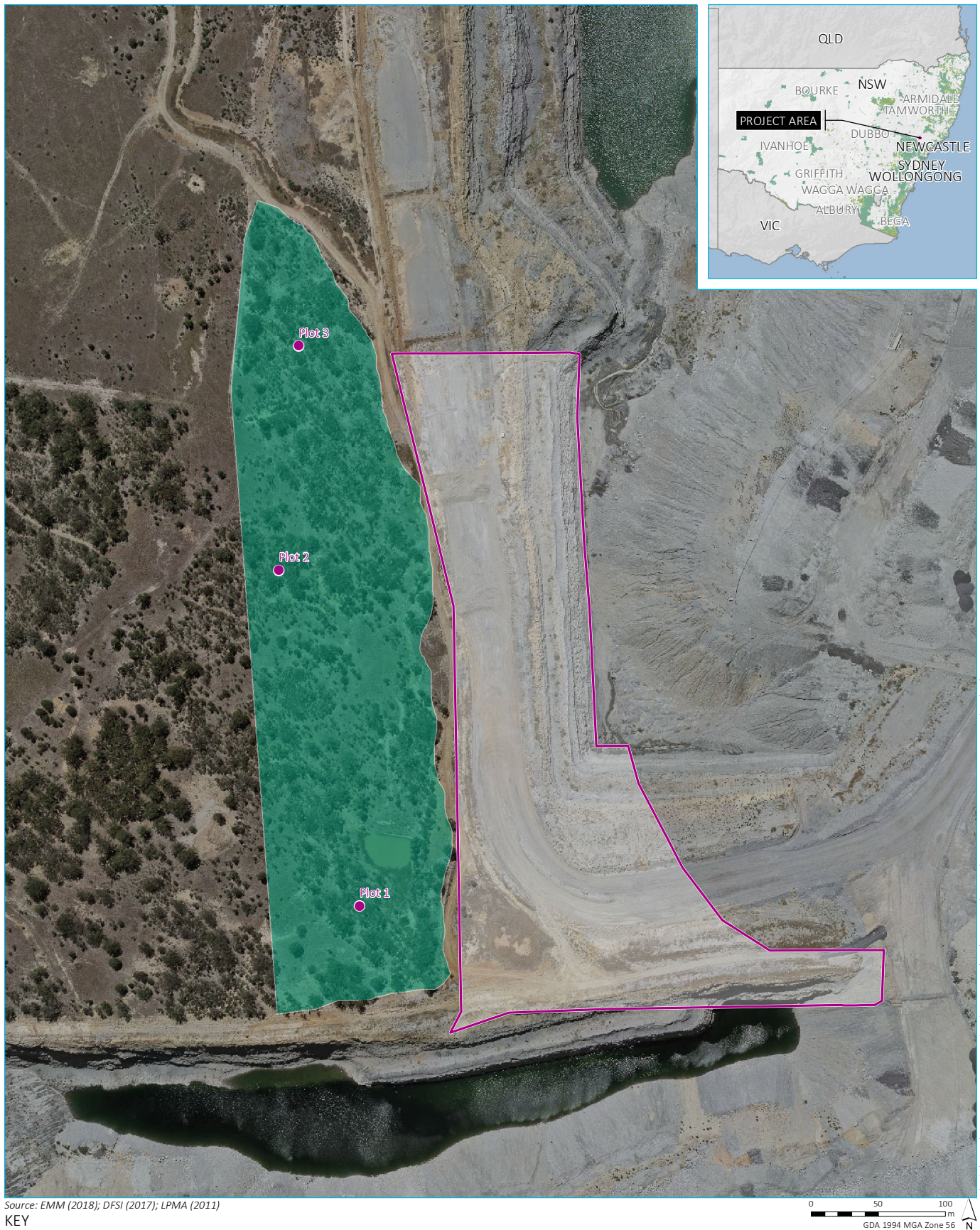
Dear Geoff,

1 Introduction

The Bloomfield Group (Bloomfield) are currently undertaking an environmental assessment for a modification to the Rix's Creek North open cut mine project approval, (Mod 8). The application for the modification will be submitted to the NSW Department of Planning and Environment (DPE). Mod 8 involves consideration of a 7.19 ha which was cleared in 2002 without consent (refer to Figure 1.1).

As a response to Bloomfield's Mod 8 submission OEH has recommended that an assessment of the vegetation and habitat types likely to have been present in the Mod 8 area prior to disturbance, is undertaken to determine the biodiversity credit offsetting requirement from the removal of vegetation and habitat areas.

EMM Consulting Pty Ltd (EMM) have been engaged by Bloomfield to calculate the biodiversity credit offsetting requirement, for the previously cleared area. In August 2017, the NSW *Biodiversity Conservation Act 2016* (BC Act) commenced operation. The Act and associated Biodiversity Conservation Regulation 2017 (BC Regulation) introduced the Biodiversity Assessment Method (BAM, OEH 2017), which has been used for this assessment.



KEY

- Plot location
- ▭ Mod 8 cleared area
- Study area
- PCT - 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter - woodland

Modification 8 - extent of cleared area and BAM plot locations within adjacent woodland

Rix's Creek Continuation Project
Figure 1

2 Method

2.1 Desktop review

A desktop review of previous biodiversity assessments and vegetation mapping was undertaken to determine which vegetation communities were present historically within the now cleared area. The following sources were reviewed;

- Chapter 9 of the Integra Open Cut Project Environmental Assessment (URS 2007);
- Appendix E of the Integra Open Cut Project Biodiversity Assessment (URS 2009);
- Peake, TC. (2006) The Vegetation of the Central Hunter Valley, New South Wales. A report on the findings of the Hunter Remnant Vegetation Project. Hunter-Central Rivers Catchment Management Authority, Paterson; and
- Camberwell coal project, Camberwell Coal Joint Venture Environmental Impact Statement (EPPS & Associates 1989).

2.2 Field surveys

The study area was cleared in 2002, and the vegetation in the cleared area cannot be assessed. It was determined that the most reliable method to assess the cleared area, is to assume that the vegetation in the extant woodland immediately west of the cleared area is likely to be of the same Plant Community Type (PCT) and broad condition class. This is largely supported by the desktop review.

A site visit was undertaken on 26 October 2018, within the extant woodland west of the cleared area, hence referred to the study area (Figure 1.1). The study area was traversed on foot with vegetation mapped and aligned with NSW PCTs and assigned to vegetation zones based on their broad condition state. Vegetation was mapped in the field using GPS-enabled tablet computers using Collector for ArcGIS™.

Following the stratification of vegetation zones within the study area, native vegetation integrity was assessed using data obtained via a series of plots as per the methodology outlined in Section 5 of the BAM (OEH 2017). A total of 3 plots were collected, at each location the following was undertaken:

- one 20 x 20 m plot for assessment of composition and structure; and
- one 20 x 50 m plot for assessment of function, including a series of five 1 x 1 m plots to assess average leaf litter cover.

The assessment of composition and structure, based on a 20 x 20 m plot, recorded species name, stratum, growth form, cover and abundance rating for each species present within the plot. Percentage Cover (foliage cover) was estimated for all species rooted in or overhanging the plot, and recorded using decimals (to 1 decimal place) if less than 1%, rounded to a whole number if between 1-5%, or estimated to increments of the nearest 5% if between 5- 100%. Abundance was counted exactly (up to 20) and estimated above 20.

The assessment of function recorded the number of large trees, the presence of tree stem size class, tree regeneration, number of trees with hollows and length of fallen logs, as well as leaf litter cover within the 20 x 50 m plot and five 1 x 1 m subplots. The minimum number of plots and transects per vegetation zone was determined using Table 4 of the BAM (OEH 2017).

Compiled plot data is provided in Appendix A.

2.3 Calculation of offset quantum

In order to calculate the number of credits required to offset the clearing of vegetation within the cleared area, vegetation integrity data was inputted into the calculator associated with the BAM (OEH 2017). For the purposes of this assessment all ecosystem credit species have been included, as there is insufficient evidence to rule any species out. All species credit species have been assumed absent as assessment of species credits species would be highly speculative given that targeted surveys cannot be undertaken.

3 Results

3.1 Desktop review

The Camberwell Coal Project EIS (EPPS & Associates 1989) mapped two vegetation types within the cleared area, including;

- Induced Open Woodland, Ironbark – Grey box on upper slopes; and
- lesser quantities of Layered Woodland Ironbark – Spotted gum grassy woodland with a layer of saplings.

Vegetation mapping within the Integra assessments (URS 2007 and 2007) indicated that the area adjacent to the cleared area was Ironbark woodland and that it is the dominant remnant vegetation type within the vicinity. The report also included regional vegetation mapping (Peake 2006), which indicates Central Hunter Ironbark Spotted Gum – Grey Box Forest was present in a portion of the cleared area.

The desktop review provided a fairly consistent indication of the historical vegetation present, with an Ironbark community mapped throughout the now cleared area and adjacent extant vegetation to the west.

3.2 Field survey

A single PCT and condition zone was recorded within the study area, which is described in Table 3.1.

Table 3.1 **Vegetation zone 1 description**

Zone 1 – 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland	
PCT ID	1603
Common name	Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter
Condition class	woodland
Extent within previously cleared area	Estimated at 7.19 ha
Description	This community occurs throughout the study area. Narrow-leaved Ironbark (<i>Eucalyptus crebra</i>) is the dominant canopy species with occasional Coastal Grey Box (<i>E. moluccana</i>) present. Bulloak (<i>Allocasuarina luehmannii</i>) is the dominant midstorey species, though its occurrence is patchy; occurring as dense stands in some areas, whilst sparse in others. Ground cover is dominated by Barbed-wire grass (<i>Cymbopogon refractus</i>) and Threeawn Speargrass (<i>Aristida ramosa</i>), with occasional Broom Bitter Pea (<i>Daviesia genistifolia</i>) and Kangaroo Thorn (<i>Acacia paradoxa</i>). Exotic species coverage was low, with recorded species including Prickly Pear (<i>Opuntia stricta</i>) and Narrow-leaved Cottonbush (<i>Gomphocarpus fruticosus</i>).
Survey effort	Three plots were conducted; Plot 1-3.
Condition description	The community has historically been partially cleared for grazing, with evidence of old fence lines and tree stumps. Canopy trees now include occasional remnant large trees with a range of small to moderately sized regenerating trees. Though several exotic species were recorded within the groundcover, they occur in low densities and are a not dominate component of the community.
Characteristic species used for identification of PCT	This PCT is stated in the Bionet Vegetation Classification System (VIS, OEH 2018), as being characterised by a canopy dominated by Narrow-leaved Ironbark, with Coastal Grey Box as a subdominant and Bulloak as the dominant midstorey species. This accurately describes the community within the study area. Coastal Grey Box was not recorded in the plots conducted but it was present in adjacent areas. In addition, many of the groundcover species match the characteristic species listed for the PCT, included Winter Apple (<i>Eremophila debilis</i>), Barbed-wire Grass and Many-flowered Mat-rush (<i>Lomandra multiflora</i>).

Table 3.1 **Vegetation zone 1 description**

Zone 1 – 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland

Justification of evidence used to identify the PCT PCT 1603 occurs in the central and lower hunter, described as an open forest, with an open shrub layer and a predominately grassy groundcover with various grammoides. The position of the study area, structure and species composition is a best fit with PCT 1603.

Status Commonwealth EPBC Act: Listed critically endangered ecological community - Central Hunter Valley eucalypt forest and woodland.
NSW BC Act: Listed endangered ecological community - Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions

Estimate of percent cleared value of PCT 74 %

Photograph 1 - Zone 1
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland (Plot 1)



3.3 Credit quantum

The calculated credits quantum of the 7.19 ha of cleared land is 189 credits (refer to Table 3.2). The vegetation integrity score is 52.6.

Table 3.2 **Summary of ecosystem credits**

PCT	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
PCT 1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower hunter_woodland	7.19	52.6	0.0	52.6	189

4 Closing

The BAM was used to calculate the vegetation integrity score of vegetation adjacent to the Mod 8 cleared area, with the assumption that the two areas were likely comparable. The estimated offset required for the Mod 8 cleared area is 189 credits of PCT 1603.

Yours sincerely

A handwritten signature in black ink, appearing to read 'E Dodd', enclosed in a thin black rectangular border.

Eugene Dodd

Senior ecologist

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Appendix A

BAM Plot and Transect Data

Table A.1 BAM Plot data

Family	Scientific Name	Common Name	Growth form	Percentage cover and abundance					
				Plot 1	Plot 1	Plot 2	Plot 2	Plot 3	Plot 3
				Cover	Abund'	Cover	Abund'	Cover	Abund'
Apocynaceae	* <i>Gomphocarpus fruticosus</i>	Narrow-leaved Cotton Bush	weed			0.1	1		
Asteraceae	* <i>Senecio madagascariensis</i>	Fireweed	weed	0.1	10	0.1	5	0.1	4
Asteraceae	* <i>Sonchus oleraceus</i>	Common Sowthistle	weed			0.1	1		
Cactaceae	* <i>Opuntia cylindrica</i>	Tiger Pear	weed			0.1	4	0.1	4
Cactaceae	* <i>Opuntia stricta</i>	Prickly Pear	weed	0.5	20	0.1	5	0.1	6
Malvaceae	* <i>Sida rhombifolia</i>	Paddy's Lucerne	weed			0.1	2		
Plantaginaceae	* <i>Plantago lanceolata</i>	Lamb's Tongues	weed	0.1	1				
Poaceae	* <i>Eragrostis pilosa</i>	Paddock Lovegrass	weed	1	20			1	40
Commelinaceae	<i>Commelina cyanea</i>	Scurvy Weed	Forb (FG)			0.1	5	0.1	1
Acanthaceae	<i>Brunoniella australis</i>	Blue Trumpet	Forb (FG)	0.1	5	0.1	15		
Anthericaceae	<i>Arthropodium minus</i>	Small Vanilla Lilly	Forb (FG)	0.1	12	0.1	6		
Anthericaceae	<i>Laxmannia gracilis</i>	Slender Wire-lily	Forb (FG)	0.1	1	0.1	4	0.1	2
Asteraceae	<i>Calocephalus citreus</i>	Lemon Beauty-heads	Forb (FG)	0.1	1			0.1	10
Asteraceae	<i>Calotis cuneifolia</i>	Purple Burr-daisy	Forb (FG)	0.5	30	0.2	20	0.1	15
Asteraceae	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	Forb (FG)	0.1	1	0.1	3		
Campanulaceae	<i>Wahlenbergia communis</i>	Tufted Bluebell	Forb (FG)					0.1	2
Campanulaceae	<i>Wahlenbergia stricta subsp. stricta</i>	Tall Bluebell	Forb (FG)	0.1	6	0.1	10		
Casuarinaceae	<i>Allocasuarina luehmannii</i>	Bulloak	Tree (SG)	1	1	20	40	60	45
Chenopodiaceae	<i>Einadia nutans subsp. linifolia</i>	Climbing Saltbush	Forb (FG)	0.5	1	0.1	6	0.1	8
Chenopodiaceae	<i>Einadia nutans subsp. nutans</i>	Climbing Saltbush	Forb (FG)			0.1	10		
Chenopodiaceae	<i>Enchylaena tomentosa</i>	Ruby Saltbush	Shrub (SG)	0.1	5			0.1	3
Chenopodiaceae	<i>Maireana microphylla</i>	Small-leaf Bluebush	Shrub (SG)			0.1	2		
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed	Forb (FG)	0.1	10				
Crassulaceae	<i>Crassula sieberiana</i>	Australian Stonecrop	Forb (FG)			0.1	8		
Fabaceae - Faboideae	<i>Daviesia genistifolia</i>	Broom Bitter Pea	Shrub (SG)	0.2	1				
Fabaceae - Faboideae	<i>Desmodium varians</i>	Slender Tick-trefoil	Other (OG)	0.1	15	0.1	10	0.1	10
Fabaceae - Faboideae	<i>Glycine tabacina</i>	Variable Glycine	Other (OG)			0.1	30		
Fabaceae - Mimosoideae	<i>Acacia falcata</i>	Sickle Wattle	Shrub (SG)	0.5	1				
Fabaceae - Mimosoideae	<i>Acacia paradoxa</i>	Kangaroo Thorn	Shrub (SG)	0.1	1				
Lomandraceae	<i>Lomandra confertifolia</i>	Mat-rush	Grass and grasslike (GG)	0.1	4				
Lomandraceae	<i>Lomandra multiflora</i>	Many-flowered Mat-rush	Grass and grasslike (GG)	0.1	5	0.1	5	0.1	5
Malvaceae	<i>Sida corrugata</i>	Corrugated Sida	Forb (FG)	0.1	4	0.1	5		
Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Tree (SG)	45	24	40	23	10	40
Phormiaceae	<i>Dianella revoluta</i>	Blueberry Lily	Forb (FG)	0.1	2			0.1	4
Plantaginaceae	<i>Plantago debilis</i>		Forb (FG)	0.1	10	0.1	4		
Poaceae	<i>Aristida ramosa</i>	Threeawn Speargrass	Grass and grasslike (GG)	1	50	2	50	2	60
Poaceae	<i>Aristida vagans</i>	Purple wiregrass	Grass and grasslike (GG)	5	200	5	100	0.5	30
Poaceae	<i>Austrostipa scabra</i>	Speargrass	Grass and grasslike (GG)	0.2	10	3	30	5	100
Poaceae	<i>Chloris truncata</i>	Windmill Grass	Grass and grasslike (GG)	0.1	4			0.1	4
Poaceae	<i>Cymbopogon refractus</i>	Barbed Wire Grass	Grass and grasslike (GG)	40	600	5	100	5	80
Poaceae	<i>Rytidosperma sp.</i>		Grass and grasslike (GG)			2	40		
Rubiaceae	<i>Asperula conferta</i>	Common Woodruff	Forb (FG)	0.1	5				
Scrophulariaceae	<i>Eremophila debilis</i>	Winter Apple	Shrub (SG)	0.5	10	0.1	6	0.1	7
Solanaceae	<i>Solanum cinereum</i>	Narrawa Burr	Shrub (SG)	0.1	4				
Total Exotic Species				4		6		4	
Total Native Species				29		24		18	

Footnote: * Indicates exotic species, where species were recorded within the plot percentage cover abundance

** Grey Box was also recorded within the vicinity as sub-dominant canopy species

Table A.2 BAM summary tables

Location

plot	pct	area	patchsize	conditionclass	zone	easting	northing	bearing
1	1603	7.2	101	woodland	55	323133	6402835	16
2	1603	7.2	101	woodland	55	323073	6403085	344
3	1603	7.2	101	woodland	55	323088	6403252	336

Composition and structure

plot	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther
1	2	6	7	13	0	1	46	1.5	46.5	2.1	0	0.1
2	2	2	6	12	0	2	60	0.2	17.1	1.3	0	0.2
3	2	2	6	7	0	1	70	0.2	12.7	0.7	0	0.1

Function

plot	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to10	funTreeStem10to20	funTreeStem20to30	funTreeStem30to50	funTreeStem50to80	funTreeRegen	funHighThreatExotic
1	0	0	32	3	0	0	0	1	1	1	0
2	1	0	57	31	0	0	1	1	1	1	0
3	1	1	66	9	0	0	1	1	1	1	0