

26 April 2017

Mr Josh Carlon
Environmental Field Team Coordinator
South 32-Illawarra Coal
Cordeaux Colliery
Picton Road
Mount Keira West NSW 2500

Via email: josh.carlon@south32.net

Dear Josh,

Re: Dendrobium Colliery Longwall 12 End of Panel Report - Aboriginal Heritage Assessment

Niche Environment and Heritage (Niche) has undertaken a site assessment and review of the predicted and observed impacts on Aboriginal heritage sites and their associated values resulting from the extraction of coal at Longwall 12 at Dendrobium Colliery. This assessment is attached for inclusion in the South 32-Illawarra Coal (Illawarra Coal) End of Panel Report for Longwall 12.

There were no new observable impacts noted during the site inspections.

Illawarra Coal should continue to monitor the Aboriginal sites as outlined in Condition 7 (b) of Aboriginal Heritage Impact Permit 1132005.

Please do not hesitate to contact me on 0488 224 758 should you require any further information.

Yours sincerely,



Renée Regal
Senior Heritage Consultant
Niche Environment and Heritage

Dendrobium Colliery, Longwall 12 End of Panel Report: Aboriginal Heritage Assessment

Background and Introduction

Illawarra Coal commissioned Niche to conduct an End of Panel (EoP) assessment of the Aboriginal cultural heritage and archaeological sites within the limit of subsidence effects of Longwall 12 at Dendrobium Colliery. This area has been defined as the ‘Subject Area’ and is shown in Figure 1, which is reproduced from MSEC459REVB 2012: 141 Figure MSEC459 B

This EoP Aboriginal heritage assessment report includes a summary of:

- previous monitoring.
- the results of the Subsidence Report prepared by MSEC.
- the results of a site inspection.
- a discussion, and
- conclusions and recommendations.

Monitoring of Aboriginal archaeological sites at Dendrobium Colliery to-date has been carried out as recommended by Biosis Research (2007 and 2012).

Subsidence Monitoring Results Summary (MSEC)

The End of Panel Subsidence Report for Longwall 12 is being prepared by MSEC. This assessment includes a comprehensive report which addresses all aspects of the recorded subsidence parameters resulting from the extraction of Longwall 12. For the purpose of this assessment the initial MSEC predictions have been referred to; to address any potential impacts at the sites.

Specifically, in relation to matters that may affect Aboriginal cultural heritage values, MSEC (Section 5.23 Archaeological sites) provides maximum predicted total conventional subsidence, tilt and curvature for the archaeological sites resulting from the extraction of the proposed longwalls (MSEC459REVB 2012:84). The predictions are reproduced below:

Table 1: Potential locations for piezometers

Location	Maximum predicted total conventional subsidence (mm)	Maximum predicted total conventional tilt (mm/m)	Maximum predicted total conventional hogging curvature (km ⁻¹)	Maximum predicted total conventional sagging curvature (km ⁻¹)
52-2-1628	225	8	0.20	0.02
52-2-1775	70	1	0.01	<0.01
52-2-1776	<20	<0.5	<0.01	<0.01
52-2-1778	<20	<0.5	<0.01	<0.01
52-2-2209	<20	<0.5	<0.01	<0.01

Browns Road Site 12 (52-2-1628) is located directly above Longwall 12. MSEC 2012; 85 noted that the likelihood of impacts to this shelter is similar to those previously experienced where shelters were directly

mined beneath by longwalls within the Southern Coalfield. As highlighted by this assessment there were no impacts resulting from mining identified at any of the monitored sites.

Site inspection and results

The five Aboriginal archaeological sites inspected as part of this assessment include:

- AHIMS #52-2-1628 (Browns Road Site 12) shelter with art,
- AHIMS #52-2-1775 (Upper Avon 39) shelter with deposit,
- AHIMS #52-2-1776 (Upper Avon 40) an Aboriginal shelter with art and deposit,
- AHIMS #52-2-1778 (Upper Avon 41) an Aboriginal shelter with deposit, and
- AHIMS #52-2-2209 (Dendrobium 2) Shelter with deposit (See Figure MSEC459 B MSEC459 REVB 2012:141).

These five sites were inspected as they were all located within the possible zone of subsidence movements associated with Longwall 12.

The site inspection was carried out on 20 and 24 April 2017 by Renée Regal (Niche). A summary of the findings of the site visit are outlined in Table 2.

Important information about this report

Information relating to Aboriginal cultural heritage sites, including some details, images and maps showing the locations of sites, has been redacted from this report at the request of Registered Aboriginal Parties.

Table 2: Summary of the site visits to the Aboriginal heritage sites in proximity to Longwall 12

AHIMS site numbers	Site name	Results of inspections	Photograph of current condition of site
52-2-1628	Browns site 12	<p>This shelter was in the same condition as described by Biosis in 2012 and 2016. There has been no movement of the horizontal bedding plane joints of the shelter and no cracking or exfoliation observed in relation to the extraction of Longwall 12.</p> <p>There has been no altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with any movement.</p> <p>The site remains the same as previously described.</p> <p>The art panel remains in the same condition as described in Biosis Research 2008, and 2009.</p>	<div data-bbox="791 591 1385 831" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="738 952 1410 981">Plate 1: General photograph of Browns Site 12, facing south.</p> <div data-bbox="791 1167 1385 1406" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="738 1568 1398 1630">Plate 2: General photograph of art panel Browns Site 12, at the northern end of the shelter.</p>

<p>52-2-1775</p>	<p>Upper Avon 39</p>	<p>This shelter was in the same condition as described by Biosis in 2012. There has been no movement of the horizontal bedding plane joints of the shelter and no cracking or exfoliation observed in relation to the extraction of Longwall 12.</p> <p>There has been no altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with any movement.</p> <p>The site remains the same as previously described.</p> <p>The artefact could not be relocated during this assessment.</p>	<div data-bbox="778 365 1369 600" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="738 728 1394 757">Plate 3: General photograph of Upper Avon 39, facing east.</p> <div data-bbox="778 1010 1369 1245" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="738 1816 1339 1877">Plate 4: General photograph of location of artefact, as highlighted on original site card.</p>
<p>52-2-1776</p>	<p>Upper Avon 40</p>	<p>This shelter was in the same condition as described by Biosis in 2012. There has been no</p>	

movement of the horizontal bedding plane joints of the shelter and no cracking or exfoliation observed in relation to the extraction of Longwall 12.

There has been no altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with any movement.

The site remains the same as previously described.

The art panel remains in the same condition as described in Bosis Research 2008, and 2009.

The artefacts were not relocated during this assessment.

This information has been redacted
For more information please contact GM3.

Plate 5: General photograph of shelter Upper Avon 40, photograph taken facing east.

This information has been redacted
For more information please contact GM3.

Plate 6: General photograph of art panel Upper Avon, at the northern end of the shelter.

<p>52-2-1778</p>	<p>Upper Avon 41</p>	<p>This shelter was in the same condition as described by Biosis in 2012. There has been no movement of the horizontal bedding plane joints of the shelter and no cracking or exfoliation observed in relation to the extraction of Longwall 12.</p> <p>There has been no altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with any movement.</p> <p>The site remains the same as previously described.</p> <p>The artefacts located during the initial assessment could not be relocated during this assessment.</p>	<div data-bbox="783 365 1377 602" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="735 728 1422 792">Plate 7: General photograph of shelter Upper Avon 40, facing south.</p> <div data-bbox="780 945 1374 1182" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p data-bbox="735 1305 1358 1370">Plate 8: General photograph of floor disturbance due to wombats at Upper Avon 40.</p>
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<p>52-2-2209</p>	<p>Dendrobium 2</p>	<p>This shelter was in the same condition as described by Biosis in 2012 and 2016. There has been no movement of the horizontal bedding plane joints of the shelter and no cracking or exfoliation observed in relation to the extraction of Longwall 12.</p> <p>There has been no altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with any movement.</p> <p>The site remains the same as previously described.</p> <p>The artefacts located during the initial assessment could not be relocated during this assessment.</p>	<div data-bbox="791 591 1385 831" style="border: 1px solid black; padding: 10px; text-align: center;"> <p>This information has been redacted For more information please contact GM3.</p> </div> <p>Plate 9: General photograph of art panel Browns Site 12, at the northern end of the shelter.</p>
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Discussion and conclusion

There were no new observable impacts noted during the site inspections. The Trigger Action Response Plan (TARP) (Table 3) contains the Performance Measures along with the proposed Corrective Management Actions (CMA) for Aboriginal heritage sites, as outlined in the Dendrobium Area 3B Subsidence Management Plan (SMP)

It is recommended Illawarra Coal continue to monitor the Aboriginal sites as outlined in Condition 7 (b) of Aboriginal Heritage Impact Permit 1132005.

Table 3: Dendrobium Approval Performance Measures Table

Feature	Performance Measures	Observations	Actions as a result of LW 12
Browns Site 12 (52-2-1628) Upper Avon 39 (52-2-1775) Upper Avon 40 (52-2-1776) Upper Avon 41 (52-2-1778) Dendrobium 2 (52-2-2209)	Level 1 <ul style="list-style-type: none"> • Change in shelter conditions not attributable to natural weathering or preservation-mineral growth of micro organism growth (as observed by comparing pre-mining photographs with post-subsidence/ mining photographs) • Changes external to the shelter that affect the site context (e.g ground cracking, boulder slumping, rock and/or tree falls) 	N/A	<ul style="list-style-type: none"> • Continue monitoring program <p>NONE REQUIRED.</p> <ul style="list-style-type: none"> • Condition assessment and photographic record <p>NONE REQUIRED.</p> <ul style="list-style-type: none"> • Notify relevant specialists and key stakeholders (e.g Aboriginal community groups) <p>NONE REQUIRED.</p> <ul style="list-style-type: none"> • Summarise impacts and report in the End of Panel report and AEMR <p>NONE REQUIRED.</p>
	Level 2 <ul style="list-style-type: none"> • Change in shelter conditions not attributable to natural weathering or 	N/A	<ul style="list-style-type: none"> • Actions as stated for Level 1 • Modify monitoring program if necessary

	<p>preservation-change in drip line or seepage, cracking or exfoliation of overhang or shelter, movement or opening of existing planes and joins in panel, block fall within shelter or overhang, shelter or overhang collapse.</p>		<ul style="list-style-type: none"> Consider development of site management plan to mitigate effects in consultation with Registered Aboriginal Groups and Landowner (WaterNSW) <p>NONE REQUIRED.</p>
	<p>Level 3</p> <ul style="list-style-type: none"> Level 2 impacts at greater frequency than predicted Level 2 impacts attributable to mining remote from the mining area 	N/A	<ul style="list-style-type: none"> Actions stated for Level 2 Immediately notify OEH, DoPI, DPI, SCA (WaterNSW), other resource managers and relevant technical specialists and seek advice in any CMA required Site visits with stakeholders if required Review monitoring program and notify if necessary within 1 month Implement increased monitoring if

required within
2 weeks

- Develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals
- Completion of works following approvals
- Issue CMA report within 1 month of works completion
- Conduct initial follow up monitoring and reporting within two months of CMA completion
- Review the relevant TARP and Management Plan in consultation with key stakeholders.

NONE REQUIRED.

References

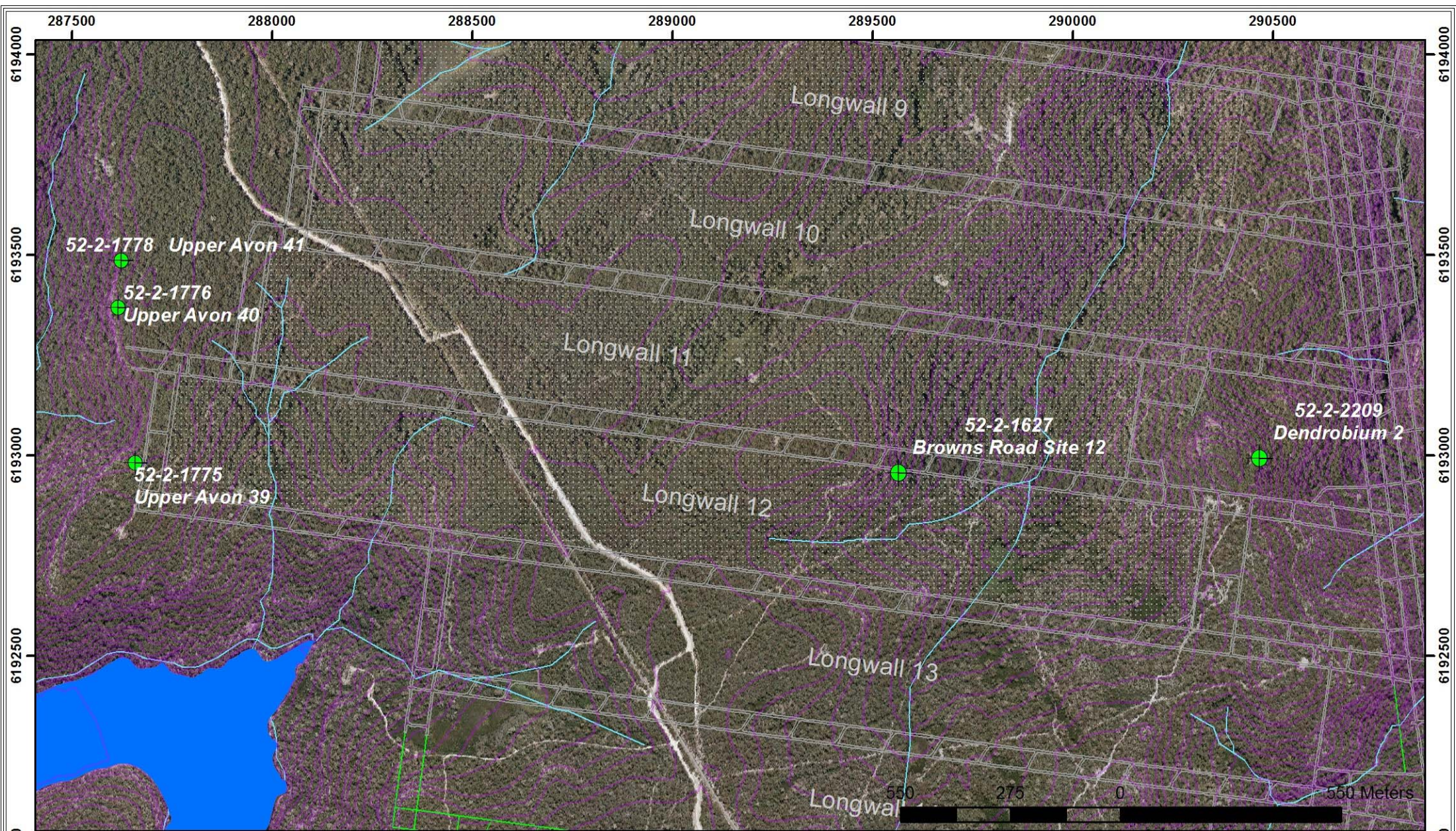
BHP Billiton Illawarra Coal (2007) *Dendrobium Area 3B: Subsidence Management Plan*. An unpublished report for DPI

Biosis Research (2007) *Dendrobium Area 3 Archaeological and Cultural Heritage Assessment*. An unpublished report for BHP Billiton Illawarra Coal

Biosis Research (2012) *Dendrobium Area 3B Longwalls 9 to 18: Aboriginal Cultural heritage Assessment Report*. An unpublished report for BHP Billiton Illawarra Coal

Biosis Pty Ltd (2013) *Baseline recording of Aboriginal sites in Dendrobium Area 3B Longwall 9-18*. Report for BHP Billiton Illawarra Coal

MSEC459 REV B (Sept 2012) *BHP Billiton Illawarra Coal: Dendrobium Area 3B-Longwalls 9 to 18*. An unpublished report for BHP Billiton Illawarra Coal



Illawarra Coal

- 5m Surface Contours
- Mine Workings
- Dendrobium Goaf
- Tributaries
- Longwall Layout

Dendrobium Area 3B
Longwall 12 End of Panel Report
 Cultural Heritage Assessment

Date: April, 2017
Author: J. Carlon

Version 1
 Horizontal Datum
 MGA - Zone 56

