

Mr Josh Carlon  
 Coordinator Environment  
 South32 - Illawarra Metallurgical Coal  
 Cordeaux Colliery  
 Picton Road, Mount Keira West NSW 2500

Via email: [josh.carlon@south32.net](mailto:josh.carlon@south32.net)

Dear Mr Carlon,

**Re: Dendrobium Colliery Longwall 15 End of Panel Report - Aboriginal Heritage Assessment – (Niche ref #5721)**

Niche Environment and Heritage (Niche) has undertaken a site assessment and review of the predicted and observed impacts on Aboriginal cultural heritage sites and their associated values resulting from the extraction of Longwall 15 at Dendrobium Colliery. This assessment was developed for inclusion in the South32 - Illawarra Metallurgical Coal (IMC) End of Panel Report (EoP) for Longwall 15.

Browns Road Site 11 (AHIMS ID# 52-2-1626), a Shelter with Art site has experienced diagonal and vertical cracking with minor block fall as a result of the extraction of Longwall 15. These impacts have not affected the art directly, however flaking of the southern Art Panel and change of seepage patterns may occur after large rain events (>142 mm rainfall in one day). DM 21 (AHIMS ID #52-2-3645), a Shelter with Art and Deposit has experienced diagonal and vertical cracking at the northern exterior end of the shelter as a result of the extraction of Longwall 15.

As a result of this assessment the following is recommended:

Recommendations	
	<b>Browns Road Site 11 (AHIMS ID# 52-2-1626) and DM 21 (AHIMS ID #52-3645)</b>
1.	Notify relevant specialists and key agency stakeholders and Registered Aboriginal Parties of impacts to Browns Road Site 11 (AHIMS ID #52-2-2-1626) and DM 21 (AHIMS ID #52-2-3645) of Level 1 Action in accordance with the Trigger Action Response Plan.
2.	Ongoing monitoring of Browns Road Site 11 (AHIMS ID #52-2-2-1626) after large rain events (>142 mm rainfall in one day) to observe and record any change in seepage patterns in areas of fissuring and opening of joints as a result of indirect mining impacts to the Art Panels.
3.	Include DM 21 (AHIMS ID #52-2-3645) in the Longwall 16 End of Panel monitoring program and continue to monitor for further impacts as a result of subsidence at the site.
	<b>General</b>
4.	Continue monitoring program for remaining longwalls with condition assessment and photographic records as per the Trigger Action Response Plan.

Please do not hesitate to contact me should you require any further information.

Yours sincerely,



Layne Holloway  
Heritage Consultant  
**Niche Environment and Heritage**

### **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.

# 1. Aboriginal heritage assessment

## 1.1 Background and introduction

South32-Illawarra Metallurgical Coal (IMC) commissioned Niche Environment and Heritage (Niche) to conduct an End of Panel (EoP) assessment of the Aboriginal cultural heritage sites within the limit of predicted subsidence effects of Longwall 15 at their Dendrobium Colliery. This area has been defined as the 'Subject Area' and is shown in Figure 1.

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).

## 1.2 Subsidence monitoring results summary (MSEC)

The EoP Subsidence Report for Area 3B, Longwalls 9 - 18 has been prepared by Mine Subsidence Engineering Consultants (MSEC). This assessment includes a comprehensive report which addresses all aspects of the recorded subsidence parameters resulting from longwall extraction. For this assessment, the initial MSEC predictions have been referred to in order to address any potential impacts at the sites.

Specifically, in relation to matters that may affect Aboriginal cultural heritage values, MSEC (Section 5.23.1 Archaeological sites) provides maximum predicted total conventional subsidence, tilt and curvature for the archaeological sites resulting from the extraction of the proposed longwalls (MSEC459) The predictions are outlined in Table 1.

**Table 1: Maximum predicted subsidence movements for Aboriginal cultural heritage sites relevant to Longwall 15.**

Aboriginal site (AHIMS)	Maximum predicted total conventional subsidence (mm)	Maximum predicted total conventional tilt (mm/m)	Maximum predicted total conventional hogging curvature (km <sup>-1</sup> )	Maximum predicted total conventional sagging curvature (km <sup>-1</sup> )
Browns Road Site 8 (AHIMS ID# 52-2-1623)	675	7	0.6	0.15
Browns Road Site 11 (AHIMS ID# 52-2-1626)	1875	25	0.40	0.55
Site 1 DB 1 (AHIMS ID# 52-2-2229)	2425	18	0.20	0.70
DM 21 (AHIMS ID# 52-2-3645)	1375	25	0.55	0.08

<b>Upper Avon 35 (AHIMS ID# 52-2-1771)</b>	<20	<0.5	<0.01	<0.01
<b>Dendrobium 6 (52-2-2248)</b>	275	7	0.20	0.01

### 1.3 Site inspection and results

The six Aboriginal sites addressed in this assessment include the following sites:

**Table 2: Sites inspected as part of this assessment**

Site Name	AHIMS ID	Site Type	Date Surveyed
Browns Road Site 8	52-2-1623	Shelter with Deposit	16 <sup>th</sup> March 2020
Browns Road Site 11	52-2-1626	Shelter with Art	15 <sup>th</sup> March 2020
Upper Avon 35	52-2-1771	Shelter with Deposit	16 <sup>th</sup> March 2020
Site 1-DB1	52-2-2229	Shelter with Art	15 <sup>th</sup> March 2020
Dendrobium 6	52-2-2246	Isolated Artefact	Could not be relocated
DM21	52-2-3645	Shelter with Art and Deposit	15 <sup>th</sup> March 2020

The site inspection was carried out on 15<sup>th</sup> and 16<sup>th</sup> of March 2020 by Layne Holloway (Heritage Consultant) and Renée Regal (Team Leader – NSW Heritage). A summary of the findings of the site visit are outlined in Sections 1.3.1 to 1.3.6. Five out of these six sites were inspected as they were all located within the possible zone of subsidence movements associated with the extraction of Longwall 15.

### 1.3.1 Browns Road Site 8 (AHIMS ID# 52-2-1623)

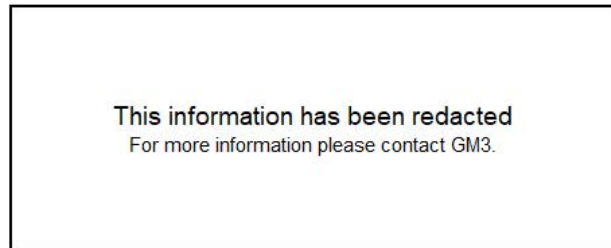
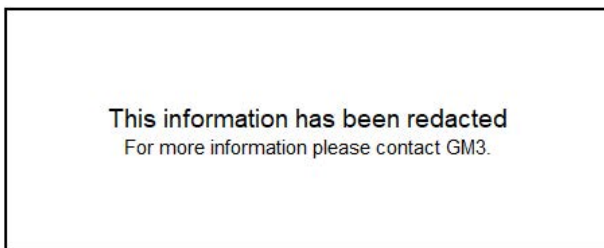
This Shelter with Deposit site is located 150 m east of Fire Trail 6Q approximately 1 km from the junction of Fire Trails 6A and 6Q; the site is 70 m from a tributary WC21. The sandstone overhang measures 8 x 4.5 x 1.8 m. The site was formed by block fall and cavernous weathering. The floor deposit is light brown loamy sand 10 cm deep. One chert flake was located in the dripline of the shelter when the site was first recorded by Sefton in 1981. This shelter does not contain art.

**Table 3 Summary of the site visit to Browns Road Site 8 (AHIMS ID# 52-2-1623)**

AHIMS number	Site name	Results of inspections
52-2-1623	Browns Road Site 8	This Shelter with Deposit site was previously recorded during the Longwall 9 -18 baseline recording completed by Biosis (2012). During the recent monitoring, no impacts related to the extraction of Longwall 15 were observed. The shelter had a dry interior, despite recent rain. Naturally occurring granular loss, exfoliation, mineral efflorescence and microvegetation were observed within the interior of the shelter. The chert flake noted in the AHIMS site card recording completed by Sefton during 1981 could not be relocated at the time of the site inspection due to deep leaf litter (Plate 1).

#### Longwall 15 EoP Monitoring Images

#### Previous Monitoring Images



**Plate 1: General photo of Browns Road Site 8 facing west showing leaf litter interior covering the deposit.**

**Plate 2: Comparison photograph from the Biosis (2012) Longwall 9- 18 baseline recording showing bedding lines in the back wall of shelter that have remained unchanged (source: Biosis 2012).**

**Longwall 15 EoP Monitoring Images**

**Previous Monitoring Images**

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

**Plate 3: Close up of shelter roof and backwall facing north west.**

### 1.3.2 Browns Road Site 11 (AHIMS ID#52-2-1626)

This Shelter with Art site is situated between Fire Road 6P and tributary WC15. The sandstone overhang measures 8 x 2 x 2 m. The living area of the shelter measures 1 x 3 m. The site was formed by block fall and cavernous weathering. The Art Panels extend the full length of the back wall of the northern end of the shelter. With remnants of six charcoal indeterminate motifs, one charcoal outline and one infill of an eel. The floor deposit is grey and loamy. The Art was in fair to poor condition.

**Table 4: Summary of the site visit to Browns Road Site 11 (AHIMS ID#52-2-1626).**

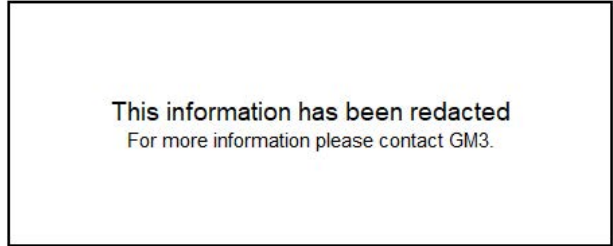
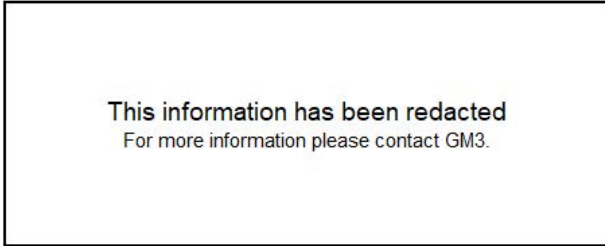
AHIMS number	Site name	Results of inspections
52-2-1626	Browns Road Site 11	<p>This Shelter with Art site was previously monitored as part of the Longwall 14 EoP reporting (Niche 2019). The main area of cracking caused by subsidence related effects due the extraction of Longwall 14 was observed in the southern floor area of the shelter. The diagonal cracking measured to an approximate length of 70 cm and a width of 3 cm. The Art Panels located at the northern extent if the shelter were not impacted.</p> <p>The latest inspection identified new subsidence related impacts due to the extraction of Longwall 15.</p> <p>Impacts to the south of the shelter consist of seven vertical and diagonal cracks to the floor of the shelter and two instances of minor block fall, summarised as follows:</p> <ol style="list-style-type: none"> <li>1) Vertical cracking measuring 76 x 2 cm</li> <li>2) Diagonal cracking with minor block fall at termination measuring 180 x 6 cm (Plate 5)</li> <li>3) Diagonal cracking with some deviations measuring 110 x 3.5 cm (Plate 6). The left side of the cracked sandstone has slipped upwards during convergence.</li> <li>4) Vertical cracking with diagonal deviations resulting in further minor cracks at the base of the shelter (Plate 9) measuring 90 x 0.1 cm.</li> <li>5) Diagonal cracking measuring 112 x 2 cm with minor block fall observed at termination point (Plate 7)</li> <li>6) General area of rock fracturing located small sandstone platform at the base of the shelter measuring approximately 46 x 200 cm. Many minor cracks, exfoliation and opening of joints (3 cm wide) are present (Plate 10).</li> <li>7) Diagonal cracking visible in shallow sandy loam deposit in floor measuring approximately 30 cm in length (Plate 11).</li> </ol> <p>New areas of joint opening and fissuring were observed in areas surrounding the two Art Panels to the north of the shelter (Plate 12 and Plate 16). The Art Panels were in moderate condition and have not been directly affected by joint opening or fissuring, although change of seepage patters may further erode opened joints which may lead to direct impacts to Art Panels after large rain events.</p> <p>It is recommended that this Shelter with Art site is monitored after a large rain event (&gt;142 mm rainfall in one day) due to the recognised</p>

AHIMS number	Site name	Results of inspections
		potential of change in seepage patterns caused by subsidence induced opening of joints and fissuring. A change in seepage may cause direct impacts to the Art Panels in the form of water damage and flaking of the sandstone Art Panels.



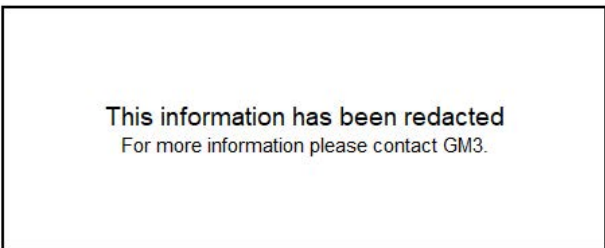
**Longwall 15 EoP Monitoring Images**

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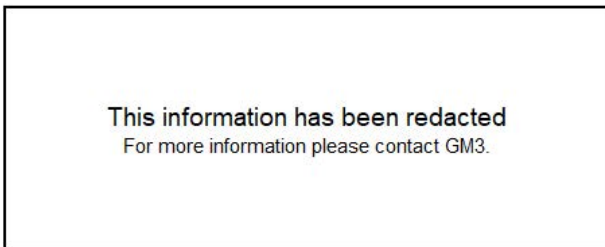


**Plate 4: Location of crack 1 and 2 facing west.**

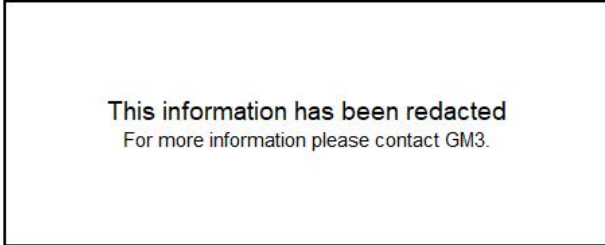
**Plate 5: Comparison photo from Niche (2019)  
Longwall 14 monitoring of cracking and minor  
block fall at the south end of the shelter facing  
south.**



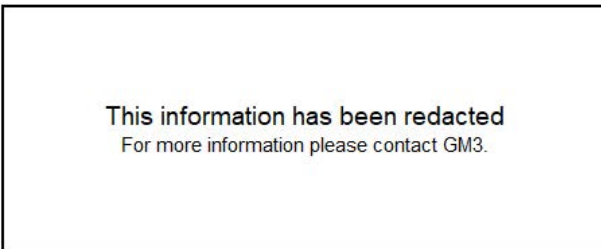
**Plate 6: Location of cracks 3 and 4 from an aerial aspect.**



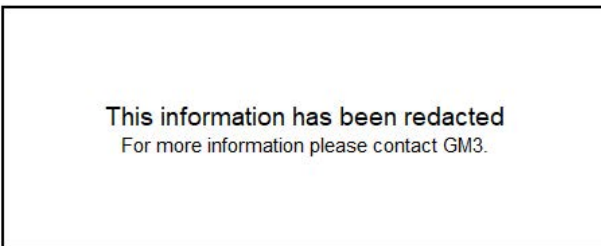
**Plate 7: Location of cracks 5 and 6 from an aerial aspect.**



**Plate 8: Convergent slip of rock platform at crack 3.**



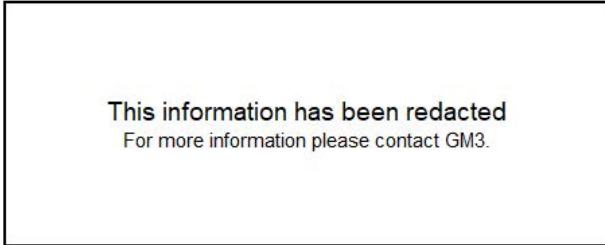
**Plate 9: Many minor cracks at the base of shelter below crack 4.**



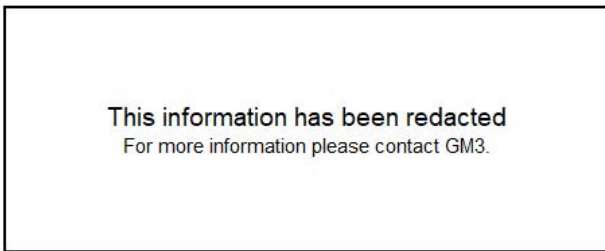
**Plate 10: Sandstone exfoliation platform at crack 6.**

**Longwall 15 EoP Monitoring Images**

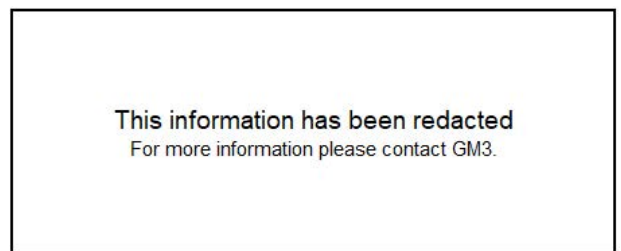
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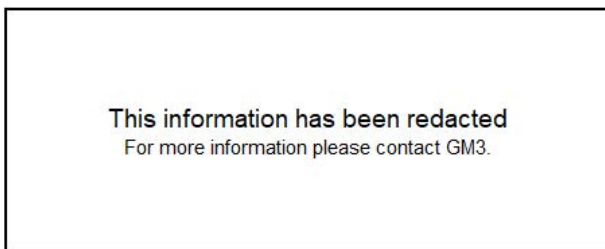
**Plate 11: Soil displacement over suspected crack 7.**



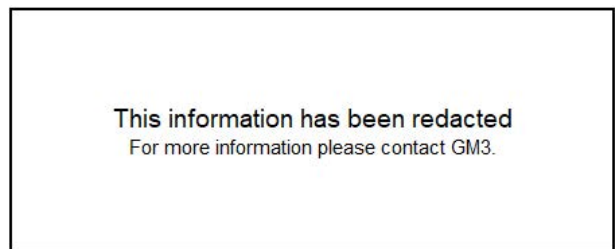
**Plate 12: Fissuring above Art Panel to the south of the shelter.**



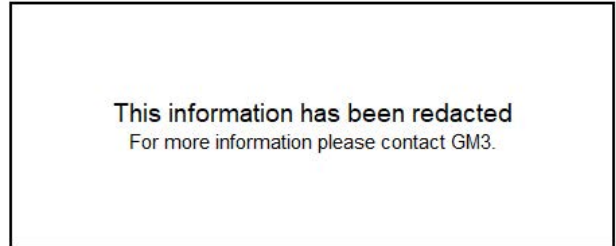
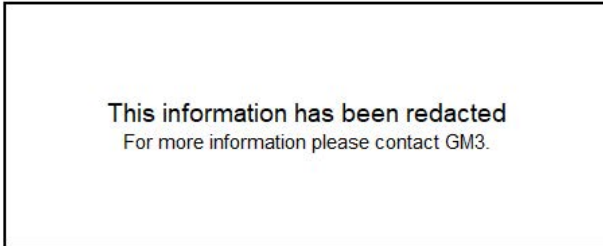
**Plate 13: Comparison Image of Art Panel from Niche (2019) Longwall 14 monitoring.**



**Plate 14: Slight opening of bedding plane adjacent to Art Panel located in the southern extent of the shelter.**

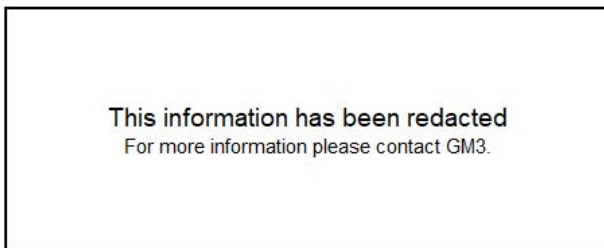


**Plate 15: Comparison image bedding planes adjacent to indeterminate art motif from Niche (2019) Longwall 14 monitoring.**



**Plate 16: Opening of bedding plane adjacent to Art Panel to the south of the shelter.**

**Plate 17: Comparison image from Biosis (2012) Longwall 9 -18 baseline recording showing bedding plane to the right of the art closed (source: Biosis 2012).**



**Plate 18: New floor cracking in the southern end of the shelter.**

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For more information please contact GM3.

**Plate 19: Flaking of sandstone the southern back wall of the shelter.**

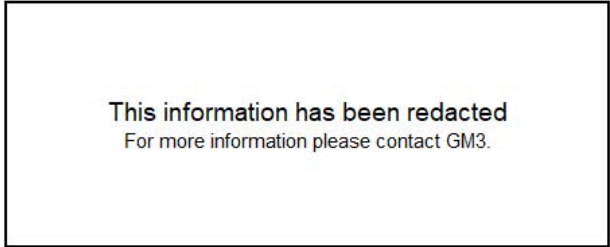
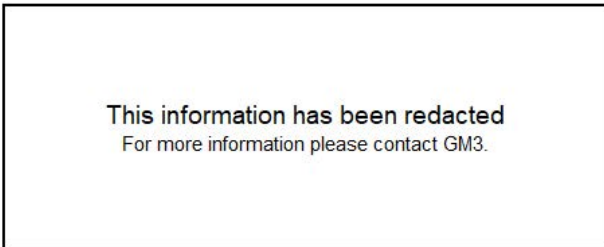
### 1.3.3 Upper Avon 35 (AHIMS ID#52-2-1771)

This Shelter with Deposit is located on the eastern site of Lake Avon, adjacent to Tributary LA 3. The site is approximately 10 m above the stored water of Avon Dam. The sandstone overhang is 15 x 4.5 x 3.5 m and the living area is 4 x 1 m. The shelter was formed by block fall. The floor deposit is yellow grey loamy sand, approximately 30 cm deep. During baseline recording, nine artefacts were located: one quartzite scraper, one quartz core, two mudstone flakes, one quartzite flake, one mudstone core, one petrified wood flake, one quartz flake and red ochre. The baseline recording noted that this site was in good condition despite the continued cavernous weathering and disturbance from a wombat burrow.

**Table 5: Summary of the site visit to Upper Avon 35 (AHIMS ID # 52-2-1771)**

AHIMS number	Site name	Results of inspections
52-2-1771	Upper Avon 35	This Shelter with Deposit site was previously recorded during the Longwall 9 -18 baseline recording report completed by Biosis (2012). During the recent monitoring, no impacts related to the extraction of Longwall 15 were observed. The shelter had a dry interior despite recent rain. Granular loss, exfoliation and microvegetation were observed within the shelter. Four of the eight artefacts noted in the AHIMS site card recording completed by Biosis (2007) were relocated (Plate 22 and Plate 23).

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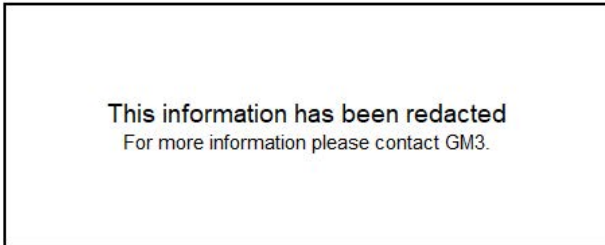


**Plate 20: General photo of shelter facing south.**

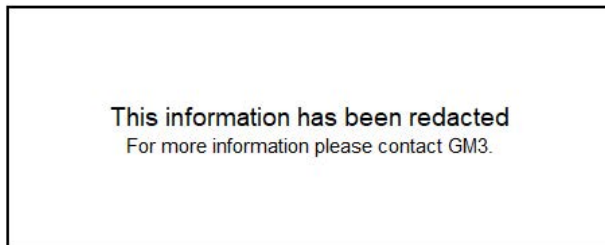
**Plate 21 Comparison general photo of shelter from Biosis (2012) Longwall 9-18 baseline recording (source: Biosis 2012).**

**Longwall 15 EoP Monitoring Images**

**Previous Monitoring Images**



**Plate 22: One chert core and petrified wood flake artefacts located in deposit during monitoring.**



**Plate 23: Two quartz fake artefacts located in deposit during monitoring.**

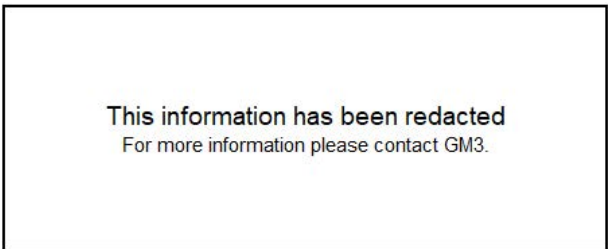
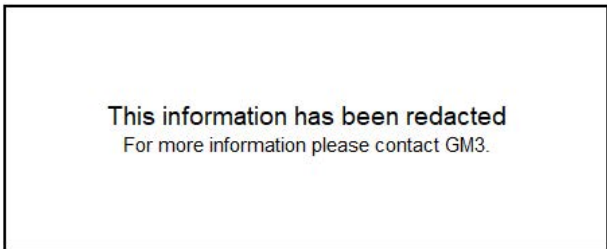
### 1.3.4 Site 1-DB1 (AHIMS # 52-2-2229)

This Shelter with Art site is a small sandstone overhang situated on the lowest sandstone outcropping cliff line adjacent to a tributary WC15 and west of Wongawilli Creek. The shelter has been formed by block fall and cavernous weathering. The shelter measures 4.5 x 2 x 1.2 m in size. The deposit is medium yellow sand to a depth of 5 to 20 cm. The floor slopes towards the east and has a number of sandstone rocks present. The Art consists of one charcoal outline and infill indeterminate on the back-ceiling panel. During the time of baseline recording, the Art was in very poor condition due to chemical weathering, particularly on the ceiling.

**Table 6: Summary of the site visit to Site 1-DB1 (AHIMS ID# 52-2-2229)**

AHIMS number	Site name	Results of inspections
52-2-2229	Site 1-DB1	<p>This Shelter with Art site was identified to have been impacted from the extraction of Longwall 14 resulting in subsidence related vertical cracking located at the backwall of the shelter. It has since been resolved that this site was not impacted by the extraction of longwall mining. The observable crack in the backwall of the shelter was observed prior to longwall mining (Biosis 2012).The cracking at the backwall of the shelter (Plate 25) has occurred due to natural processes.</p> <p>Nor subsidence related impacts were observed during the Longwall 15 EoP monitoring. The shelter was deemed unsafe to enter due to the large crack in the back wall of the shelter. The Art could not be relocated from distant inspection. The roof of the shelter has naturally exfoliated. The interior of the shelter was dry despite recent rain.</p>

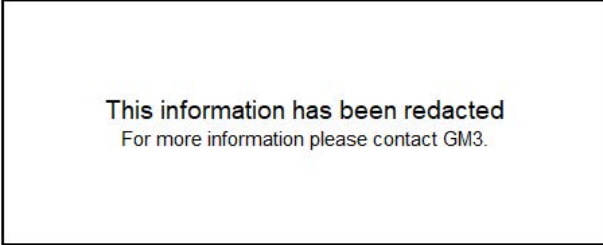
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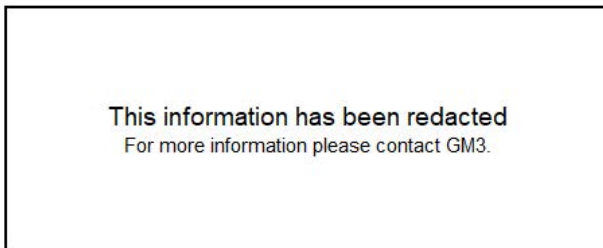
**Plate 24:** Close up photo of vertical crack in the back wall of shelter that occurred due to natural processes (Niche 2020). No changes observed.

**Plate 25:** Comparison image of vertical crack in the back wall of shelter from Biosis (2012) Longwall 9-18 baseline recording (source: Biosis 2012).





**Plate 26: General photo of interior of Site 1-DB1 facing north.**



**Plate 27: General photo from a distance showing the general location of Art Panel located on the roof of shelter facing north.**

### 1.3.5 Dendrobium 6 (AHIMS #52-2-2246)

Dendrobium 6 is an Isolated Artefact site located on the surface of a vehicle track. The site has experienced some disturbance from the vehicle track and contains only a single artefact. This site has little representational rarity value as the isolated artefacts can and do occur virtually anywhere in any landform (Biosis 2012).

**Table 7: Summary of the site visit to Dendrobium 6 (AHIMS ID# 52-2-2246)**

AHIMS number	Site name	Results of inspection
52-2-2246	Dendrobium 6	This Isolated Artefact is a surface find that has a negligible chance of impact from subsidence related effects (Biosis 2012). This site was not relocated by this survey and is not expected to be impacted by the extraction of Longwall 15.

### 1.3.6 DM 21 (AHIMS ID# 52-3645)

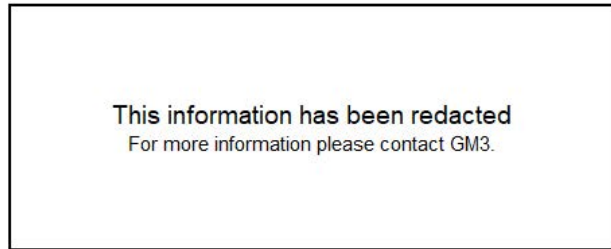
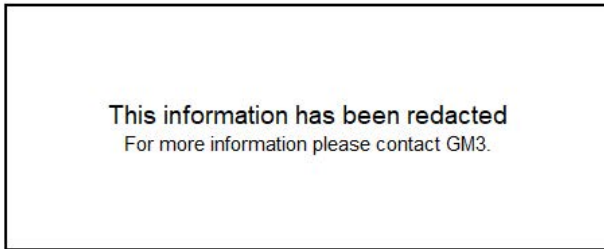
This Shelter with Art and Deposit is situated at the end of a small sandstone spur and adjacent to Swamp 14. The shelter is cavernously weathered, and has a wide but low entrance that opens out to a large cavern. During baseline recording (Biosis 2012), some seepage was present on the shelter walls and roof, and the shelter was slightly damp. Green lichen and mould growth cover the majority of the shelters inside surface and dense vegetation surrounded the exterior of the shelter. The shelter interior measures 9 x 3.5 x 2 m. The Art consists of ten red ochre stencils, a single white clay handprint, scratching superimposition associated with one set of stencils, and a series of indeterminate charcoal motifs that have been obscured by lichen and mould at the time of baseline recording. Seven flaked stone artefacts recorded on the floor of the shelter with a good deposit to be at least 20 cm deep.

**Table 8: Summary of the site visit to DM 21 (AHIMS ID# 52-2-3645)**

AHIMS number	Site name	Results of inspections
52-2-3645	DM 21	<p>This Shelter with Art and Deposit site was previously recorded as part of the Longwall 14 EoP monitoring program (Niche 2019). The site did not experience any impacts in result of the extraction of Longwall 14.</p> <p>The landscape surrounding the shelter site has experienced a range of subsidence impacts from the extraction of Longwall 15 such as localised rockfalls to the upper ridgelines (South 32 2020). The northern exterior of the shelter has experienced fracturing as result of subsidence from the extraction of Longwall 15. Four main instances of vertical and diagonal cracking were observed. The largest crack at the base of the ridgeline measures 3.7 cm in width.</p> <p>The interior cavern of the shelter did not have any direct impacts from subsidence. The monitoring point of natural fissuring (Plate 33 and Plate 34) did not have any further separation in comparison to previous monitoring. It was observed that Art Panels have substantially faded in comparison to baseline recording (Plate 28, Plate 29 and Plate 30). Vegetation surrounding the shelter is notably reduced from archaeological observations of shelter. The reduction of vegetation may have resulted in the interior of the shelter being increasingly exposed to natural erosive elements.</p> <p>It is recommended that this site is revisited as part of the Longwall 16 monitoring.</p>

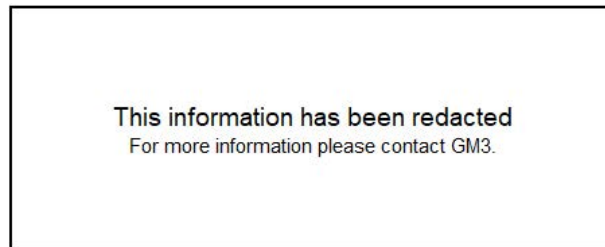
**Longwall 15 EoP Monitoring Images**

**Previous Monitoring Images**



**Plate 28: Image of fading ochre hand stencils located on the roof shelter.**

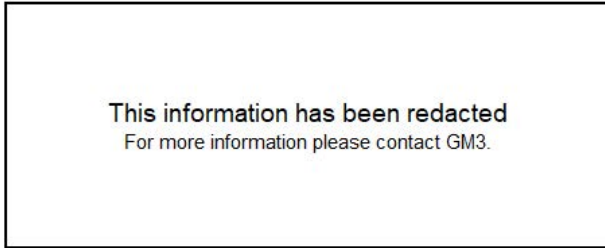
**Plate 29: Comparison image ochre hand stencils taken during Biosis (2012) Longwall 14 EoP monitoring (source: Biosis 2012).**



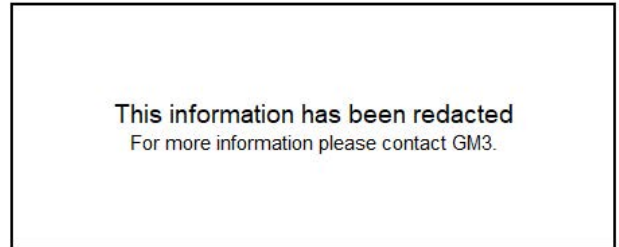
**Plate 30 Comparison spherical photo of the interior cavern area taken during Biosis (2012) Longwall 9 -18 baseline recording (source: Biosis 2012).**

**Longwall 15 EoP Monitoring Images**

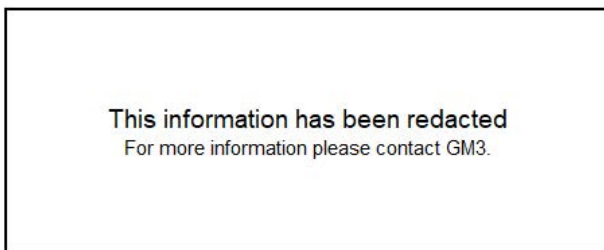
**Previous Monitoring Images**



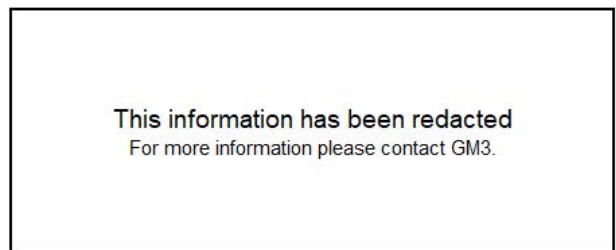
**Plate 31: General photo of interior cavern area facing south west.**



**Plate 32: Comparison image of interior cavern area taken during Biosis (2012) Longwall 9 -18 baseline recording (source: Biosis 2012).**



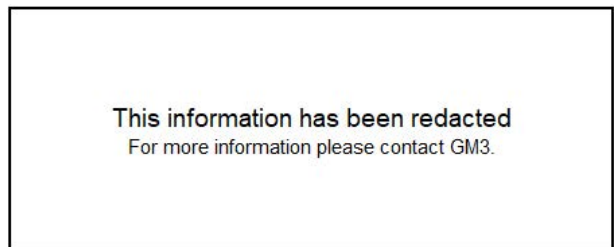
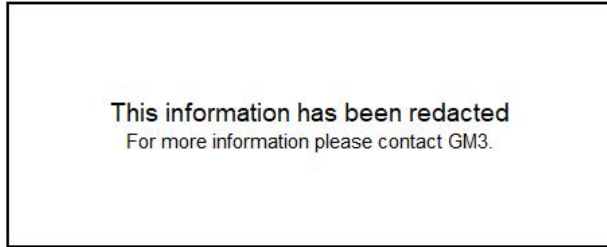
**Plate 33: Natural fissuring located on southern extent of the shelter.**



**Plate 34: Comparison image of interior of the shelter taken during Biosis (2012) Longwall 9 -18 baseline recording. Location of natural fissuring circled in red (source: Biosis 2012).**

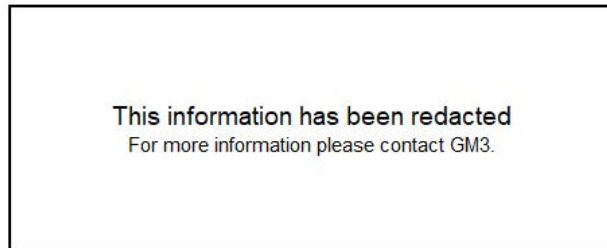
**Longwall 15 EoP Monitoring Images**

**Previous Monitoring Images**



**Plate 35: Close up of vertical cracking located northern exterior of the shelter cavern area.**

**Plate 36: General image of DM 21, taken during Biosis (2012) Longwall 9 -18 baseline recording (source: Biosis 2012).**



**Plate 37: Two new instances of vertical cracking located northern exterior of the shelter cavern area.**

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

**Plate 38: Close up of vertical cracking located at the base of the northern exterior of the shelter cavern area.**

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

**Plate 39: Close up of diagonal cracking located northern exterior of the shelter cavern area.**



## 1.4 Discussion and conclusion

Two (2) out of the six (6) Aboriginal cultural heritage sites have observable impacts from subsidence movements related to extraction of Longwall 15. Browns Road Site 11 (AHIMS ID# 52-2-1626) has experienced diagonal and vertical cracking with minor block fall. These impacts have not affected the art directly, however flaking of the southern Art Panel and change of seepage patterns may occur after large rain events (>142 mm rainfall in one day). DM 21 (AHIMS ID #52-2-3645), has experienced diagonal and vertical cracking at the northern exterior end of the shelter. While the Art Panels have not been directly impacted by subsidence impacts.

The Aboriginal Heritage Impact Permit (AHIP # 1132005), granted to harm Aboriginal objects located within Dendrobium Underground Mine Area 3B, states that Browns Road Site 11 (AHIMS ID# 52-2-1626) and DM21 (AHIMS ID #52-2-3645) are identified in schedule C as sites that can be harmed by extraction related activity under Section 90 of *The National Parks and Wildlife Act*.

The Trigger Action Response Plan (TARP) (Table 10) contains the Performance Measures along with the proposed Corrective Management Actions (CMA) for Aboriginal cultural heritage sites, as outlined in the Dendrobium Area 3B Subsidence Management Plan (SMP). As per the TARP's performance measures, Browns Road Site 11 (AHIMS ID# 52-2-1626) and DM 21 (AHIMS ID #52-2-3645) are considered to act on Level 1 performance measures. Browns Road Site 8 (AHIMS ID#52-2-1623) Dendrobium 6 (AHIMS ID# 52-2-2246) Upper Avon 35 (AHIMS ID# 52-2-1771), and Site 1 – DB1 (AHIMS ID# 52-2-2229) do not trigger CMA's.

As a result of this assessment, the following is recommended:

**Table 9: Recommendations for Aboriginal sites within the Subject Area.**

Recommendations	
	<b>Browns Road Site 11 (AHIMS ID# 52-2-1626) and DM 21 (AHIMS ID #52-3645)</b>
5.	Notify relevant specialists, key agency stakeholders and Registered Aboriginal Parties of impacts to Browns Road Site 11 (AHIMS ID #52-2-2-1626) and DM 21 (AHIMS ID #52-2-3645) of Level 1 Action in accordance with the Trigger Action Response Plan.
6.	Ongoing monitoring of Browns Road Site 11 (AHIMS ID #52-2-2-1626) after large rain events (>142 mm rainfall in one day) to observe and record a change in seepage patterns in areas of fissuring and opening of joints as a result of indirect mining impacts to the Art Panels.
7.	Include DM 21 (AHIMS ID #52-2-3645) in the Longwall 16 End of Panel monitoring program and continue to monitor for further impacts as a result of subsidence at the site.
	<b>General</b>
8.	Continue monitoring program for remaining Longwalls with condition assessment and photographic records as per the Trigger Action Response Plan.

Table 10: Dendrobium Approval Performance Measures Table - Trigger Action Response Plan (TARP)

Feature	Performance Measures	Observations	Actions as a result of performance measure rating
<p>Browns Road Site 8 (AHIMS ID #52-2-1623)</p> <p>Dendrobium 6 (AHIMS ID #52-2-2248)</p> <p>Upper Avon 37 (AHIMS ID #52-2-1771),</p> <p>Site 1 – DB 1 (AHIMS ID #52-2--2-2229)</p>	<ul style="list-style-type: none"> <li>Observational and photographic monitoring in consultation with stakeholders (completed by this assessment).</li> </ul>	<ul style="list-style-type: none"> <li>Changes attributable to natural weathering such as macro vegetation growth and exfoliation.</li> <li>Art remains intact.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
<p>Browns Road Site 11 (AHIMS ID #52-2-2-1626)</p> <p>DM 21 (AHIMS ID #52-2-3645)</p>	<p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>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).</li> <li>Changes external to the shelter that affect the site context (e.g. ground cracking, boulder slumping, rock and/or tree falls).</li> </ul>	<ul style="list-style-type: none"> <li>Diagonal And horizontal cracking of sandstone shelter caused by subsidence.</li> <li>Exfoliation expedited by subsidence.</li> <li>Minor block fall within sandstone shelter caused by subsidence.</li> <li>Art Panels remains intact.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring program</li> <li>Condition assessment and photographic record</li> <li>Notify relevant specialists and key stakeholders (e.g. Aboriginal community groups), outlined in section 21.3 of the Dendrobium Area 3B Subsidence Management Plan).</li> <li>Summarise impacts and report in the End of Panel report and AEMR.</li> </ul>
<p>None identified</p>	<p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>Change in shelter conditions not attributable to natural weathering or preservation-change in drip line or seepage, cracking or exfoliation of overhang or</li> </ul>	<ul style="list-style-type: none"> <li>N/A.</li> </ul>	<ul style="list-style-type: none"> <li>Actions as stated for Level 1.</li> <li>Modify monitoring program if necessary.</li> <li>Consider development of site management plan to mitigate effects in consultation with Registered Aboriginal Groups and Landowner (WaterNSW).</li> <li>Notify RAP's of damages caused from mining.</li> </ul>

Feature	Performance Measures	Observations	Actions as a result of performance measure rating
	shelter, movement or opening of existing planes and joints in panel, block fall within shelter or overhang, shelter or overhang collapse.		<ul style="list-style-type: none"> <li>Notify OEH and complete Aboriginal Site Impact Recording Forms (ASIRF) for damaged sites.</li> </ul>
None identified	<p><b>Level 3</b></p> <ul style="list-style-type: none"> <li>Level 2 impacts at greater frequency than predicted.</li> <li>Level 2 impacts attributable to mining remote from the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>N/A.</li> </ul>	<ul style="list-style-type: none"> <li>Actions stated for Level 2.</li> <li>Immediately notify OEH<sup>1</sup>, DoPI, DPI, SCA (WaterNSW), other resource managers and relevant technical specialists and seek advice in any CMA required.</li> <li>Site visits with stakeholders if required.</li> <li>Review monitoring program and notify if necessary, within 1 month.</li> <li>Implement increased monitoring if required within 2 weeks.</li> <li>Develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals.</li> <li>Completion of works following approvals.</li> <li>Issue CMA report within 1 month of works completion.</li> <li>Conduct initial follow up monitoring and reporting within two months of CMA completion.</li> <li>Review the relevant TARP and Management Plan in consultation with key stakeholders.</li> </ul>

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<sup>1</sup> Office of Environment and Heritage (OEH) is now known as the Biodiversity and Conservation Division (BCD), of the Department of Planning, Industry and Environment (DPIE).

## 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.

Niche Environment and Heritage (2019) *Dendrobium Colliery Longwall 15 Longwall Report - Aboriginal Heritage Assessment*. An unpublished report for South 32 Illawarra Coal.

South32 - Illawarra Metallurgical Coal (2020) *End of Panel Landscape Monitoring Report, Dendrobium Area 3B*. An unpublished report for DPIE.

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