

Aboriginal Cultural Heritage Management Plan

Longwall 19A Dendrobium Area 3A

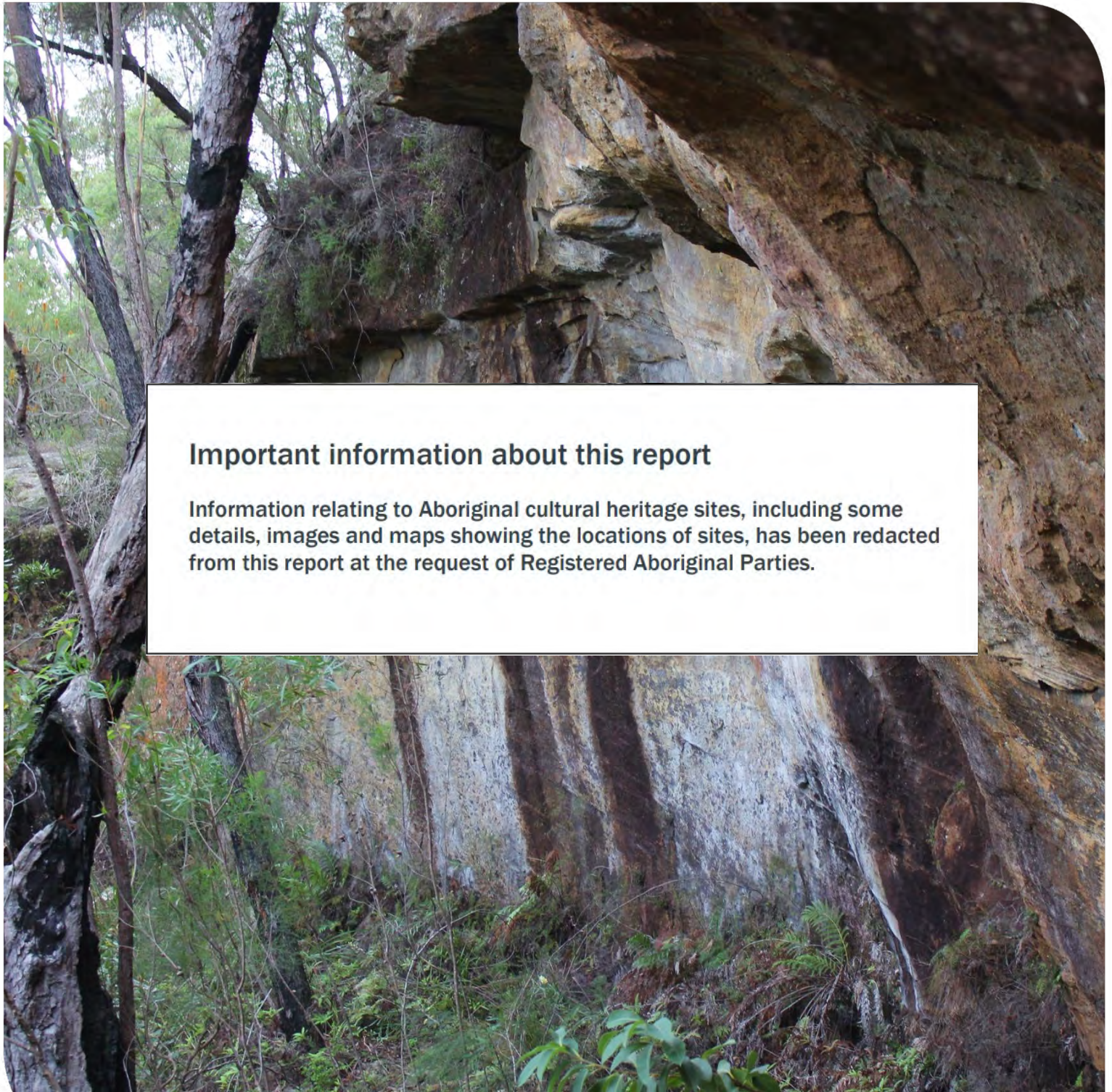
Lake Cordeaux Catchment LGA: Wollongong City Council

Prepared for South32 – Illawarra Metallurgical Coal

Prepared by Niche Environment and Heritage | 12 February 2024

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.



Document control

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1. Introduction

South32 Illawarra Metallurgical Coal (IMC) operates Dendrobium Mine, located in the Southern Coalfield of New South Wales, west of Wollongong and the Illawarra Escarpment and to the east of Bargo. Dendrobium Mine Area 3A lies within the Metropolitan Catchment Area, a declared special area controlled by WaterNSW.

IMC has recently completed the extraction of Longwall 19 in Area 3A of the Dendrobium Mine within Consolidated Coal Lease (CCL) 768, under the Development Consent (DA) 60-03-2001, and proposes to extract Longwall 19A within the same area (The Project). The Project comprises the continuation of underground coal mining operations at Dendrobium Mine Area 3A. The proposed Longwall 19A (Figures 1 and 2) is located immediately south of the previously extracted Longwalls 6-8 and 19, and east of Longwalls 9-18 (Area 3B), and are located to the southwest of Lake Cordeaux, approximately 8 km west of Wollongong, NSW.

1.1 Purpose and scope

In accordance with Condition 12, Schedule 3 of the Dendrobium Development Consent (DA 60-03-2001 Modification 8, 2018), this Aboriginal Cultural Heritage Management Plan (ACHMP) has been prepared as a component of the IMC Longwall 19A Subsidence Management Plan (SMP) to manage the potential environmental consequences of the proposed Project on Aboriginal cultural heritage sites and values.

This report presents an ACHMP to support the Longwall 19A SMP, and is necessary to satisfy the requirement to manage Aboriginal cultural heritage sites and objects under the:

- *National Parks and Wildlife Act 1974* (NPW Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act); and
- Aboriginal Heritage Impact Permit (AHIP-5179) dated 18/12/2023 provided in Appendix 1.

IMC has engaged Niche Environment and Heritage (Niche) to assist with the development of this ACHMP.

The Subject Area is defined by the 600 m boundary around the extent of Longwall 19A, encompassing the area that may be affected by mining related impacts including the:

- Longwall 19A void;
- 600 m boundaries; and
- 35-degree angle of draw.

The Longwall 19A Subject Area encompasses 302 hectares (ha) to the south-west of Lake Cordeaux, located to the immediate south of the previously extracted Longwall 19. Longwall 19A is proposed to be extracted from the Wongawilli Coal Seam, at depths of 290 metres (m) to 360 m subsurface.

Table 1: Overall Void length of Longwall 19A (Source MSEC 2020)

Longwall (LW)	Overall void length including installation heading (m)	Overall void width including first workings (m)	Overall tailgate chain pillar width (m)
LW19A	889*	275	45

*Void length was required to be shortened at the eastern end to allow for a setback of 120 m to the west of Swamp 15a.

IMC previously prepared an Environmental Impact Statement (EIS) (2001) for the Dendrobium Mine that included longwalls in Areas 1, 2 and 3. IMC submitted an Environmental Assessment (EA) in 2007 to support a Modification Application which extended and divided Area 3 into Areas 3A, 3B and 3C. Modification 6 of the Dendrobium Consent was approved 8 December 2008. As outlined in the EA, the longwall layout in Dendrobium Area 3A originally comprised five longwalls, referred to as Longwalls 6 to 10 and each with a void width of 250 m. The subsidence predictions and impact assessments for the original longwall layout were provided in Report No. MSEC311 (Rev. D).

Longwall 19 (previously known as Longwall 10) was extracted following the completion of Longwalls 9 to 18 in Area 3B. The commencing and finishing ends of Longwall 6 to Longwall 8 and Longwall 19 were shortened, and the void widths of Longwall 8 and Longwall 19 were increased to 305 metres. The subsidence predictions and impact assessments for the revised longwall layout were provided in Report No. MSEC1082 (Rev. E).

IMC has completed the extraction of Longwall 6 to Longwall 8 in Area 3A and completed the extraction of Longwall 19 in Area 3A 29 March 2023. IMC is currently mining Longwall 19A in Area 3A. The Longwall 19A SMP was approved by the Planning Secretary on 11 August 2023. Condition 7 of Schedule 3 requires that Longwall 19A be setback at least 120 metres to the west of Swamp 15a.

There are seven (7) Aboriginal cultural heritage sites that have been identified within the Longwall 19A Subject Area, including Browns Road Site 32 (AHIMS ID#52-2-1646) that has been included in Condition 12 of the Project Approval. The RAPs have advised during previous assessments completed by Biosis Research (2007) and Niche Environment and Heritage (2021 and 2022) that all sites have a high cultural significance. The status of sites within the Subject Area can be described as below:

- All have high cultural value, and associated landscape attributes of the area also have value,
- one (1) site has high scientific (archaeological) significance,
- two (2) sites have moderate scientific (archaeological) significance, and
- four sites (4) have a low scientific (archaeological) significance.

Subsequent to the SMP Application, the locations of sites 52-2-1645 and 52-2-1646 as stated on the AHIMs were found to be incorrect during site visits for the End of Panel assessment for Longwall 19. Relevant documentation has been revised with corrected coordinates of these sites.

The potential for adverse impacts on the sites located in the Subject Area from the mining of Longwall 19A has been assessed as unlikely (MSEC, 2022). Subsidence predictions detailed by Mine Subsidence Engineering Consultants ([MSEC] 2022; 2023) suggested that five (5) Aboriginal cultural heritage sites located in the area above the extracted Longwall 19 had the potential to experience impacts from the extraction of Longwall 19A (including DM 15 AHIMS ID#52-2-3639; DM 20 AHIMS ID# 52-2-3644; and Sandy Creek Road 21 AHIMS ID#52-5-0273). MSEC1234 Addendum (MSEC, 2023) revised subsidence predictions for two sites 52-2-1645 and 52-2-1646 with the corrected coordinates and concluded “it is possible but unlikely, therefore, that fracturing could occur in the vicinity of sites 52-2-1645 and 52-2-1646.”

The table below details the Aboriginal cultural heritage sites associated with Longwall 19A.

Table 2: AHIMS within the Subject Area

AHIMS No.	Site Code	Site Type
52-2-1644	Browns Road Site 30	Shelter with Art
52-2-1645	Browns Road Site 31	Shelter with Art
52-2-1646	Browns Road Site 32	Shelter with Art
52-2-3639	DM 15	Shelter with Art
52-2-3644	DM 20	Shelter with Art and Potential Archaeological Deposit (PAD)
52-5-0272	Sandy Creek Road 20	Shelter with Art
52-5-0273	Sandy Creek Road 21	Shelter with Art and Deposit

This ACHMP includes post-mining monitoring and management of Aboriginal cultural heritage sites for Longwall 19A, subject to the previously approved Dendrobium Mine Area 3A Aboriginal Heritage Plan (AHP) (Biosis Research 2010) and in accordance with AHIP-5179 conditions for Longwall 19A as required (following consultation with Heritage NSW). Consistent with the recommended approach in the NSW Department of Planning and Environment (DPE) and NSW Division of Resources and Energy (DRE) (2015) *Guidelines for the Preparation of Extraction Plans*, the IMC Area 3A AHP will be superseded by this ACHMP.

1.2 Structure of the Heritage Management Plan

The remainder of this ACHMP is structured as follows:

Section 2: Describes the review and update of this ACHMP

Section 3: Outlines the statutory requirements applicable to this ACHMP

Section 4: Provides a revised assessment of the potential subsidence impacts and environmental consequences for Longwall 19A

Section 5: Describes the consultation protocol

Section 6: Details the performance measures and indicators that will be used to assess the Project

Section 7: Outlines the baseline data for Aboriginal cultural heritage sites

Section 8: Describes supplementary fieldwork and pre-clearance surveys to be undertaken

Section 9: Describes the monitoring program and provides the detailed Trigger Action Response Plan (TARP)

Section 10: Describes the management, remediation and mitigation measures that will be implemented to reduce potential impacts on Aboriginal cultural heritage

Section 11: Provides a Contingency Plan to manage any unpredicted impacts and their consequences

Section 12: Describes the program to collect baseline data for future SMPs

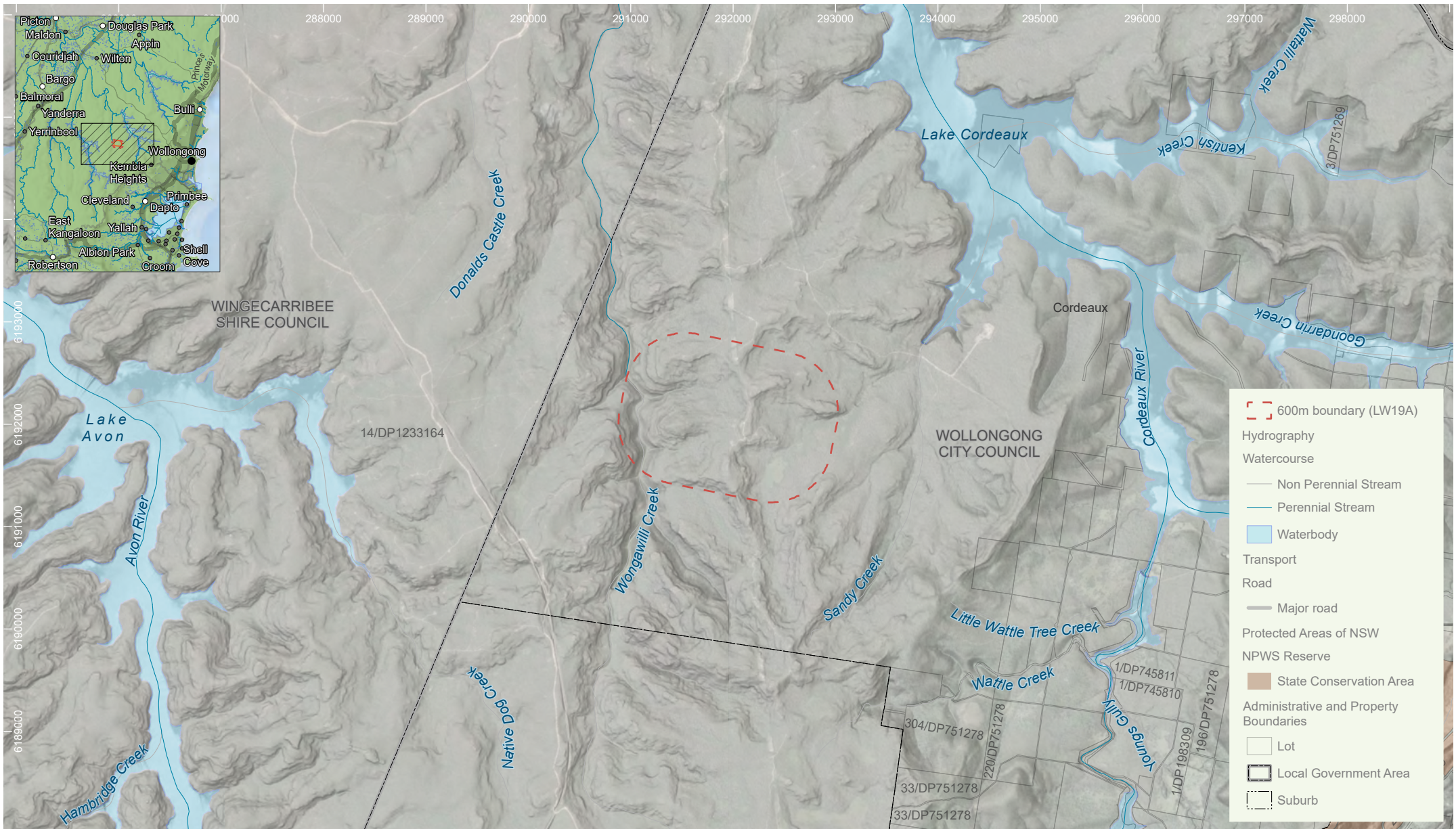
Section 13: Describes the annual review and improvement of environmental performance

Section 14: Outlines the management and reporting of incidents

Section 15: Outlines the management and reporting of complaints

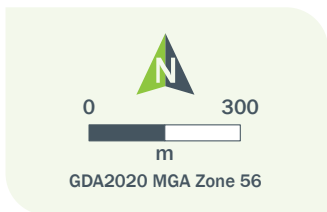
Section 16: Outlines the management and reporting of non-compliances with statutory requirements

Section 17: Lists the references cited in this ACHMP





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Dendrobium Area 3A Longwall 19A, Subject Area
Longwall 19A ACHMP

Niche PM: Stella Quest
Niche Proj. #: 8038
Client: South32 Illawarra Metallurgical Coal

Figure 2

2. Aboriginal Cultural Heritage Management Plan Review and Update

2.1 Overview

In accordance with Condition 2A, Schedule 8 of the Development Consent, this ACHMP will be reviewed within three months of the:

- a) submission of an incident report under condition 4 of Schedule 8;
- b) submission of an Annual Review under condition 5 of schedule 8;
- c) submission of an Independent Environmental Audit under condition 6 of schedule 8; or
- d) approval of any modification of the conditions of this consent, the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.

If necessary, to either improve the environmental performance of the development or cater for a modification, this ACHMP will be revised to the satisfaction of the Secretary and submitted to the Secretary for approval within six weeks of the review. The revision status of this ACHMP is indicated on the title page of each copy. The distribution register for controlled copies of this ACHMP is described in Section 2.2.

2.2 Access to Information

In accordance with Condition 11, Schedule 8 of the Development Consent, 'Access to Information', IMC will make the approved ACHMP publicly available on the IMC, South32 website. IMC recognises that various regulators have different distribution requirements, both in relation to whom documents should be sent and in what format.

3. Statutory Requirements

3.1 Introduction

IMC's statutory obligations are contained in:

- (i) the conditions of the Development Consent;
- (ii) relevant licences and permits, including conditions attached to mining leases; and
- (iii) other relevant legislation.

These are described below.

3.2 Environmental Planning and Assessment Act Approval

Condition 2, Schedule 8 of the Dendrobium 3 Development Consent requires the preparation of a Management Plan as a component of all SMPs. Condition 2, Schedule 8 states that:

Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:

(a) a summary of relevant background or baseline data;

(b) details of:

(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);

(ii) any relevant limits or performance measures and criteria; and

(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;

(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;

(d) a program to monitor and report on the:

(i) impacts and environmental performance of the development; and

(ii) effectiveness of the management measures set out pursuant to condition 2(c);

(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;

(f) a program to investigate and implement ways to improve the environmental performance of the development over time;

(g) a protocol for managing and reporting any:

(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);

(ii) complaint;

(iii) failure to comply with statutory requirements; and

(h) a protocol for periodic review of the plan.

In addition, Conditions 2 and 3, Appendix 4 of the Development Consent outline management plan requirements that are applicable to the preparation of this ACHMP. Table 3 indicates where each component of the conditions is addressed within this ACHMP.

Table 3: Management Plan Requirements

Development Consent Condition	ACHMP Section
Condition 2, Schedule 8	
Management Plan Requirements	
2. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) a summary of relevant background or baseline data;	Sections 4, 7 and 8
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Sections 2 and 3
(ii) any relevant limits or performance measures and criteria; and	Section 6
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 6
(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Sections 3, 4, 5, 6, 7, 8, 9, 10, 11 and 13
(d) a program to monitor and report on the:	
(i) impacts and environmental performance of the development; and	Sections 9, 11 and 13
(ii) effectiveness of the management measures set out pursuant to condition 2(c);	Sections 9, 10 and 13
(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 11
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 13
(g) a protocol for managing and reporting any:	
(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	Sections 14 and 16
(ii) complaint;	Section 15
(iii) failure to comply with statutory requirements; and	Section 16
(h) a protocol for periodic review of the plan.	Section 13
Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	
REVISION OF STRATEGIES, PLANS AND PROGRAMS	
2A. Within three months of the:	
(a) submission of an incident report under condition 4 of Schedule 8;	Section 14
(b) submission of an Annual Review under condition 5 of Schedule 8;	Section 13

Development Consent Condition	ACHMP Section
<p>(c) submission of an Independent Environmental Audit under condition 6 of Schedule 8; or</p> <p>(d) approval of any modification of the conditions of this consent, the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.</p> <p>If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary and submitted to the Secretary for approval within six weeks of the review.</p> <p>Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.</p>	Section 2
<p>Commitment 2, Appendix 4</p> <p>2. Subsidence Impact – Monitoring</p> <p>Pre, during and post mining subsidence impact monitoring will be undertaken in accordance with the approved Subsidence Management Plan. The monitoring component of the Subsidence Management Plan includes but is not necessarily limited to:</p> <p>...</p> <ul style="list-style-type: none"> • Subsidence movement of natural and man made features <p>...</p> <ul style="list-style-type: none"> • Aboriginal cultural heritage sites 	<p>Sections 4, 7, 8, 9, 10</p> <p>Sections 4 and 9</p> <p>Sections 4.4, 7, 8, 9 and 10</p>
<p>Commitment 3, Appendix 4</p> <p>3. Subsidence Impact – Avoidance, Mitigation and Rehabilitation</p> <p>If the monitoring program identifies impacts to natural features that exceed those predicted, the following contingent measures will be implemented.</p> <p>...</p> <p><i>Aboriginal Places of Cultural Significance - Archaeological sites</i></p> <p>Predicted Impacts: Unlikely that the sites will sustain structural impacts. Empirical data suggests the probability of impacts to a site is less than 10%.</p> <p>Avoidance & Mitigation: Baseline, active subsidence and post mining monitoring. Appropriate consultation.</p> <p>Impacts Exceeding Those Predicted: Change in shelter conditions not attributable to natural weathering or preservation – cracking or exfoliation of art panel, movement of existing planes and joints at panel, block fall within shelter or overhang, shelter or overhang collapse.</p> <p>Contingent Measure: Site and event specific mitigation and rehabilitation will be developed with appropriate Aboriginal representatives, Heritage NSW (formerly DECC) and WaterNSW. Techniques may involve installing artificial drip lines, detailed recording of art, stabilising and cleaning rock faces.</p>	<p>Sections 4, 5, 6, 7, 8, 9, 10 and 11</p> <p>Sections 10 and 11</p>

3.3 Licences, permit and leases

In addition to the Development Consent, all activities at or in association with the Dendrobium Mine will be undertaken in accordance with the following licences, permits and leases which have been issued or are pending issue:

- The conditions of mining leases issued by Mining, Exploration and Geosciences (MEG) (previously known as the NSW Division of Resources and Geoscience) under the *NSW Mining Act, 1992* Dendrobium Mining Lease (ML) 1510 and ML 1566 and Consolidated Coal Lease (CCL) 768.
- The Dendrobium Mine and Cordeaux Colliery Rehabilitation Management Plan, DENMP0107, Version 1.1 dated 10 October 2022.
- The conditions of Environment Protection Licence (EPL) No. 3241 issued by the NSW Environment Protection Authority under the *NSW Protection of the Environment Operations Act, 1997*. Revision of the EPL will be required prior to the commencement of IMC activities that differ from those currently licensed.
- The prescribed conditions of specific surface access leases within CCL 768 for the installation of surface facilities as required.
- Water Approval 10WA118772, issued on 1 July 2013 by the Natural Resource Access Regulator.
- WaterNSW Access Consent F2020/1545, most recently issued 18 April 2023.
- Water Access Licences (WALs) issued by the then Department of Industry – Water (now DPE-Water) under the *NSW Water Management Act, 2000*, including WAL 36473, WAL 37465, WAL 42385 and WAL 42386 under the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011.
- Mining and workplace health and safety related approvals granted by the NSW Resources Regulator and WorkCover NSW.
- Supplementary approvals obtained from WaterNSW for surface activities within the Metropolitan Special Area (e.g. fire road maintenance activities).
- AHIP-5179 for Longwall 19A.

3.4 Other legislation

IMC will conduct the Project consistent with the Development Consent and any other legislation that is applicable to an approved DA under the EP&A Act. The following Acts may be applicable to the conduct of the Project:

- *Biodiversity Conservation Act, 2016*
- *Biosecurity Act, 2015*
- *Contaminated Land Management Act, 1997*
- *Crown Land Management Act, 2016*
- *Dams Safety Act, 2015*
- *Dangerous Goods (Road and Rail Transport) Act, 2008*
- *Energy and Utilities Administration Act, 1987*
- *Fisheries Management Act, 1994*
- *Mining Act, 1992*
- *Protection of the Environment Operations Act, 1997*
- *Rail Safety (Adoption of National Law) Act, 2012*
- *Roads Act, 1993*

- *Water Act, 1912*
- *Water Management Act, 2000*
- *Water NSW Act, 2014*
- *Work Health and Safety Act, 2011; and*
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

4. Revised assessment of potential environmental consequences

4.1 Longwall 19A extraction layout

Longwall 19A and the area of land within 600 m of Longwall 19A is shown on Figures 1, 2 and 3. Longwall extraction will occur from east to west towards the main headings (i.e. retreat mining) within the Wongawilli Coal Seam, at depths of approximately 290 m to 360 m. The Longwall 19A void was originally proposed to be 1009m in length including the installation heading, with a panel width of 275m including first workings. Condition 7 of Schedule 3 of the Longwall 19A SMP Approval (11 August 2023) requires that Longwall 19A be setback at least 120 metres to the west of Swamp 15a. The provisional extraction schedule for Longwall 19A is provided in the table below.

Table 4: Longwall 19A Provisional Extraction Schedule

Longwall	Start Date	Estimated Duration	Estimated Completion Date
Longwall 19A	2 November 2023	7 Months	June 2024

The total cumulative predicted subsidence effects, subsidence impacts and/or environmental consequences at the completion of the Project are considered in the Dendrobium – Longwall 19A Subsidence Predictions and Impact Assessments report (MSEC 2022) and Longwall 19A Addendum report on Aboriginal heritage sites (MSEC 2023).

4.2 Relevant information obtained since Development Consent

An Aboriginal Heritage Management Plan was implemented for Dendrobium Area 3A in 2010. Monitoring Assessments were undertaken for Longwalls 6 to 8 by Biosis until completion in 2013, to monitor the impacts and environmental consequences of Project related subsidence on Aboriginal cultural heritage sites. The monitoring programs were undertaken by a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders.

IMC acknowledges that all Aboriginal cultural heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country. Aboriginal cultural heritage sites will be monitored for subsidence impacts by the observation and recording of any and all changes at the sites over the monitoring period.

Archaeological monitoring programs undertaken by Sefton between 1990 and 2000 have continued in the Southern Coalfield at the majority of underground mine sites. Monitoring programs have been undertaken at the Dendrobium Mine and at Tower, Appin, West Cliff, Elouera, Cordeaux, Tahmoor and Metropolitan Collieries. During the past 17 years monitoring programs have been developed and implemented using a similar methodology to Sefton (2000) by (Biosis research 2008, 2009a, 2009b, 2012, 2013a, 2013 and 2015; Gun, and Kayandel Archaeological Services 2007; Kayandel Archaeological Services 2012; Niche 2011, 2012, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c, 2015a, 2015b, 2015c, 2016a, 2016b, 2016c, 2017, 2019, 2020a and 2020b; and Sefton 2000, 2002a, 2002b, 2002c and 2002d).

Baseline recording has been completed for those Aboriginal cultural heritage sites identified by MSEC (2022) as having potential to be affected by subsidence. Site types that are subject to baseline recording in the Southern Coalfield include sandstone shelter sites with art and or potential archaeological deposit, stone artefacts deposits, engravings and sandstone platforms that include engravings (often of animals, humans, anthropomorphic figures and ancestral beings) and or axe grinding grooves.

At the completion of baseline recording, Aboriginal cultural heritage sites are often monitored a second time in line with the individual projects monitoring requirements, generally within 3 months of the completion of a longwall extraction. Monitoring programs are generally continued in this fashion until the Aboriginal cultural heritage site is no longer subject to subsidence movements.

Within the Southern Coalfield, a total of 206 Aboriginal cultural heritage sites have been monitored since 1990 (Regal and Reeves 2017). Of the 206 Aboriginal cultural heritage sites monitored (Table 5), 26 Aboriginal cultural heritage sites were identified as having impacts or changes that may be attributable to subsidence, environmental factors or a combination of both.

The most recently observed impacts to Aboriginal cultural heritage sites were as a result of the extraction of Longwall 19. Subsidence related changes were identified on 28 March 2023 at two sites above Longwall 19, DM 15 AHIMS ID#52-2-3639 and Sandy Creek Road 21 AHIMS ID#52-5-0273.

The observed impacts at each Aboriginal cultural heritage site are summarised in Table 5.

Table 5: Aboriginal cultural heritage sites within the Southern Coalfield observed to have subsidence related changes during monitoring programs.

AHIMS No.	Site Code	Site Type	Subsidence Related Changes
52-2-0094	Flat Rock Creek 4	Shelter with Art	Opening of existing bedding planes, along the roof/rear wall and minor roof fall.
52-2-0106	Flat Rock Creek 10	Shelter with Art	Cracks in rear wall, potential for altered seepage to impact art – mitigation with an artificial drip line.
52-2-0089	Flat Rock Creek 11	Shelter with Art	Exfoliation and block fall at rear wall.
52-2-0154	Flat Rock Creek 49	Shelter with Art	Minor block fall from rear wall and ceiling.
52-2-0258	Flat Rock Creek 27	Sandstone platform with engraving and axe grinding grooves	Crack in sandstone platform.
52-2-0176	Flat Rock Creek 152	Shelter with Art	Cracking and minor block fall at rear wall.
52-2-1638	Browns Road Site 24	Shelter with Art	Minor block fall at rear wall.
52-2-1625	Browns Road Site 10	Shelter with Art	Cracking and minor blockfall at rear wall.
Number could not be confirmed	Wedderburn Road 1	Shelter with Art	Cracking in floor and rear wall.
52-2-1300	Wedderburn Road 2	Shelter with Art	Opening of crack in back wall.
52-2-1162	Stokes Creek Site 67	Shelter with Art	Opening of the bedding plane above the art and increased water seepage as a result.
52-2-2252	Dendrobium 4	Shelter with Art	Opening of crack along the back wall.
52-2-0195	Flat Rock Creek 34	Shelter with Art	Horizontal cracking visible on the ceiling of the shelter. Cracking occurred over the most southern hand stencil on the back panel.
52-2-3083	Flat Rock creek 281	Shelter with Art	Thin cracking adjacent to the hand stencil at the northern end of the shelter.
52-2-3086	Flat Rock Creek 284	Shelter with Art	Fractured a corner of a buttress-like formation on the rear wall.

AHIMS No.	Site Code	Site Type	Subsidence Related Changes
52-2-2243	Georges River No. 2	Shelter with Art	Thin vertical cracking in the shelter ceiling, adjacent to the art panel.
52-2-0396	Flat Rock Creek 15	Shelter with Art	The large vertical fissure in the central back wall had increased in width (opened) and shifted laterally.
52-2-2244	Georges River No. 3	Shelter with Art and Axe Grinding Grooves	Opening of the horizontal bedding plane, cracking and exfoliation along the back wall.
Number could not be confirmed	Met 1	Shelter with Art	Vertical cracking within the shelter.
52-2-0826	Flat Rock Creek 176	Shelter with Art	Vertical cracking at the northern and southern ends of the shelter.
52-2-3077	Flat Rock Creek 275	Shelter with Art	The horizontal bedding plane joints at the back of the shelter have been noted as opening, three hairline cracks have formed, running vertical from the bedding plane.
52-2-3486	Flat Rock Creek 301	Shelter with Art	A large crack was observed running east to west along the entire rock platform. Crack is approximately 3.08 m to the north of the grinding groove and is approximately 25m long and continues past the rock platform.
52-2-1626	Browns Site 11	Shelter with Art	Vertical and diagonal cracking within the rockshelter, exfoliation of surfaces and opening of some joints. Small crack in sediments on floor of shelter.
52-2-3645	DM21	Shelter with Art	The landscape and rock formation surrounding the shelter site shows fracturing, the interior cavern of the shelter did not have any impacts from subsidence.
52-5-0273	Sandy Creek Road 21	Shelter with Art	Horizontal cracking, opening of joints, exfoliation of surfaces and minor rockfall. Art panels not affected by cracking or exfoliation.
52-2-3639	DM15	Shelter with Art	Horizontal and diagonal cracking of surfaces, including the art panel and single motif that is present at this site.

The results of the monitoring programs have been used to assess the likelihood of Aboriginal cultural heritage sites being impacted from subsidence movements (Sefton 2000; 49, Regal and Reeves 2017):

Less than 10% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.

The Dendrobium Area 3 Statement of Commitments (2007) identified predicted impacts to Aboriginal Places of Cultural Significance – Archaeological sites would be “unlikely that all sites will sustain structural impacts. Empirical data suggests the probability of impacts to a site are less than 10%.” The impacts assessed in relation to the probability analysis are described in Sefton (2000) and Regal and Reeves (2017). The commitment specified avoidance and mitigation including, “Baseline, active subsidence and post mining monitoring. Appropriate consultation and approvals.”

Aboriginal cultural heritage sites are considered to be “affected by subsidence impacts” if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration (Sefton 2000, Regal and Reeves 2017):

- overhang collapse;
- cracking of sandstone or soil;
- impacts to Aboriginal art or grinding grooves; and/or
- rock fall that impacts a site, including Aboriginal art.

26 Aboriginal cultural heritage sites are identified as having impacts or changes that may be attributable to subsidence of the 206 Aboriginal cultural heritage sites monitored (Regal and Reeves 2017).

Of the 26 Aboriginal cultural heritage sites impacted, three (3) Sandstone Shelter with Art sites have been identified as having direct impact to archaeological features resulting in adverse consequences and loss of Aboriginal cultural heritage values attributable to subsidence:

- Flat Rock Creek 34, AHIMS ID# 52-2-0195
- Flat Rock Creek 281, AHIMS ID# 52-2-3083, and
- DM15 (AHIMS ID#52-2-3639)

In these three cases the adverse consequences were cracking that occurred directly across motifs or adjacent to the art panels. The cracks adjacent to art panels have caused changes to water seepage above the panel, causing water flow to redirect over the art. This indicates that the percentage of Aboriginal cultural heritage sites with impacts to art panels in this instance is approximately 2% of the 144 sites with art assessed across the Southern Coalfield; considerably less than the 10% predicted to be affected by subsidence impacts by Sefton (2000) within the mining area. In summary the most frequently observed impacts from over 30 years of monitoring the effects of mine subsidence on Aboriginal archaeological sites in the Southern Coalfield has shown that impacts have involved cracking of rock and rock surfaces, separation of strata, movement along existing structural elements such as planes and joints, and associated exfoliation and block fall. Often naturally occurring processes such as granular loss, mass movement, vegetation growth, exfoliation of shelter surfaces, water ingress and vandalism were observed in the absence of subsidence during monitoring programs. This is indicative of the rapid landscape retreat that is present in the Hawkesbury sandstone environments (Reeves and Regal 2017; 277-278, Turkington and Paradise 2005). In very rare cases subsidence induced cracking has occurred coincident with art or art panels, and no shelters have collapsed except Whale Cave (Reeves and Regal 2017).

The results of the monitoring to date are consistent with the potential subsidence impacts and environmental consequences predicted in the Project EA, where it was expected that the majority of identified Aboriginal cultural heritage sites would experience no significant change, particularly when compared to natural weathering processes unrelated to mining and given the conservative nature of the subsidence predictions.

The potential for vehicle-generated dust in the WaterNSW Metropolitan Special Area or rare minor blasting events underground (which is undertaken at significant depths) to impact on Aboriginal cultural heritage sites in the underground mining area is very low. Vehicle access in the WaterNSW Metropolitan Special Area is via formed tracks and existing fire trails. IMC personnel and contractors are required to observe speed limits when using the fire trails, which limits the amount of dust generated. In most cases Aboriginal cultural heritage sites are distant from the tracks and fire trails, and therefore are not subject to direct exposure to any dust generated by vehicles using the tracks and fire trails.

This information has been redacted
For more information please contact South 32 Illawarra Metallurgical Coal.

4.3 Environmental risk assessment

The development of an impact prediction methodology provides reasonably accurate subsidence impact predictions to shelter sites, which, in combination with a cultural heritage significance assessment, is then used to provide appropriate avoidance, mitigation and management recommendations (generally subsidence monitoring and response plans). The risk of impact criteria adopted for the purposes of this assessment are shelter size (volume), the presence of water seepage, maximum predicted subsidence movement and the presence/absence of art. Risk categories are from moderate to negligible and reflect subsidence effect occurrence and actual impacts to heritage values from subsidence effects monitored to date. A description of risk categories and criteria is provided in Table 6.

The subsidence risk assessment for Aboriginal cultural heritage sites in the Project Area is presented in Table 9. This assessment includes the parameters considered in Sefton’s 2000 principal components analysis and subsidence predictions provided by Mine Subsidence Engineering Consultants (MSEC) (MSEC 2012: 75). The assessment of risk was made using a cumulative scoring of the criteria outlined in Table 6. A summary of potential impacts is also provided in Table 6. To date no impacts from subsidence effects have resulted in a total loss of heritage values.

Table 6: Subsidence Risk Categories and Criteria.

Category	Description	Criteria	LW19A Sites Assessment
Moderate	Moderate chance of subsidence effects occurring. Impacts to heritage values are possible.	<ul style="list-style-type: none"> The shelter has an art panel present. The shelter has a volume greater than 50 cubic metres. The shelter has joints or bedding plans subject to water seepage. Maximum predicted subsidence is greater than 300mm. 	<ul style="list-style-type: none"> No sites
Low	Low chance of subsidence effects occurring. Impacts to heritage values unlikely.	<ul style="list-style-type: none"> The shelter has a volume greater than 50 cubic metres. Maximum predicted subsidence is greater than 300mm. 	<ul style="list-style-type: none"> DM15 DM20 Sandy Creek Rd 21
Very Low	Very low chance of subsidence effects occurring. Impacts to heritage values are highly unlikely.	<ul style="list-style-type: none"> The shelter has a volume less than 50 cubic metres and maximum predicted subsidence is greater than 300mm. The shelter has a volume more than 50 cubic metres and maximum predicted subsidence is less than 300mm. 	<ul style="list-style-type: none"> Browns Rd 30 Browns Rd 32
Negligible	Impacts to heritage values are unlikely and if they did occur would normally be indistinguishable from natural environmental effects.	<ul style="list-style-type: none"> The shelter has a volume less than 50 cubic metres. Maximum predicted subsidence is less than 300mm, tensile strain predictions are <0.5mm/m and compressive strain estimates are <0.01mm/m. 	<ul style="list-style-type: none"> Browns Rd 31 Sandy Creek Rd 20

4.4 Aboriginal Cultural Heritage Sites

The seven (7) Aboriginal cultural heritage sites identified within the Longwall 19A Subject Area are shown on Figure 3, and a summary is provided in the table below.

Table 7: Aboriginal Cultural Heritage Sites located within the Subject Area of Longwall 19A.

AHIMS No.	Site Code	Site Type	Scientific (Archaeological) Significance Rating
52-2-1644	Browns Road Site 30	Shelter with Art	Low- The art comprises of one charcoal outline/ infill frontal human figure. One artefact has been located within the shelter dripline.
52-2-1645	Browns Road Site 31	Shelter with Art	Low – the three charcoal motifs within this Shelter with Art site are poorly preserved and a common site type within the regional area. Additional comment from Niche notes that the two charcoal indeterminates and one kangaroo motif located on the roof of the sandstone shelter site is representative of motif types of the region.
52-2-1646	Browns Road Site 32	Shelter with Art	High – This shelter provides a diversity of Art motifs with varying pigment types. Additional comment from Niche notes the art depicted in this shelter features a variety of inland native terrestrial and aquatic animal species that would have been present as food resources within the Woronora Plateau. This shelter also presents several red ochre handprints and stencils which are densely layered over charcoal Art. Ochre handprints are a rare motif type for the Dendrobium Area. The density and layering of the handprints over the charcoal art indicated that the site was visited a number of times by the Aboriginal community in the past.
52-2-3639	DM 15	Shelter with Art	Low – this shelter is an example of the most common type motif in Shelter with Art site types within the region, being a male frontal anthropomorphic figure. The Art is in a good condition from case hardening preservation.
52-2-3644	DM 20	Shelter with Art and Potential Archaeological Deposit (PAD)	Low – This shelter features a row of charcoal motifs that are in a poor condition. This site is a common site type within the region. And contains no outstanding characteristics. Additional comment from Niche notes that the combination of charcoal motifs a partial anthropomorphic figure is a representative of common Art motifs within the Subject Area.
52-5-0272	Sandy Creek Road 20	Shelter with Art	Moderate - The art comprises of one dry red ochre male figure with boomerang in hand, and one charcoal indeterminate charcoal outline/ infill motif.
52-5-0273	Sandy Creek Road 21	Shelter with Art and Deposit	Moderate - This Shelter with Art and Deposit contains notable irregular motifs. The Art is in moderate condition and the deposit has potential to inform of archaeological assemblages.

AHIMS No.	Site Code	Site Type	Scientific (Archaeological) Significance Rating
			Additional comment from Niche notes this site has a combination of indeterminate and anthropomorphic motifs of interest, being a charcoal frontal male figure with large eyes, and small scatter of artefacts representative of materials that were not present within the Subject Area and were likely sourced from distant regions, such as chert and silcrete.

The Mine Subsidence Engineering Consultants report ([MSEC] 2022) identify three (3) previously mentioned Aboriginal cultural heritage sites located above Longwall 19 have the potential to experience direct impacts from the extraction of Longwall 19A. MSCE1234 Addendum (MSEC, 2023) revised subsidence predictions for two sites Browns Road Site 31 (AHIMS ID#52-2-1645) and Browns Road Site 32 (AHIMS ID #48-5-1646) with the corrected coordinates and concluded “it is possible but unlikely, therefore, that fracturing could occur in the vicinity of sites 52-2-1645 and 52-2-1646.”

The sites within the Subject Area comprise five sandstone Shelters with Art, one Shelter with Art and Deposit, and one Shelter with Art and Potential Archaeological Deposit (Figure 3 and Table 5). Five (5) AHIMS registered sites are predicted to have the potential to be directly impacted by Longwall 19A (DM 15 AHIMS ID #52-2-3639, DM 20 AHIMS ID#52-2-3644, Sandy Creek Road 21 AHIMS ID#52-5-0273, Browns Road Site 31 AHIMS ID#52-2-1645 and Browns Road Site 32 AHIMS ID #48-5-1646).

The proposed extraction of Longwall 19A is likely to result in fracturing of the exposed bedrock along the ridgelines and, where the rock is marginally stable, could then result in rockfalls or instabilities. Should this fracturing or rock fall occur at the Aboriginal heritage sites these changes will adversely impact the heritage values of the sites.

Cultural Significance

IMC acknowledges that the entire Subject Area holds cultural significance to the local Aboriginal community, and that all Aboriginal cultural heritage sites within the Subject Area are of high cultural significance. There is the contemporary view held by Aboriginal people that all Aboriginal cultural objects and sites are important within the region due to their interconnectivity with the natural landscape and past occupation of the region.

An extract regarding the cultural significance of the Subject Area from the Longwall 19 SMP Appendix A Archaeological Report is provided below (Niche, 2020b):

The entire Subject Area holds cultural significance to the local Aboriginal community. This is the contemporary view held by Aboriginal people that all Aboriginal objects and sites are important within the region, due to their interconnectivity with the natural landscape and past occupation of the region.

The range in Aboriginal cultural heritage sites within the Subject Area are representative of intact and tangible items of cultural heritage, providing a strong cultural link to generations past. These Aboriginal cultural heritage sites are seen to hold high cultural significance based on this strong cultural connection. Any damage that may occur to these sites has an impact to the local Aboriginal Community (Knight, 2020 pers. comms.).

The Subject Area is located on the traditional country of the Dharawal nation. Tindale (1940, 1974) considered Dharawal/Tharawal boundaries to extend from Botany Bay in the north, west to Appin, and as far south as Nowra and Goulburn. The coastal plains and escarpment around Wollongong were inhabited by the Wadi Wadi, a tribe or subgroup of Dharawal-speakers (Tindale 1940:194-5, DEC 2005:3). Other named groups of the Dharawal language group are thought to include the Gweagal, Norongerraga, Illawarra, Tagary, Wandeanega, Wodi Wodi and Ory-ang-ora (Tindale 1974). Attenbrow (Attenbrow 2010:35) points out that such boundary mapping, undertaken as it was in the nineteenth century, is indicative at best, however, there appears to be reasonably strong agreement between those who have mapped language boundaries that the area is Dharawal country. Dharawal people distinguished themselves as Fresh Water, Bitter Water or Salt Water depending on where in the wider language boundary their traditional lands were – the inland hills and valleys, the plateaus and swamps or the coastal plain respectively (DEC, NSW, 2005:6)

Past Aboriginal land use of the Subject Area can be re-traced using contemporary comments from Aboriginal people, previously recorded archaeological resources, and historical observations of early settlers and surveyors (though the inherent bias present in historical European observations must be recognised).

Aboriginal cultural heritage sites within the Woronora Plateau remain in relatively undisturbed environment with a relatively high density of sites, many being a highly visual cultural resource which creates a strong sense of place and cultural identity. It has been identified in the previous Dendrobium Area 3 Archaeological and Cultural Heritage Assessment (Biosis Research, 2007) that all Aboriginal cultural heritage sites located within Dendrobium Area 3 are of cultural significance to the Illawarra Local Aboriginal Land Council, Korewal Elouera Jerrunga and Cubbitch Barta Native Title Claimants Aboriginal Corporation. It is important that comment on the area is provided directly by members of the Aboriginal community.

4.4.1 Revised Subsidence Predictions

The subsidence predictions for Longwall 19A in relation to Aboriginal cultural heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour have been prepared by MSEC (2020; 2022) (Table 9).

Seven (7) AHIMS registered Aboriginal cultural heritage sites are located within the Subject Area (Figure 3 and Table 5). One (1) of these sites is a sandstone Shelter with Deposit (DM 17 AHIMS ID#52-2-3641); one (1) is a Shelter with Art and Deposit (Sandy Creek Road 21 AHIMS ID#52-5-0273); five (5) are Shelters with Art (Browns Road Site 30 AHIMS ID#52-2-1644; Browns Road Site 31 AHIMS ID#52-2-1645, Browns Road Site 32 AHIMS ID#52-2-1646, DM 15 AHIMS ID#52-2-3639, and Sandy Creek Road 20 AHIMS ID#52-5-0272); and one site is a Shelter with Art and Potential Archaeological Deposit (PAD) (DM 20 AHIMS ID#52-2-3644). There are no additional sites known that are located within the Subject Area based on the 600 m boundary and 35-degree angle of draw.

Table 8: AHIMS within the Subject Area

AHIMS No.	Site Code	Site Type
52-2-1644	Browns Road Site 30	Shelter with Art
52-2-1645	Browns Road Site 31	Shelter with Art
52-2-1646	Browns Road Site 32	Shelter with Art
52-2-3639	DM 15	Shelter with Art
52-2-3644	DM 20	Shelter with Art and Potential Archaeological Deposit (PAD)

AHIMS No.	Site Code	Site Type
52-5-0272	Sandy Creek Road 20	Shelter with Art
52-5-0273	Sandy Creek Road 21	Shelter with Art and Deposit

For Longwall 19A, five (5) of the seven (7) AHIMS registered sites within the Subject Area were predicted to have the potential to be directly affected by the proposed works: DM 15 AHIMS ID #52-2-3639, DM 20 AHIMS ID#52-2-3644, Sandy Creek Road 21 AHIMS ID#52-5-0273, Browns Road Site 31 AHIMS ID#52-2-1645, and Browns Road Site 32 AHIMS ID #48-5-1646. There are no sites located directly above Longwall 19A, however, three (3) of these sites are located directly above Longwall 19 (DM 15 AHIMS ID #52-2-3639, DM 20 AHIMS ID#52-2-3644 and Sandy Creek Road 21 AHIMS ID#52-5-0273). Site DM 13 (AHIMS ID#48-2-0056) is located above the previously extracted Longwall 8 and site Browns Road Site 32 (AHIMS ID #48-5-1646) is located approximately 130 m west of the finishing end of the Longwall 19A.

The maximum predicted total subsidence effects for Longwall 19A are 3250 mm vertical subsidence, 40 mm/m tilt (i.e. 4 %, or 1 in 25), 1.0km⁻¹ hogging and sagging curvatures (MSEC 2022). Table 9 provides further details on subsidence predictions by MSEC (2020:58-60 and 2022:63) for the Aboriginal cultural heritage sites located within the Subject Area.

MSCE1234 Addendum (MSEC, 2023) revised subsidence predictions for two sites Browns Road Site 31 (AHIMS ID#52-2-1645) and Browns Road Site 32 (AHIMS ID #48-5-1646) with the corrected coordinates and concluded “it is possible but unlikely, therefore, that fracturing could occur in the vicinity of sites 52-2-1645 and 52-2-1646.”

The remaining two (2) site within the Subject Area are, Browns Road Site 30 (AHIMS ID#52-2-1644), and Sandy Creek Road 20 (AHIMS ID#52-5-0272). These sites are located on the sides of the ridgelines where there are no significant surface incisions, and are therefore not expected to experience measurable valley related effects (MSEC 2020:58-60 and MSEC 2020:63).

The extraction of Longwall 19A is likely to result in fracturing of the exposed bedrock along the ridgelines and, where the rock is marginally stable, could then result in rockfalls or instabilities. The fracturing and rock falls could adversely impact the sandstone shelters located within the proposed Longwall 19A Subject Area.

The potential for adverse impacts on Aboriginal cultural heritage sites DM 15 (AHIMS ID #52-2-3639), DM 20 (AHIMS ID#52-2-3644) and Sandy Creek Road 21 (AHIMS ID#52-5-0273) has been assessed as unlikely (i.e. less than 10 %) (MSEC 2020 and MSEC 2022). However, it is possible that these sites could experience fracturing resulting in spalling or rock falls. The potential for adverse impacts on Aboriginal cultural heritage site Browns Road Site 32 (AHIMS ID #48-5-1646) and Browns Road Site 31 (AHIMS ID#52-2-1645) is possible but unlikely based on the predicted subsidence effects and the distance of the site from the proposed Longwall 19A (MSEC 2023).

Table 9: Revised Subsidence Predictions for Longwall 19A (LW19A) Aboriginal Cultural Heritage Sites

Aboriginal Cultural Heritage Sites ¹	Maximum Predicted Total Vertical Subsidence ² (mm)	Maximum Predicted Total Tilt ³ (mm/m)	Maximum Predicted Total Hogging Curvature ⁴ (km ⁻¹)	Maximum Predicted Sagging Curvature ⁴ (km ⁻¹)
Browns Road Site 30 (AHIMS ID#52-2-1644)	< 20	< 0.5	< 0.01	< 0.01
Browns Road Site 31 (AHIMS ID#52-2-1645)	< 20	< 0.5	< 0.01	< 0.01
Browns Road Site 32 (AHIMS ID#52-2-1646)	< 20	< 0.5	< 0.01	< 0.01
DM 15 (AHIMS ID#52-2-3639)*	2350	30	0.05	0.65
DM 20 (AHIMS ID#52-2-3644)*	1450	5.4	0.15	0.09
Sandy Creek Road 20 (AHIMS ID#52-5-0272)	< 20	< 0.5	< 0.01	< 0.01
Sandy Creek Road 21 (AHIMS ID#52-5-0273)*	1400	10	0.35	0.06
*Sites predicted to be directly affected by the proposed extraction of Longwall 19A.				
Site of High Scientific (Archaeological) Significance				

Source: after MSEC (2022).

4.4.2 Revised Assessment of Potential Subsidence Impacts and Environmental Consequences

The Longwall 19A SMP Subsidence Assessment (MSEC 2022) provides a description of the impacts on Aboriginal cultural heritage sites (including open sites and sandstone overhang sites) in the Southern Coalfield as a consequence of longwall mining. The following provides a summary of potential impact mechanisms and any changes to the predicted subsidence impacts and environmental consequences due to the revised subsidence predictions for Longwall19A.

Open Sites

Open sites have the potential to be impacted by the cracking of sandstone resulting from mine subsidence. No open sites are located within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A.

Sandstone Overhang Sites

There are seven (7) sandstone overhang sites located within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A (Table 9). Of the seven sites with overhangs, five (5) contain art only (Browns Road Site 30 AHIMS ID#52-2-1644, Browns Road Site 31 AHIMS ID#52-2-1645, Browns Road Site 32 AHIMS ID#52-2-1646, DM 15 AHIMS ID# 52-2-3639, Sandy Creek Road 20 AHIMS ID#52-5-0272) and two (2) contain art and deposit or PAD (DM 20 AHIMS ID#52-2-3644 and Sandy Creek Road 21 AHIMS ID#52-5-0273). Overhang sites can potentially be impacted by the cracking of sandstone. Where cracking is

¹ Aboriginal heritage sites within the 600 m boundary of Longwall 19A and/or predicted 20 mm subsidence contour.

² Subsidence refers to vertical displacements of the ground.

³ Tilt is the change in the slope of the ground as a result of differential subsidence and is calculated as the change in subsidence between two points divided by the distance between those points.

⁴ Curvature is the second derivative of subsidence, the rate of change of tilt, and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by average length of those sections.

coincident with an overhang, it is possible there could be cracking of art panels and/or isolated rock fall as the result of mining, or in rare cases, overhang collapse.

The majority of the Aboriginal cultural heritage sites are located above solid coal and based on the low magnitudes of the predicted subsidence movements, impacts to these sites resulting from the extraction of Longwall 19A are considered unlikely (MSEC 2020: 60 and MSEC 2022:65). Surface fracturing of the bedrock can occur outside the longwall layouts, however such fracturing is minor and isolated, and the likelihood of such fracturing impacting the Aboriginal cultural heritage sites outside the longwall layouts is considered to be low (MSEC 2020 and MSEC 2022).

Table 6 presented a risk analysis based on some of the rock shelter features and components developed by Sefton (2000) and subsequent studies. This risk assessment showed that adverse impacts that result in the loss of heritage values at the sites have a low likelihood of occurring. Impacts that would result in the total loss of heritage values at an individual site have not previously occurred in the Southern Coalfield.

In addition to the above, Section 10.2 provides an additional assessment for Aboriginal cultural heritage sites of high scientific (archaeological) significance and/or particular Aboriginal cultural significance. Notwithstanding the above and the assessments presented in Section 4.2.2 and 10.2, Section 9 describes a monitoring program that will be implemented to monitor the impacts and consequences of Project related subsidence on Aboriginal cultural heritage sites. The monitoring includes Aboriginal cultural heritage sites of low, moderate and high (archaeological) significance.

5. Consultation Protocol

5.1 Identification of Aboriginal Stakeholders

For the purpose of this ACHMP, Aboriginal stakeholders are defined as being those Aboriginal groups/parties who have previously registered an interest in being consulted in relation to the Project or who have been involved on an ongoing basis with IMC. These Aboriginal stakeholders include the following:

- Cubbitch Barta Native Title Claimants Aboriginal Corporation;
- Gary Caines;
- Illawarra Local Aboriginal Land Council;
- Korewal Elouera Jerrungurah Tribal Elders Council;
- Leanne Tungai;
- Merrigarn;
- Murra Bidgee Mullangari Native Title Claimants;
- Murramarang;
- Muragadi Heritage Indigenous Corporation;
- Three Ducks Dreaming;
- Warra Bingi Nunda Gurr;
- Wodi Wodi Traditional Owners;
- Woronora Plateau Gundungara Elders Council; and
- South Coast Native Title Claimants.

5.2 Aboriginal Stakeholder Participation

IMC is committed to maintaining ongoing consultation with Aboriginal stakeholders throughout the life of the Project; however, it is the responsibility of Aboriginal stakeholders to ensure that up-to-date contact details (full name, postal address, telephone number, and where possible, email address) are provided to IMC.

5.2.1 Involvement of Aboriginal Stakeholders in fieldwork

The number of participants in an effective field team is governed by a number of safety, logistic and access considerations, including:

- **Safety:** a large group can be difficult to keep together when moving through dense vegetation in steep terrain as is the case across the majority of the Project underground mining area. Large groups move slowly (especially through dense vegetation and in steep terrain) and can prevent a rapid response (i.e. evacuation) to hazards that can be encountered in the Project underground mining area (e.g. bush fire warnings and electrical storms).
- **Logistics:** Participant numbers are limited by vehicle availability and safety restrictions. The isolated nature of the Project underground mining area requires the use of vehicles for efficient field work.
- **Access Restrictions:** Areas within the Project underground mining area are located within a WaterNSW Schedule One special area. Public access is controlled in this area to protect water quality and ecological integrity (WaterNSW and OEH, 2015). Excessive access into this area is not consistent with the WaterNSW's Special Areas Strategic Plan of Management (WaterNSW and OEH, 2015).

Aboriginal stakeholders will be invited to attend relevant scheduled fieldwork in consideration of the above. Scheduled fieldwork to which Aboriginal stakeholders may be invited to attend includes:

- Aboriginal cultural heritage monitoring (Section 9);
- supplementary fieldwork (Section 8); and
- the planning for and/or implementation of management and mitigation measures (Section 10).

Invitations to attend scheduled fieldwork will be provided in writing with 10 business days' notice and no less than 5 business days' notice where unscheduled inspections are required. Where there are matters that require rapid assessment and participation, with agreement from RAPs, the 5 days' notice may be less. Dates for undertaking fieldwork will be subject to consultation with Aboriginal stakeholders and archaeologists, and scheduling and conducting of fieldwork will be subject to access conditions as required by WaterNSW, which may result in delays and unplanned changes to some fieldwork.

Prior to undertaking fieldwork, all participating Aboriginal stakeholders and archaeologists will be required to comply with the workplace health and safety requirements of IMC. These requirements include the provision of copies of current relevant insurances (i.e. public liability and workers compensation) and appropriate personal protection equipment.

All IMC staff and contractors (including Aboriginal stakeholders and archaeologists) may be subject to random drug and alcohol testing. All IMC staff and contractors (including Aboriginal stakeholders and archaeologists) must be able bodied and fit to undertake the work required.

5.2.2 Ongoing consultation with Aboriginal Stakeholders

IMC will continue to maintain a consultation log to record all correspondence with Aboriginal stakeholders (e.g. emails, telephone calls, letters, meeting minutes, etc.).

Aboriginal stakeholders will be invited to comment on relevant draft documentation regarding the management of Aboriginal cultural heritage, if and when required.

Where the ACHMP is amended or modified, Aboriginal stakeholders and Heritage NSW will be provided with a reasonable opportunity to comment on the amendments before the revised version is adopted. In the context of this ACHMP, an amendment or modification would include any change that affects the management of Aboriginal cultural heritage associated with IMC. Examples of amendments or modifications in the context of this ACHMP include:

- Any change to the monitoring program methodology (e.g. monitoring frequency or parameters).
- Any change to the available remediation or mitigation measures (e.g. proposed use of a new engineering technology to reduce potential consequences).
- Any change to the surface disturbance protocol.

Copies of earlier drafts of this ACHMP were sent to the Aboriginal stakeholders identified in Section 5.1, with a comment period open for two-weeks on the following dates:

- 26 March 2021 (ACHMP for Longwall 19 and 19A)
- 1 May 2023 (revised ACHMP for Longwall 19 and 19A)

One written submission was received from the Illawarra LALC (reproduced in full in Annex 2). Illawarra LALC stated their opposition to longwall mining in the Illawarra Escarpment and water catchment areas. Several matters were raised specifically regarding this draft management plan; these along with responses are summarised in Annex 2.

5.2.3 Aboriginal Stakeholder Access Protocol

In addition to scheduled field activities, Aboriginal stakeholders may apply to WaterNSW or other landholders for access to Aboriginal cultural heritage sites within the larger Project Area (e.g. for personal, spiritual or cultural reasons). IMC will endeavour to facilitate the requested access, consistent with personnel workplace health and safety requirements and associated landholder requirements.

6. Performance measures and indicators

Condition 12 of the Development Consent required IMC to do the following in relation to Aboriginal cultural heritage:

The SMPs under Condition 12 must include an Aboriginal Heritage Management Plan, which must include a:

- (a) description of known Aboriginal heritage sites*
- (b) protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal heritage*
- (c) description of the measures that would be implemented to protect Aboriginal sites generally, including measures that would be implemented to secure, analyse and record sites at risk of subsidence and;*
- (d) description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the development.*

Aboriginal cultural heritage sites are subject to ongoing natural deteriorating processes unrelated to mining, including impacts from tree roots, natural weathering or deterioration, natural cracking of sandstone and inappropriate visitor behaviour (Lambert, 1989; Reeves and Regal, 2017). Limited long term studies have been undertaken on subsidence impacts to overhangs in the NSW Southern Coalfield and as the internal structures of overhangs (e.g. existing bedding planes, joints, cracking and seepage) are not always observable, not all risks to shelters from mining can be identified. Therefore, it can be difficult to clearly differentiate between subsidence impacts and natural weathering.

As indicated in Section 4.2, IMC acknowledges that all Aboriginal cultural heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country.

7. Baseline Data

Baseline recording of Aboriginal cultural heritage sites for Longwalls 6-8 and 9-18 and Longwall 19 and 19A has been conducted by Biosis Research and Niche Environment and Heritage. The baseline records include:

- a photographic record of each Aboriginal cultural heritage site;
- detailed scaled plans of each site including physical characteristics and features; and
- detailed information regarding the dimensions, composition and features of the site.

All of the currently known Aboriginal archaeological sites within Dendrobium Area 3A have been subject to baseline recording at the level appropriate for registration on the Aboriginal Heritage Information Management System (AHIMS) at Heritage NSW (Tables 7 and 8). The purpose detailed is to:

- Mitigate the risk of potential impact through more detailed archival recording of all Aboriginal cultural heritage sites (Shelter with Art, Deposit and/or Axe Grinding Groove sites, Axe Grinding Groove Sites and Engraving Sites).
- Provide a set of baseline records for the monitoring program.

Baseline recording for the Longwall 19A sites included:

- Imaging laser scanning of all shelter interiors and features;
- High resolution 3D photogrammetry of sites of high significance;
- Imaging laser scanning or photogrammetry of shelter exteriors where possible (often not possible due to vegetation at Dendrobium);
- Photographic records of art and features;
- Photographic records of monitoring points; and
- Construction of 3D renders/models with point-cloud and imagery data stored by IMC and made available to RAPs.

A monitoring regime established by Sefton (2000) and amended and continued by Biosis Research (2007), and further implemented by Niche Environment and Heritage (2009 to date) has proven effective in observing changes to Aboriginal cultural heritage shelter sites due to subsidence movements.

Previous Aboriginal cultural heritage sites that were subject to detailed baseline recording for all longwalls adjacent to the proposed Longwall 19A are listed in Table 10. Longwall 8 runs parallel to Longwall 19 and is located directly north of the Subject Area in Dendrobium Area 3A (Figure 2).

Table 10: Aboriginal Cultural Heritage Sites Subject to Previous Baseline Recording

Sites Subject to Baseline Recording for Longwalls 6-8 (Dendrobium Area 3A)				
48-2-0056	52-2-0458	52-2-1646*	52-2-1647	52-2-2043
52-2-3052	52-2-3638	52-2-3639*	52-2-3644*	52-2-3651
52-5-0273*	52-5-0274	52-5-0277	52-5-0278	
*Baseline recording done for Longwall 8				

Four (4) of the Aboriginal cultural heritage sites located within 600 m of Longwall 19A (i.e. the Subject Area), have been subject to baseline recording for Longwall 8 in Dendrobium Area 3A (Table 10). One site within 600 m of Longwall 19 (Browns Road Site 31 AHIMS ID#52-2-1645) has only been subject to the

previous baseline recording by Biosis (2007), and is identified as being outside the SMP Area but within the general Study Area.

All Aboriginal cultural heritage sites within 600 m of Longwall 19A, have undergone detailed baseline recording for Longwall 19A. The baseline recording has involved the capture of photogrammetry for all sites (using the photogrammetric method proposed for high significance sites, which is of higher image quality and the same precision for 3D modelling as a laser scanner). In addition to the photogrammetry, shelter context photography, art and panel detail photography (using RAW and JPG and set distance offset) and key monitoring point photography (using JPG) was also captured. D-stretch was used on-site and will be further utilised on the captured baseline images.

The photogrammetry data will be used to derive 3D models to a precision of approximately 4 mm / 10 m, from which plans and sections will be digitally derived.

A digital archive of the baseline recording will be produced and made available to the RAPs for their inspection.

8. Supplementary fieldwork and pre-clearance surveys

8.1 Supplementary fieldwork/investigation

Supplementary Aboriginal cultural heritage fieldwork may be undertaken over the life of the Project to inform the management and monitoring of Aboriginal cultural heritage sites.

8.2 Recording and registering new Aboriginal Cultural Heritage Sites

Any previously unrecorded Aboriginal cultural heritage sites identified during fieldwork (e.g. baseline recording, supplementary fieldwork, pre-clearance surveys, monitoring, follow-up inspections to assess the effectiveness of mitigation/management/remediation measures, etc.) would be recorded using the standard Heritage NSW site card. This information would be submitted to the Heritage NSW for registration on the AHIMS database. Any previously unrecorded sites would also be subject to subsidence risk and impact assessments, and an archaeological and Aboriginal cultural significance assessment in consultation with Aboriginal stakeholders. Any previously unrecorded Aboriginal cultural heritage sites would be managed in accordance with the requirements of this ACHMP.

9. Monitoring

A monitoring program will be implemented to monitor subsidence impacts and environmental consequences of Project related subsidence on Aboriginal cultural heritage sites.

As indicated in Section 4.3, no sites showed any changes due to mining induced subsidence following the completion of Longwall 8 in Area 3A. However, two sites were impacted by Longwall 19. End of Panel Monitoring results for Longwall 19 and details of observations are provided in Table 11.

Monitoring of the Longwall 19A Aboriginal cultural heritage sites will be undertaken as a component of this ACHMP. Monitoring of Dendrobium 3A Aboriginal cultural heritage sites, at which previous monitoring indicates continued change due to mining induced subsidence following the completion of Dendrobium 3A Longwalls will be monitored as a component of this ACHMP.

Table 11 summarises the results of End of Panel monitoring inspections undertaken for Longwall 19 in April 2023.

Table 11. End of Panel monitoring results for Dendrobium Area 3A Longwall 19

Site Name	AHIMS No.	LW19 Monitoring observations
DM 13	48-2-0056	No subsidence impacts
Browns Road Site 31*	52-2-1645	No subsidence impacts
Browns Road Site 32*	52-2-1646	No subsidence impacts
DM 15*	52-2-3639	Subsidence impacts noted: art panel cracked, crack is across motif.
DM 16	52-2-3640	No subsidence impacts
DM 17	52-2-3641	No subsidence impacts
DM 20*	52-2-3644	No subsidence impacts
Sandy Creek Road 21*	52-5-0273	Subsidence impacts noted: separation of pre-existing cracks, delamination of surfaces and rock fall. Art panels not impacted.
* These sites are within the Longwall 19A 600m boundary and will be included in the LW19A monitoring program		

The following Aboriginal cultural heritage sites will be monitored within six months of the completion of Longwall 19A (Table 10):

- Browns Road Site 30 (AHIMS ID#52-2-1644)
- Browns Road Site 31 (AHIMS ID#52-2-1645)
- Browns Road Site 32 (AHIMS ID#52-2-1646)
- DM 15 (AHIMS ID#52-2-3639)
- DM 20 (AHIMS ID#52-2-3644)
- Sandy Creek Road 20 (AHIMS ID#52-5-0272), and
- Sandy Creek Road 21 (AHIMS ID#52-5-0273)

All Aboriginal cultural heritage sites located within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A will be monitored following the method and schedule used consistently at Dendrobium in accordance with approval conditions (Table 8; Table 9; Figure 3). The

monitoring program involves three rounds of monitoring during and after the predicted subsidence effects associated with Longwall 19A (Table 12).

Round 1 baseline monitoring was undertaken prior to the extraction of Longwall 19A and included all Aboriginal cultural heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour for Longwall 19A.

Round 2 monitoring will be undertaken within 6 months following the completion of Longwall 19A and will include all Aboriginal cultural heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A as part of the End of Panel assessment.

Round 3 monitoring will be undertaken as part of a final End of Panel assessment approximately 12 months after the completion of Longwall 19A, and will include all Aboriginal cultural heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A.

Table 12: Longwall 19A Aboriginal Cultural Heritage Sites Monitoring Schedule

Aboriginal Cultural Heritage Site	Round 1	Round 2	Round 3
	<i>Baseline archival recording</i>	<i>Impact assessment recording</i>	<i>Final impact assessment recording</i>
Browns Road Site 30 (AHIMS ID#52-2-1644)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
Browns Road Site 31 (AHIMS ID#52-2-1645)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
Browns Road Site 32 (AHIMS ID#52-2-1646)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
DM 15 (AHIMS ID#52-2-3639)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
DM 20 (AHIMS ID#52-2-3644)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
Sandy Creek Road 20 (AHIMS ID#52-5-0272)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months
Sandy Creek Road 21 (AHIMS ID#52-5-0273)	Observational and photographic monitoring in consultation with stakeholders.	Six (6) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months	Twelve (12) months after each predicted subsidence movement at the Aboriginal cultural heritage site (that is when a longwall makes its closest traverse to the site), and/or (if the longwall is to finish mining within six (6) months

The monitoring team will include a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available) (Section 5.1).

Specific details that will be recorded during the monitoring program include (but are not limited to):

- the date of monitoring;
- the location of longwall extraction (i.e. the longwall chainage) at the time of monitoring;
- comparison of the physical characteristics of the site at the time of monitoring against the previous monitoring and the baseline record (detail/quantify any changes observed);
- inspections of rock surfaces for cracking and/or exfoliation and/or blockfall since the previous monitoring and against the baseline record;
- inspection of art motifs for Impacts or deterioration since the previous monitoring and against the baseline record;
- identification of any natural weathering processes that may result in deterioration (e.g. fire, vegetation growth and water seepage);
- detailed description and quantification of any changes noted during the completion of the above tasks;
- a photographic record of any changes noted during monitoring (taken at the same position and distance as baseline record to allow comparison over time);
- whether any follow-up actions are required (e.g. implementation of management or initiation of the Contingency Plan, etc.); and
- any other relevant information.

An example monitoring pro forma detailing the minimum recording requirements during monitoring is provided in Form 1.

A summary of the information collected during monitoring will be recorded and reported in accordance with the Development Consent conditions. At the completion of monitoring, a report will be prepared and distributed to the Heritage NSW and each of the Aboriginal stakeholders. The report will include the following:

- a map of the area and the location of Aboriginal cultural heritage sites monitored;
- a table outlining the dates on which each site was monitored, and which Aboriginal stakeholders were present;
- a table outlining Aboriginal cultural heritage sites at which change has been noted and the nature and degree of change;
- a summary of comments made by Aboriginal stakeholders present during monitoring regarding: - the degree and nature of change to Aboriginal cultural heritage sites; and - proposed recommendations.
- general observations made during the monitoring; and
- recommendations for future monitoring.

The monitoring results will be used to assess the Project against the Aboriginal cultural heritage sites (Section 6) in accordance with the detailed TARP provided in Table 13.

As described in Section 10, in the event that any subsidence impact is recorded during monitoring, the implementation of appropriate management, remediation and/or mitigation measures would be required in consultation with the landowner, Heritage NSW and the Aboriginal stakeholders. In addition, the AHIMS site card for any Aboriginal cultural heritage site affected by subsidence impacts will be updated and submitted to the Heritage NSW for registration on the AHIMS database. In the event the subsidence impact performance measure is exceeded, the Contingency Plan outlined in Section 11 will be implemented.

Form 1: Monitoring Pro-forma

		<p>0040 Dendrobium Area 3 LW 19A Monitoring Site Recording Form</p>
Site Name:		Date:
Overview		
Site type		MGAE
Previous Recording		Date
MGAN		Monitoring Round#
STOP! Take a minute to assess the site and situation		
ASSESS SAFETY AND STABILITY OF SHELTER OR PLATFORM BEFORE ENTERING		
Changes since last monitoring observation/recording		
YES		NO
Currently WET or DRY?		Notes:
Quick check of changes observed		
Vertical Crack(s)		(Horizontal) Crack(s)
Opening of joint(s)		Lateral movement of planes
Block fall		Granular loss
Change in seepage		Vegetation - macro
Floor crack(s)		Exterior Context effected
Diagonal Crack(s)		Exfoliation
Mineral efflorescence		Vegetation - micro
Art panel effected?		
Describe the changes observed		
Overall		
Art surfaces		
Proposed mitigation or actions required		
Describe		

9.1 Aboriginal Cultural Heritage Site Monitoring (Trigger Action Response Plan)

The Trigger Action Response Plan (TARP) (Table 13) contains the reporting and proposed Corrective Management Actions (CMA) for Aboriginal cultural heritage sites, as outlined in the Dendrobium Area 3A Subsidence Management Plan (SMP). The following sites are considered by the TARP:

- Browns Road Site 30 (AHIMS ID#52-2-1644)
- Browns Road Site 31 (AHIMS ID#52-2-1645)
- Browns Road Site 32 (AHIMS ID#52-2-1646)
- DM 15 (AHIMS ID#52-2-3639)
- DM 20 (AHIMS ID#52-2-3644)
- Sandy Creek Road 20 (AHIMS ID#52-5-0272), and
- Sandy Creek Road 21 (AHIMS ID#52-5-0273).

Table 13: Trigger Action Response Plan – Aboriginal Cultural Heritage Sites Monitoring for Longwall 19A (LW19A)

Feature (*Sites predicted to be impacted)	Performance Measures	Actions as a result of performance measure rating
Browns Road Site 30 (AHIMS ID#52-2-1644) Browns Road Site 31 (AHIMS ID#52-2-1645)* Browns Road Site 32 (AHIMS ID#52-2-1646)* DM 15 (AHIMS ID#52-2-3639)* DM 20 (AHIMS ID#52-2-3644)* Sandy Creek Road 20 (AHIMS ID#52-5-0272) Sandy Creek Road 21 (AHIMS ID#52-5-0273)*	Observational and photographic monitoring in consultation with stakeholders (completed by this assessment).	None.
	<u>Level 1</u> 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).	Continue monitoring program. Condition assessment and photographic record. Notify RAPs and Heritage NSW within 24 hours of any confirmed changes to the conditions of Aboriginal cultural heritage sites. Summarise impacts and report in the End of Panel report and Annual Review.
	<u>Level 2</u> Change in shelter conditions not attributable to natural weathering or preservation- change in drip line or seepage, cracking or exfoliation of overhang or shelter, movement or opening of existing planes and joints in panel, block fall within shelter or overhang, shelter or overhang collapse.	Actions as stated for Level 1. Modify monitoring program if necessary. Trigger the development of site management plan to mitigate effects in consultation with Registered Aboriginal Parties and Landowner (WaterNSW). Notify RAPs and Heritage NSW within 24 hours of any confirmed changes to the conditions of Aboriginal cultural heritage sites. Complete Aboriginal Site Impact Recording Forms (ASIRF) for impacted sites and submit to Heritage NSW.
<u>Level 3</u> Level 2 impacts at greater frequency than predicted. Level 2 impacts attributable to mining remote from the mining area.	Actions stated for Level 2. Notify Heritage NSW, DPE, WaterNSW, other resource managers and relevant technical specialists and seek advice on any Corrective Management Actions (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.	

10. Management, Remediation and Mitigation Measures

10.1 Management and remediation measures

Following two monitoring events (within approximately six (6) and twelve (12) months) of the completion of Longwall 19A, IMC in consultation with the RAPs and landowner, will assess the need for implementation of appropriate management and/or remediation measures.

Examples of potential management and remediation measures are provided in Table 14. Development and implementation of these measures will be assessed on a case-by-case basis and will acknowledge that whilst the measures may reduce the risk of impact and consequence, they can also have the potential to cause impacts to Aboriginal cultural heritage sites and their settings.

Table 14: Potential Management and Remediation Measures

Consequence	Potential Management and Remediation Measures	
	Measure	Description
Increased seepage with the potential to impact art.	Seepage control techniques	<ul style="list-style-type: none"> Installation of an artificial dripline (e.g. silicone dripline) to direct increased moisture/water seepage away from art panels.
Reduction in the stability of a sandstone overhang due to substantial cracking or block fall.	Stabilisation techniques	<ul style="list-style-type: none"> Installation of artificial rock support (e.g. rock bolts, cable bolts, cement sprays [e.g. shotcrete], injection of a binding agent [PUR or similar]). Installation of standing supports (e.g. timber props, timber cogs, sandbags and metal [hydraulic] props). Scaling/dislodgement/removal of remaining loose rock.
	Salvage	<ul style="list-style-type: none"> Surface salvage of artefacts for safekeeping and storage and/or display at a suitable location in consultation with the Aboriginal community.
Impacts on aesthetic values due to cracking.	Restoration of aesthetic values	<ul style="list-style-type: none"> Use of cosmetic treatments (e.g. in the form of coloured grout or similar) to restore aesthetic values.
Cracking of sandstone at open sites, threatening grinding grooves or engraved art.	Strain reduction techniques	<ul style="list-style-type: none"> Installation of a stress relief slot or stress focus notch.

The development of management and/or remediation measures will be determined in consultation with Heritage NSW and the Aboriginal stakeholders and regarding the specific circumstances of the subsidence impact (e.g. the location, nature and extent of the impact) and the assessment of consequences.

If proposed, the implementation of any invasive techniques (e.g. stabilisation, stress relief/focus slots, use of material for aesthetic restoration, etc.) will also be developed in consultation with WaterNSW or other relevant landowners.

Follow-up inspections will be conducted to assess the effectiveness of implemented management and/or remediation measures and the requirement for any additional measures. The specific timing and nature of follow-up inspections/additional monitoring will be dependent on the nature of the management and/or remediation measures implemented. Any management and/or remediation measures implemented will be reported in the Annual Review (Section 13).

Consideration of any examples of successful remediation actions for Aboriginal heritage values and rockshelters will be undertaken in future assessments of Aboriginal cultural heritage and ACHMPs by Dendrobium.

10.2 Mitigation Measures

10.2.1 Mitigation Measure Consideration and Implementation Process

As part of the development of SMPs (and on an ongoing basis during mining), IMC will consider the requirement for development and implementation of Aboriginal cultural heritage mitigation measures. The aim of the mitigation measures is to reduce the potential for substantial impacts and consequences to Aboriginal cultural heritage sites.

The development of mitigation measures will be determined with regard to the specific circumstances of individual sites, including accessibility, size and spatial extent, nature of predicted subsidence impacts and consequences, and level of impact or disturbance (to the site or its setting) associated with implementing the measure(s). The consideration of mitigation measures will acknowledge that while they may reduce the risk of consequence to the site, they also have the potential to cause impacts to the site and its settings (including impacts to cultural setting). Other potential environmental impacts associated with implementation of mitigation works (e.g. vegetation clearing) will also be considered.

Examples of potential mitigation measures currently available are provided in Table 17 that would be discussed with the RAPs prior to implementation. It should be noted during consultation with the Aboriginal Parties for previous assessments that the cutting of stress slots and inclusion of bracing are not considered appropriate mitigation measures as they can cause more harm than subsidence may cause.

Any physical impacts would be reported to the IMC Management, DPE, Heritage NSW and the RAPs. Consultation would then begin as to which action(s) would be appropriate as a mitigation measure.

Any proposed mitigation measures will be developed and implemented (if approved) in consultation with Heritage NSW, Aboriginal stakeholders and the relevant landowner (e.g. WaterNSW).

If mitigation measures are implemented, follow-up inspections will be conducted to assess the effectiveness of mitigation measures and to determine the requirement for any additional measures. The specific nature of follow-up inspections/additional measures will be dependent on the specific nature of the mitigation measure(s) implemented and their success.

A summary of the development process and success of implemented mitigation measures will be reported in the Annual Review (Section 13).

Table 15: Example of potential mitigation measures currently available for Aboriginal cultural heritage sites within the Southern Coalfield

Proposed Mitigation Measure	Details
Mine Planning	Design of LW19A was completed using ESD Principals and included an integrated planning process with input from experts, including mine engineers, resource geologists and natural and cultural heritage experts. IMC considered all potential impacts relating to the proposed extraction. The proposed layout was developed with consideration for sensitive surface features, including Aboriginal cultural heritage and the natural environment. The proposed mining has been set back from sensitive surface features, including Aboriginal cultural heritage, to minimise the potential for harm. These assessments are

Proposed Mitigation Measure	Details
	undertaken within an overall context of the approved operations and economics of the Dendrobium Mine.
Additional Monitoring during active subsidence movements	During the active subsidence of LW 19A, when the longwall is within 400m of the Aboriginal cultural heritage, the sites would be monitored on a weekly basis as part of the IMC field crews ⁵ regular landscape monitoring process (where the site can be safely accessed). The purpose of the weekly monitoring is to identify any physical changes at the sites that require notification to the RAPs and relevant Government agencies in the form of a letter memo and initiate further consultation with the RAPs and Government agencies and consideration of Corrective Management Actions. The IMC field crews are experienced in monitoring subsidence impacts and are involved in RAP consultation and site visits on an ongoing basis. IMC field teams have been provided with cultural heritage awareness training and inductions. Should any changes be identified during weekly inspections the RAPs would be invited to undertake additional site visits.
Increased consultation	RAPs would be informed of the extraction timing of LW 19A.
Bracing	Should a shelter suffer cracking or destabilisation of its ceiling or back wall, mitigation measures such as the use of bracing poles or similar would be discussed with the RAPs, the landowner and a suitably qualified engineer and archaeologist for further settling processes.
Stress slots	Should a rock platform suffer cracking due to longwall extraction, mitigation measures such as the cutting of stress slots, grouting or similar within the platform would be discussed with the RAPs, the landowner and a suitably qualified archaeologist and subsidence specialist.
Artificial Driplines	Should a shelter suffer cracking and/or tilt that may cause any art panels to be impacted due to changes in water flow, mitigation measures such as the installation of an artificial dripline or similar would be discussed with RAPs, the landowner and a suitably qualified archaeologist.

10.2.2 Consideration of Mitigation Measures for Longwall 19A

Seven (7) Aboriginal cultural heritage sites are located within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A (Figure 3). One (1) of these sites is of high scientific (archaeological) significance and of high cultural significance (Browns Road Site 32 AHIMS ID#52-2-1646). Two (2) sites are of moderate archaeological significance and high cultural significance (Sandy Creek Road 20 AHIMS ID#52-5-0272 and Sandy Creek Road 21 AHIMS ID#52-5-0273). The remaining four (4) sites are of low archaeological significance and high cultural significance (Browns Road Site 30 AHIMS ID#52-2-1644, Browns Road Site 31 AHIMS ID#52-2-1645, DM 15 AHIMS ID#52-2-3639, and DM 20 AHIMS ID#52-2-3644).

IMC acknowledges that all Aboriginal cultural heritage sites are of high cultural significance to the Aboriginal people who have a traditional connection to Country.

Previous monitoring, studies and experience from the Woronora Plateau and greater Southern Coalfield have identified several site characteristics/features as being most relevant when assessing the risk of consequence to an Aboriginal cultural heritage site from subsidence impacts. These characteristics include (Sefton, 2000 and 2004; Bosis Research, 2007 and 2009a; Regal and Reeves 2017; MSEC, 2007 and 2020):

- overhang volume – > 50 cubic metres increases the risk of negative consequence;

⁵ The IMC Field Team is led by the Coordinator Environment with over 15 years experience and expertise in the field of Environmental Science.

- presence of existing water seepage – damage to art from water is more likely if existing seepage is present;
- location in relation to a drainage line – sites located in valley bottoms can experience valley closure mechanisms and increased risk of cracking;
- location in relation to goaf – location of sites relative to the goaf influences the level of subsidence impacts experienced;
- overhang formation process – block-fall type overhangs are more likely to have roof or rear wall damage due to subsidence impacts;
- depth of cover – increased depth of cover reduces subsidence impacts and consequences; and
- presence of existing joints and bedding planes – subsidence movements may be dissipated through existing joints and bedding planes rather than the creation of new cracks.

MSEC was engaged by IMC to conduct a risk assessment of the Aboriginal cultural heritage sites in order to inform the potential implementation of mitigation measures to reduce the potential for substantial impacts and consequences to the Aboriginal cultural heritage sites. The assessment by MSEC (2022) are provided in Annex 3 and considers the above characteristics and the potential for damage at each Aboriginal cultural heritage site.

Based on the information provided in the assessment and in consideration of the potential impacts caused by the implementation of available techniques, pre-mining mitigation measures are not proposed for Aboriginal cultural heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwall 19A.

Future longwalls have the potential to result in additional subsidence movements at Aboriginal cultural heritage sites associated with Longwall 19A or the previous Dendrobium Area 3A mining areas (i.e. Longwalls 6-8 and 19). As part of the development of the future SMPs, IMC will review the potential impacts and environmental consequences to Aboriginal cultural heritage sites and re-consider the development and implementation of mitigation measures if required.

As described above, the development and implementation of any mitigation measures will be undertaken in consultation with Heritage NSW, the Aboriginal stakeholders and relevant landowners (e.g. WaterNSW).

10.2.3 Mitigation Measures for Aboriginal site 52-2-1646

Condition 12(d), Schedule 3 of the Development Consent requires description of the measures that would be implemented to protect Browns Road Site 32 AHIMS ID#52-2-1646, including measures to avoid significant impact, contingency plans to protect the site and a full recording of the site.

12. The SMPs prepared under condition 7 must include an Aboriginal Heritage Plan, which must include a:

(d) description of the measures that would be implemented to protect Aboriginal site 52-2-1646, including:

- *a full recording and assessment of the site's rock art;*
- *a more detailed subsidence assessment for the site;*
- *measures which seek to avoid any significant impact on the site and any necessary contingency plans to protect the site against collapse or substantial impact on its rock art*

A full recording and assessment of the site's rock art

The site and rock art will be recorded using the following methods:

- Imaging laser scanning of shelter interiors and features;

- Imaging laser scanning or photogrammetry of the shelter exterior;
- Photographic records of art panels, motifs and features using DSLR and smartphone/tablet;
- A description of weathering processes at the site;
- A catalogue of each motif, including clearly numbered photographs of panels, the media used, form (e.g., outline, outline and infill, stencil, print), size, condition and interpretation (describing completeness and type (e.g., anthropomorphic figure, zoomorphic figure));
- Construction of 3D renders/models with point-cloud and imagery data stored by IMC and made available to RAPs.

The following records will be prepared, presented in a separate report and provided to AHIMS:

- Updated site card;
- Plans and sections of the shelter derived from the 3D model;
- Renders of the site and art panels derived from the 3D model;
- Presentation of records of art panels and motifs including:
 - Unaltered photographs;
 - D-stretch image enhancement (where informative);
 - Manual interpretation of art via photo-tracing.

A more detailed subsidence assessment for the site

A site-specific geotechnical assessment of how the site will react to the predicted subsidence from Longwall 19A will be commissioned to further inform risk and management responses. The geotechnical assessment will include consideration of:

- Predicted subsidence parameters at Browns Road Site 32;
- Underlying geology and surface and geomorphic processes (including shelter formation and stability) at the site;
- Pre-existing internal site features including condition of panels, the presence of planes, fissures, joints other informative strata indicators and block fall;
- The orientation of the shelter with respect to Longwall 19A.

The site-specific geotechnical assessment would provide an overall risk assessment for the site and include any particular further risk assessment resultant from the investigation (e.g., specific risk to different portions of the site).

Measures which seek to avoid any significant impact on the site

During the design process of the proposed Longwall 19A, a number of mining layout options were considered based on a range of multidisciplinary factors. The aim of this process is to reduce the potential for impacts to surface features.

Browns Road Site 32 (AHIMS ID#52-2-1646) is located approximately 130 m to the west of the Longwall 19A extent. Longwall 19A was reduced in length to reduce the likelihood of subsidence impacts due to the extraction. Detailed subsidence assessment for the site was undertaken as part of the MSEC subsidence assessment (Annex 3) in order to determine the likelihood of impacts.

This approach is consistent with the Heritage NSW requirements of ecologically sustainable development and intergenerational equity.

10.3 Surface Disturbance Protocol

The surface disturbance protocol aims to avoid accidental impacts to Aboriginal cultural heritage sites located in close proximity to surface disturbance works. As described in Section 8, pre-clearance surveys will be undertaken (as needed) to identify the most appropriate location for required Project infrastructure.

This protocol will apply to surface disturbance works (e.g. exploration works, installation/operation/maintenance of surface infrastructure, construction/maintenance of access tracks, monitoring and stream restoration) proposed to be located in proximity to any known Aboriginal cultural heritage site(s).

Surface disturbance works will be undertaken in consideration of the following:

1. Avoidance of impact to Aboriginal cultural heritage sites will be the primary management measure, where practicable.
2. To avoid accidental impacts to Aboriginal cultural heritage sites located close to surface disturbance works, appropriate demarcation will be implemented (e.g. fencing, sign-posting or temporary flagging).
3. Where avoidance is not practicable, a comprehensive baseline record will be developed, and consideration of salvage will be undertaken in consultation with Heritage NSW, RAPs and the landowner prior to disturbance.

10.4 Human Skeletal Material Protocol

Burial sites can have high cultural significance to Aboriginal communities and culturally appropriate management of burial sites is a high priority for the Aboriginal community. “Aboriginal remains” are defined in the *National Parks and Wildlife Act, 1974* as:

... the body or the remains of the body of a deceased Aboriginal person, but does not include:

- (a) body or the remains of a body buried in a cemetery in which non-Aboriginal persons are also buried, or*
- (b) a body or the remains of a body dealt with or to be dealt with in accordance with a law of the State relating to medical treatment or the examination, for forensic or other purposes, of the bodies of deceased persons.*

No burial or potential burial sites have been identified in the Project underground mining area. Nor are they considered likely to be identified in the future due to the shallow soil profiles present on the Woronora Plateau. Notwithstanding, the following steps will be carried out in the event that suspected Aboriginal human skeletal material is encountered within the Project underground mining area:

- surface works in the immediate vicinity of the skeletal material will cease;
- Environment Line will be contacted as soon as practicable by phone (131 555) or email (info@environment.nsw.gov.au);
- the DPE, Heritage NSW, NSW Police and Aboriginal stakeholders will be informed as soon as practicable; and
- the identified skeletal remains will not be disturbed until the NSW Police and Heritage NSW have authorised their disturbance.

10.5 Cultural Awareness Program

IMC includes a cultural awareness program as part of inductions aimed at minimising the potential for accidental damage to Aboriginal cultural heritage. The Aboriginal cultural awareness program provides:

- an overview of the Aboriginal cultural heritage management program;
- an overview of the consultation protocol (Section 5);
- an overview of mitigation, management and remediation measures (Section 10);
- simple criteria and procedures for artefact and human bone recognition;
- actions to follow if human skeletal material is encountered (Section 10. 4); and
- personnel to contact for more information or assistance.

11. Contingency Plan

In the event the Aboriginal cultural heritage sites subsidence impacts detailed in Section 6 of this ACHMP are considered to have been exceeded, IMC will implement the following Contingency Plan:

- The impact will be reported to the Approvals Manager within 24 hours.
- The impact will be recorded consistent with the monitoring program described in Section 9 of this AHMP.
- IMC will provide a report to the DPE, Heritage NSW and RAPs within 24 hours of an impact being confirmed.
- IMC will conduct an investigation to evaluate the potential contributing factors. The investigation will:
 - compare and critically analyse measured versus predicted subsidence parameters;
 - review measured subsidence parameters against the observed impact; and
 - review the subsidence monitoring program and update the program where appropriate, in consultation with Heritage NSW and the RAPs.
- IMC will identify an appropriate course of action with respect to the identified impact(s), in consultation with specialists, relevant agencies and RAPs, as necessary. For example:
 - proposed management and/or mitigation measures (Section 10); and
 - a program to review the effectiveness of the management and/or mitigation measures.
- IMC will submit the proposed course of action to Heritage NSW and WaterNSW (or other landholder) for approval, in accordance with AHIP-5179, as required following consultation with Heritage NSW.
- IMC will implement the approved course of action to the satisfaction of Heritage NSW.

12. Future Subsidence Management Plans (SMPs)

In accordance with Condition 2, Schedule 8 of the Development Consent, IMC will collect baseline data for future SMPs. The collection of baseline data will include:

- Imaging laser scanning of shelter interiors and features;
- Imaging laser scanning or photogrammetry of shelter exteriors where possible (often not possible due to vegetation at Dendrobium);
- Photographic records of art and features;
- Photographic records of monitoring points;
- Construction of 3D renders/models with point-cloud and imagery data stored by IMC and made available to RAPs;
- photographic records;
- detailed scaled plans including physical characteristics and features; and
- detailed information regarding the dimensions, composition and features.

Prior to the commencement of extraction associated with the next SMP, baseline data will be obtained for Aboriginal cultural heritage sites located within the relevant 35° angle of draw and/or predicted 20 mm subsidence contour of the SMP longwall layout.

In addition to the baseline data collection, consideration of the environmental management measures in accordance with the review(s) conducted as part of this ACHMP will inform the appropriate type and frequency of monitoring of the Aboriginal cultural heritage sites relevant to the next SMP.

13. Annual Review and Improvement of Environmental Performance

In accordance with Condition 5, Schedule 8 of the Development Consent, IMC will conduct an Annual Review of the environmental performance of the Project by the end of September each year, and for at least three (3) years following the cessation of mining at the development. IMC must submit an Annual Review to the Secretary, CCC and relevant agencies reviewing the environmental performance.

The Annual Review will relate to the previous financial year and specifically address the environmental performance of the ACHMP and will:

- identify the standards and performance measures that apply to the Project
- describe the development (including any rehabilitation) that was carried out in the previous financial year
- describe the Project (including any rehabilitation) that is proposed to be carried out in the current financial year
- include a summary of the complaints received during the past year, and compare this to the complaints received in the previous years
- include a summary of the monitoring results for the Project during the past year
- include a comprehensive review of the monitoring results and complaints records of the Project over previous financial year, including a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria,
 - requirements of any plan or program required under this consent,
 - monitoring results of previous years, and
 - relevant predictions in the documents listed in condition 2 of Schedule 2.
- identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence
- evaluate and report on:
 - the effectiveness of the noise and air quality management systems, and
 - compliance with the performance measures, criteria and operating conditions in this consent.
- identify any trends in the monitoring data over the life of the Project:
 - identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies, and
 - describe what measures will be implemented over the next financial year to improve the environmental performance of the Project.

Copies of the Annual Review must be submitted to the affected Councils and made available to the CCC and any interested person upon request.

14. Incidents

An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in the Development Consent. An incident may or may not be or cause a non-compliance.

The reporting of incidents will be conducted in accordance with Conditions 3 and 4, Schedule 8 of the Development Consent. IMC will notify DPE and any other relevant agencies of any incident associated with the Project:

- within 24 hours of the incident being detected by IMC;
- within seven days of notifying the DPE and other relevant agencies, IMC will provide a detailed written report on the incident. This report will include:
 - (a) a description of the date, time, and nature of the incident;
 - (b) an identification of the cause (or likely cause) of the incident;
 - (c) a description what action has been taken to date; and
 - (d) a description of the proposed measures to address the incident.

Where the incident has caused or has the potential to cause material environmental harm, the Dendrobium Mine Pollution Incident Response Management Plan (PIRMP) will be activated, and notifications as listed in the PIRMP completed as required.

15. Complaints

A protocol for managing and reporting of complaints has been developed by IMC as a component of the Dendrobium Mine Environmental Management Strategy (EMS) (DENMP0039) and *Handling Community Complaints, Enquiries & Disputes Procedure (IMCP0112)*, and is described below.

Section 6.1 of the EMS states that:

6.6.1 Complaints

IMC has a 24 hour, free community call line (1800 102 210) and email address (illawarracommunity@south32.net) which is displayed at IMC Projects and Mine Sites, and included in newsletters, letters and other correspondence. The call line is for all complaints and general enquiries regarding environmental or community issues associated with IMC's operations.

Community complaints and enquiries may also be received in person by any employee of IMC, with details to be immediately shared with the Community Team for investigation. All complaints received in relation to Dendrobium Mine will be managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint. An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.

A summary of all complaints received during the reporting year will be provided as part of the Annual Review. A log of complaints is also maintained on the South32 website at: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

6.6.2 Dispute Resolution Process

In the event that an issue cannot be resolved between the IMC representative and complainant, the issue is escalated within IMC. The escalation of the issue is aligned with the risk associated with the nature of the complaint.

In the event that the matter remains unresolved, it may be appropriate that the matter be taken to third-party mediation (e.g. Subsidence Advisory NSW, DPIE, EPA or other relevant agencies) in order to achieve an outcome.

IMC is responsible for maintaining a complaints register recording all complaints, in accordance with Section 6.1 of the EMS; Condition 11, Schedule 8 of the Development Consent; and the *Handling Community Complaints, Enquiries & Disputes Procedure (IMCP0112)*. For each complaint, the following information will be recorded in the complaints register:

- date and time of complaint;
- method by which the complaint was made;
- personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- nature of the complaint;

- the action(s) taken by IMC in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by IMC, the reason why no action was taken.

The South32 IMC External Affairs Team will be responsible for the management of complaints and ensuring access to information, as stated in Section 2 of the EMS. In accordance with Condition 11, Schedule 8 of the Development Consent, the complaints register will be made publicly available on the South32 website (<https://www.south32.net/>) and updated on a monthly basis. As per Condition 5, Schedule 8 of the Development Consent, a summary of complaints received during the past year will be submitted to the Secretary, CCC and relevant agencies as part of the Annual Review, alongside a comparison of the complaints received in previous years.

16. Non-Compliances with Statutory Requirements

The most recently observed impacts to Aboriginal cultural heritage sites were as a result of the extraction of Longwall 19. Subsidence related changes were identified on 28 March 2023 at two sites above Longwall 19, DM 15 AHIMS ID#52-2-3639 and Sandy Creek Road 21 AHIMS ID#52-5-0273.

These impacts were reported to RAPs and Heritage NSW within 24 hours of being identified in accordance with the Longwall 19 ACHMP TARP, and to key stakeholders including DPE, WaterNSW, Resources Regulator and BCD as required under the Area 3A Landscape TARP. Recent advice from Heritage NSW dated 31 January 2024 indicated the requirement to report non-compliances to the Environment Line. A report to the Environment Line was emailed on 9 February 2024 detailing the non-compliance. This section has been updated to include provisions for the Environment Line to be contacted in the event of non-compliance with the ACHMP and AHIP-5179.

A protocol for managing and reporting of non-compliances with statutory requirements has been developed as a component of IMC's Dendrobium Mine EMS. Section 6.2 of the EMS states:

6.2 Events, Cumulative Impacts, Non-Compliances, Corrective Actions and Preventative Actions

Events, non-compliances, non-conformances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification. The key elements of the process include:

- *Identification of events, non-conformances and/or non-compliances:*
- *Recording of the event, non-conformance and/or non-compliance in the event management system (G360);*
- *Investigation/evaluation of the event, non-conformance and/or non-compliance to determine specific corrective and preventative actions;*
- *Assigning of corrective and preventative actions to responsible persons in G360; and*
- *Review of corrective actions to ensure the status and effectiveness of the actions.*

Corrective and preventative actions address the cumulative impacts of the mining operations as applicable.

Subsidence modelling at Dendrobium Mine uses the Incremental Profile Method. This method uses a database of past movements/measurements to calibrate the subsidence model. The model predicts subsidence movements for each longwall (incremental) as well as all other longwalls and other influences on subsidence movements, including any adjacent, overlying or underlying workings (cumulative).

Ground and surface water modelling takes into account all other mining operations and other activities which impact water resources.

Integrated mine planning considers these cumulative impacts by adopting mine design and subsidence monitoring and management programs to ensure conditions of consent and performance measures are met.

Non-compliances with this ACHMP and conditions of AHIP-5179 will be reported to the Environment Line at info@environment.nsw.gov.au and 131 555.

As outlined in Section 6.3 of the Dendrobium Area 3 SMPs, compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed at or in association with Dendrobium Mine operations. Regular inspections, internal audits and initiation of any remediation/rectification work in relation to this Plan will be undertaken by the Principal Approvals.

Non-conformances, corrective actions and preventative actions are managed in accordance with the following process:

- Identification, reporting and recording of non-conformance and/or non-compliance;
- Evaluation of the non-conformance and/or non-compliance to determine specific corrective and preventative actions;
- Corrective and preventative actions to be assigned to the responsible person;
- Management review of corrective actions to ensure the status and effectiveness of the actions; and
- An Annual Review will be undertaken to assess IMC's compliance with all conditions of the Dendrobium Development Consent, Mining Leases and other approvals and licenses.

An independent environmental audit will be undertaken in accordance with Schedule 8, Condition 6 of Development Consent 60-03-2001 to review the adequacy of strategies, plans or programs under these approvals and if appropriate, recommend actions to improve environmental performance. The independent environmental audit will be undertaken by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of DPE.

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Annex 1: Glossary and List of Abbreviations

Term or abbreviation	Definition
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, legends and places) cultural practices and traditions associated with past and present-day Aboriginal communities.
ACHA	Aboriginal Cultural Heritage Assessment.
ACHMP	Aboriginal Cultural Heritage Management Plan.
Aboriginal object(s)	The legal definition for material Aboriginal cultural heritage under the NSW <i>National Parks and Wildlife Act 1974</i> .
Aboriginal stakeholders	Members of a local Aboriginal land council, registered holders of Native Title, Aboriginal groups or other Aboriginal people who may have an interest in the Project.
AHIP	Aboriginal Heritage Impact Permit.
Angle of draw	<p>This is a subsidence engineering term used to define the limits of the subsidence movements in a landscape caused by mine workings, that leads to vertical displacement on the surface.</p> <p>The angle of draw is determined through a series of geometric parameters in which the angle between two lines drawn from the edge of the mine workings. One being a vertical line, and the other a line to the limit of vertical displacement on the surface. Because surface movements can also be caused by natural effects such as seasonal variations or drought leading to swelling or shrinkage of near-surface soil and sediment, it can be very difficult to identify where vertical movement due to mining ceases. Therefore, it is standard practice to specify a limiting value for vertical displacement which might be attributable to mining. In New South Wales, this value is usually 20 mm of vertical subsidence. It should be noted that, in some environments, up to 50 mm or more of vertical movement may occur due to seasonal climatic changes.</p>
Archaeology	The scientific study of material traces of human history, particularly the relics and cultural remains of past human activities.
Archaeological deposit	A layer of soil material containing archaeological objects and/or human remains.
Archaeological investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological site	An area that contains surface or sub-surface material evidence of past human activity in which material evidence (artefacts) of past activity is preserved.
Artefact	An object made by human agency (e.g. stone artefacts).
Assemblage	<p>A group of artefacts found in close association with one another.</p> <p>Any group of items designated for analysis that exist in spatial and/or vertical context – without any assumptions of chronological or spatial relatedness.</p>
Avoidance	A management strategy which protects Aboriginal sites within an impact area by avoiding them totally in development.
Heritage NSW	Heritage NSW, of the Department of Premier and Cabinet (DPC). Previously known as the Biodiversity Conservation Division (BCD) of the Department of Planning, Industry and Environment, which was priorly known as the Office of Environment and Heritage (OEH).

Term or abbreviation	Definition
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
Code of Practice	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.</i>
CMA	Corrective Management Actions.
Cumulative impacts	Combination of individual effects of the same kind due to multiple actions from various sources over time.
DA	Development Approval (same as Development Consent).
DCP	Development Control Plan.
DECCW	The Department of Conservation, Climate Change and Water, then known as the Office of Environment and Heritage, now known as Heritage NSW.
DPE	Department of Planning and Environment, NSW.
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
DRG	NSW Resources and Geoscience, of the Department of Planning and Environment Cluster. Now known as Mining, Exploration and Geosciences (MEG).
EA / Project EA	Project Environmental Assessment.
EMS	Dendrobium Mine Environmental Management Strategy (DENMP0039, version 7.0, 2023).
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979.</i>
EPL	Environment Protection Licence.
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform.
FY	Financial Year.
Harm	With regard to Aboriginal objects this has the same meaning as the <i>NSW National Parks and Wildlife Act 1974.</i>
Heritage NSW	Heritage NSW, of the Department of Premier and Cabinet. Previously known as the Office of Environment and Heritage (OEH), and the Department of Conservation, Climate Change and Water (DECCW) priorly.
HMP	Heritage Management Plan.
ILALC	Illawarra Local Aboriginal Land Council
IMC	The proponent; South32–Illawarra Metallurgical Coal
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Impact area	An area that requires archaeological investigation and management assessment.
In situ	Latin words meaning ‘on the spot, undisturbed’.
Isolated artefact / find	A single artefact found in an isolated context.
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features.
Landform	Any one of the various features that make up the surface of the earth.

Term or abbreviation	Definition
LEP	Local Environmental Plan.
LW	Longwall.
Management plans	Conservation plans which identify short- and long-term management strategies for all known sites recorded within a (usually approved) Subject Area.
MEG	Mining, Exploration and Geosciences Department NSW.
Methodology	The procedures used to undertake an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
ML	Mining Lease.
MSEC	Mine Subsidence Engineering Consultants Pty Ltd.
NPW Act	National Parks and Wildlife Act 1974.
NPW Regulation	National Parks and Wildlife Regulation 2009.
OEH	Office of Environment and Heritage NSW, previously known as the Department of Conservation, Climate Change and Water (DECCW). Now called Heritage NSW.
Open camp site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill, etc.).
PAD	Potential Archaeological Deposit. A location considered to have a potential for subsurface archaeological material.
PIRMP	Pollution Incident Response Management Plan
RAP	Registered Aboriginal Party.
SHI	State Heritage Inventory
Statutory controls	Control or regulation provided for by legislation.
Site recording	The systematic process of collecting archaeological data for an archaeological investigation.
Site	A place where past human activity is identifiable.
SMP	Subsidence Management Plan.
Spit	A unit of archaeological excavation with an arbitrary assigned measurement of depth and extent.
Survey coverage	A graphic and statistical representation of how much of an impact area was surveyed and therefore assessed.
TARP	Trigger Action Response Plan.
WA	Water Approval.
WAL	Water Access Licence.

Annex 2: Consultation Records

Illawarra ILALC review comment / submission	Niche / IMC response
<p>1. It is ILALCs understanding that a previous Aboriginal Heritage Impact Permit (AHIP ID #1098243) had been approved within the existing Subject Area. The AHIP (#1098243) for the impact relating to the mining of Dendrobium Area 3A was approved on 27 March 2009 and expired after eight years on the 27th March 2017. During the valid period of the AHIP, three out of the four longwalls within Dendrobium Area 3A were extracted. Mining activities ceased in Dendrobium Area 3A in 2012. IMC recommenced mining of the fourth longwall – longwall 19 in 2023. An ACHA was developed that supported a new AHIP application for the harm to Aboriginal cultural heritage sites due to subsidence-related movement from the proposed mining at Longwall 19.</p> <p>There was a requirement under the DA 60-03-2001 and supporting Subsistence Management Plan (SMP) and Aboriginal Cultural Heritage Management Plan for AHIPs to be obtained before impact on Aboriginal cultural heritage as is evident in the issuing of the past AHIP, and recommendation in the SMP and past reports, including the Aboriginal Cultural Heritage Assessment Report Longwall 19 (3 June 2020) which states ‘An Aboriginal Heritage Impact Permit will be required to undertake the proposed activities as it may result in harm to an object’. We seek clarification on how harm to sites and objects can occur without an AHIP as conditioned in the approved SMP, and why no AHIP is being sought for the potential harm caused by subsidence at Longwall 19 and 19A?</p>	<p>AHIPs have and are being applied for in response to potential impacts relating to Longwall 19A and this ACHMP.</p>
<p>2. ILALC is requesting clarification regarding including Longwall 19 in the amended Aboriginal Cultural Heritage Management Plan (ACHMP), considering that Longwall 19 has already been extracted. ILALC seeks to understand if it has been determined that the previous ACHMP and Subsistence Management Plans (SMPs) were inadequate in meeting the development consent requirements.</p>	<p>Due to timing of extraction and approvals relating to the longwalls in Dendrobium Area 3A Longwall 19A is now subject to a stand-alone ACHMP.</p>
<p>3. According to DA 60-03-2001, the probability of structural impacts on sites is estimated to be less than 10%, making it unlikely for sites to be significantly affected. It is ILALCs understanding that conditions set forth in the DA have been surpassed if more than 10% of the sites in Area 3A are harmed. Currently, two sites, DM 15 and Sand Creek Road 21 have already experienced direct impacts from mine-related subsidence (or 66.6% of sites located directly above Longwall 19).</p>	<p>The Dendrobium Area 3 Statement of Commitments (2007) identified predicted impacts to Aboriginal Places of Cultural Significance – Archaeological sites would be “unlikely that all sites will sustain structural impacts. Empirical data suggests the probability of impacts to a site are less than 10%.” This is not a Condition of Consent but rather a</p>

Illawarra ILALC review comment / submission	Niche / IMC response
<p>Although there are inconsistencies in numbers throughout the report, page 24 suggests that an additional three sites are expected to be affected. Considering that there are a total of 10 Aboriginal sites in the project area, it becomes probable that 50% of these sites will be damaged. The ILALC argues that this exceeds the projected impact of less than 10%, as stipulated in the DA 60-03-2001. Therefore, the ILALC seeks clarification regarding why it is deemed acceptable for a significantly higher percentage of sites to be damaged than what was initially specified in the conditions. Alternatively, we seek clarification as to what percentage of sites or objects have been harmed under the DA (including for the waste infrastructure) and if the cumulative effect is less than 10%.</p>	<p>statement of predicted impact against which exceedances can be framed.</p> <p>Commitments to actions for Avoidance, Mitigation and Rehabilitation in response to exceedance of the predicted impacts include:</p> <p><i>Site and event specific mitigation and rehabilitation will be developed with appropriate Aboriginal representatives, DECC and WaterNSW. Techniques may involve installing artificial drip lines, detailed recording of art, stabilising and cleaning rock faces.</i></p> <p>38 rock shelters have been monitored for impacts at Dendrobium and impacts attributable to mine subsidence have been noted in 6 cases, or 17% of monitored shelter sites.</p>
<p>4. The Management Plan for Longwall 19 and Longwall 19A should encompass actions and recommendations for managing the two rock shelters affected by mine-related subsidence associated with the extraction of Longwall 19: DM 15 (AHIMS ID#52-2-3639) and Sand Creek Road 21 (AHIMS ID#52-5-0273). Impacts on the two rock shelters are consistent with Level 2 performance measures, as detailed in Table 15 of this ACHMP. Therefore, ILALC proposes implementing actions based on the performance measure rating for impacted sites. ILALC suggests the following steps be taken: a. Enhanced monitoring program: ILALC recommends conducting increased monitoring for all currently impacted sites and those potentially affected in the future. During the extraction period for Longwall 19, and for three months after extraction, monthly monitoring with RAPS participation should be conducted for DM 15 and Sand Creek Road 21. This monitoring should diligently identify and document any changes in cracking, fracturing, rock fall or other subsidence-related effects. It should also assess indirect changes such as alterations to driplines, water lines/movement, and increased moisture/water seepage levels (which may contribute to the degradation of rock art (lichen/moss) or subsurface organic preservation). After 3 months past extraction and stabilisation of cracking, monitoring every six months should be undertaken for two years. b. Development of a site management plan: It is essential to create a comprehensive site management plan in consultation with RAPs and landowners to mitigate the effects of subsidence. c. Timely notification:</p>	<p>Weekly monitoring is undertaken as part of the IMC Environmental Field Team’s regular landscape monitoring process to identify any physical changes at sites during the period of active subsidence (when the longwall is within 400 m of Aboriginal Cultural Heritage sites) and is undertaken in addition to the three targeted rounds of monitoring included in the Dendrobium 3A monitoring program for Aboriginal cultural heritage sites which includes RAP participation. The purpose of the weekly monitoring is to identify changes at the sites that require notification in accordance with the TARP (Table 13) and is undertaken by an experienced IMC field team led by the Coordinator Environment with over 15 years of experience and expertise in the field of environmental science.</p> <p>Based on the results of regular landscape monitoring, including observations at the sites and reporting protocols currently in place, additional monitoring rounds for the sites is not considered warranted. It is proposed to monitor the effected sites again at 6 months (October 2023) and 12 months (April 2024) from the completion of Longwall 19 in</p>

Illawarra ILALC review comment / submission	Niche / IMC response
<p>ILALC emphasises the importance of promptly notifying RAPS and Heritage NSW within 24 hours of confirming any changes in the conditions of Aboriginal cultural heritage sites. d. Completion of Aboriginal Site Impact Recording Forms (ASIRF): Impacted sites should have ASIRFs completed and submitted to Heritage NSW.</p> <p>Furthermore, ILALC suggests additional baseline recording be carried out to ensure monitoring and evaluating impacts can be undertaken and to mitigate against further damage. This should involve photogrammetry and Dstretch digital recording methods conducted for both shelters in collaboration with RAPS, in addition to baseline recording detailed in the ACHMP. If there is a potential risk of shelter collapse identified during monitoring, discussions should be held with RAPS and other stakeholders regarding the need for additional mitigation measures, such as salvage operations, before a complete collapse occurs. It is important to note that the impacts on these two shelters deeply sadden ILALC and reiterate that the risks posed to significant Aboriginal sites, values, and landscapes outweigh any benefits derived from the mining process. Again we repeat that ILALC strongly opposes mining in this culturally sensitive landscape.</p>	<p>April 2023. The sites will also be monitored during the End of Panel and subsequent 6 and 12 month monitoring of Longwall 19A. Previous monitoring results have demonstrated that these intervals are suitable for effective management responses to be implemented.</p> <p>Individual management plans and ASIRFs are being prepared.</p> <p>Section 7 of this ACHMP describes the baseline data methods that will be used henceforth, including photogrammetry and image manipulation.</p> <p>The shelters are not at risk of collapse from the subsidence.</p>
<p>5. Section 4.5 presents the Scientific (archaeological) Significance Rating for each site located within Longwall 19 and 19A. ILALC would like to point out that archaeological deposits and Potential Archaeological Deposits (PADs) within rock shelters have yet to be investigated. As the nature of these deposits is unknown, an actual scientific significance value cannot be attributed. If the deposit is a highly stratified deposit with antiquity, this will significantly increase the scientific value of the sites. Therefore the Scientific Values of these sites may need to be considered.</p>	<p>For PADs all scientific significance assessments presented are contingent upon demonstration of the archaeological potential.</p>
<p>6. Section 7 details information gathered during baseline recording undertaken by Biosis Research and Niche Environment and Heritage. ILALC would like to see a more comprehensive baseline recording undertaken for the five sites that have or are likely to be impacted by the proposed works. ILALC would encourage additional baseline recording for damages and at[1]risk areas. This includes the following: a. High-resolution images of all motifs, motif panels and the shelter itself, b. Detailed plans of each shelter and rock art panel, c. Detailed and complete notes taken for each shelter, including details of each crack, fracture etc., that already occurs within the shelter. d.</p>	<p>As per Section 7 of this ACHMP future baseline recording, including for Longwall 19A will include a suite of measures including high resolution image capture using DSLR, image manipulation using D-stretch (or similar), digital tracing, and photogrammetry.</p>

Illawarra ILALC review comment / submission	Niche / IMC response
<p>Photogrammetry undertaken for each shelter. e. The use of the DSTRECH digital imagery tool to identify and record rock art that is difficult to see or may be invisible to the eye.</p>	
<p>7. TARPs specific to each site monitored should be developed and approved by RAPS before the approval of this document.</p>	<p>IMC welcomes discussion of, and input into, the TARPs from the Illawarra LALC.</p>
<p>8. Section 8.1 suggests that ‘Supplementary Aboriginal cultural heritage fieldwork may be undertaken over the life of the Project to inform the management and monitoring of Aboriginal cultural heritage sites’. ILALC has submitted a comment regarding the subsidence management plan for Longwall 19A, as provided in the attached letter dated 24 August 2022. The letter emphasises the importance of employing a comprehensive survey methodology during site surveys to ensure a thorough understanding of the effects of subsidence and subsequent subsidence management on Aboriginal cultural heritage (ACH). ILALC requests Niche to confirm whether a comprehensive and systematic survey has been conducted for this area, serving as the basis for the Aboriginal Cultural Heritage Management Plan (ACHMP). If such a survey has not been undertaken, ILALC suggests that there is a possibility that not all potential Aboriginal objects and sites have been considered in the report and that an additional site survey should be undertaken.</p>	<p>The Longwall 19A area was subject to stratified survey by Navin Officer (2001) and Biosis Research (2007). This saw survey concentrated in the western part of the area, where rock shelter sites are most likely to occur.</p> <p>In addition to this, 3 days of site inspections were conducted at the time of the Aboriginal Cultural Heritage Assessment (Niche 2021) to inform the Subsidence Management Plan. This Aboriginal Cultural Heritage Assessment was conducted in consultation with RAPS and did not identify the need for further survey. It should be noted also that the Longwall 19A start position has been modified by reduction in length of 142 m, reducing the area above the longwall that has not been included in previous survey efforts.</p>
<p>9. Section 9: Monitoring. This section should be updated to incorporate the damage observed in the two rock shelters during monitoring for Longwall 19A. Furthermore, considering the damage inflicted on these rock shelters and the anticipated ongoing impact from the extraction of Longwall 19A, ILALC recommends intensifying the monitoring efforts for DM 15 and Sandy Creek 21. Specifically, ILALC proposes increasing the frequency of monitoring using RAPS to once a month during the extraction period and a period of three months post[1]extraction to track any further deterioration in the condition of the shelters. This should also be applied to any shelters identified as presenting mine-related subsidence effects identified during the monitoring program.</p>	<p>Section 9 makes reference to the two sites impacted by Longwall 19. As noted above the sites will be monitored weekly and further changes, as per this ACHMP, will be immediately notified to the ILALC.</p>
<p>10. In contrast to the findings presented in the report (4.5.2), ILALC proposes that open sites may exist within the Project Area and could experience direct and indirect subsidence-related impacts. These impacts might include subsidence cracking of soil profiles, erosions resulting from</p>	<p>While open sites may occur in the area, they are proportionally rare, and subsidence effects, including cracking and potential erosion, are highly unlikely to occur at the same place as open sites. Cracking,</p>

Illawarra ILALC review comment / submission	Niche / IMC response
<p>subsidence, and the implementation of management measures to mitigate and address cracking and erosion. ILALC urges for these factors to be taken into account in the assessment and areas that have the potential for open sites to occur be surveyed if this has not already been undertaken. Additionally, as an added precaution, before any management of surface cracking and erosions, a survey be undertaken to see if management actions will impact open sites.</p>	<p>slumping and erosion generally occur on steeper slopes, while open sites occur on more gentle country in the Dendrobium area, and in particular would have been most likely to occur in the valley bottoms that are now inundated by dams in this region.</p> <p>Prior to undertaking any remediation works IMC must conduct an environmental assessment, including consideration of Aboriginal cultural heritage.</p>

Annex 3: Geotechnical Risk Assessment Reports

Appendix 1: Aboriginal Heritage Impact Permit number 5179



AHIP No: 5179
Application ID: EF23/6828
Notice number: DOC23/887223

Ms Linda Zanotto
Principal Mining Approvals
Illawarra Metallurgical Coal
for Illawarra Coal Holdings Pty Ltd
Level 35, 108 St Georges Terrace
PERTH WA 6000

By email: Linda Zanotto, Principal Mining Approvals, Illawarra Metallurgical Coal - linda.zanotto@south32.net
cc: Gary Brassington, Approvals Manager, Illawarra Metallurgical Coal - gary.m.brassington@south32.net
cc: James Reeves, Founding Partner, Niche Environment and Heritage - jreeves@niche-eh.com

Dear Linda

ABORIGINAL HERITAGE IMPACT PERMIT 5179

Longwall 19A Dendrobium Area 3A

Thank you for your application for an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Act 1974* (the Act) received on 1 September 2023. Additional information was received between the period, 15 - 27 November 2023.

I understand that the proposed development involves the continuation of underground longwall coal mining at Dendrobium Mine Area A3, on proposed Longwall 19A, under modified Consent DA 60-03-2001.

Your application has been assessed and approved. Your AHIP is attached.

Aboriginal cultural heritage is important and invaluable. Please be aware of your responsibilities in relation to Aboriginal cultural heritage and the conditions of the attached permit.

Advice

Your works may need approval from other local, State or Commonwealth government authorities.

You may need to report any discovery of Aboriginal remains under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*.

The AHIP holder is responsible for obtaining permission to enter land from the owner and/or occupier of the land.



Section 164 of the Act allows authorised officers to enter land if they suspect that an offence has been or is being committed.

Right of Appeal

Under section 90L of the Act, the AHIP holder may appeal to the Land and Environment Court if they are dissatisfied with any condition of this AHIP. The appeal must be lodged within **21 days** of the date this AHIP was issued.

If you require any further assistance do not hesitate to contact Rebecca Yit, Principal Assessments Officer at Heritage NSW on 4927 3244 or via email at Rebecca.yit@environment.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read "Kym McNamara".

Kym McNamara

Manager, Assessments

Heritage NSW

Department of Planning and Environment

(As Delegate under *National Parks and Wildlife Act 1974*)

18/12/2023



AHIP number: 5179

AHIP Issued to:

Illawarra Coal Holdings Pty Ltd
ABN: 69 093 857 286
Level 35, 108 St Georges Terrace
PERTH WA 6000

ADDITIONAL DETAILS FOR PUBLIC REGISTER

Name of development or project	Longwall 19A Area 3A Dendrobium Mine
Location	Dendrobium Mine Area 3A Consolidated Coal Lease 768 Lot 14 / DP 1233164
Local Government Area(s)	Wollongong City Council
Description of harm authorised	<ul style="list-style-type: none">Harm to certain Aboriginal objects through the proposed works
AHIP commencement date and duration	Commencement date: 18/12/2023 Duration: 10 years



AHIP TO HARM ABORIGINAL OBJECTS

AHIP ISSUED SUBJECT TO CONDITIONS

This AHIP is issued pursuant to section 90 of the *National Parks and Wildlife Act 1974* (the Act). All actions on the land must be carried out in accordance with the application except as otherwise expressly provided by a condition of this AHIP.

An AHIP is issued to harm Aboriginal objects identified in Schedule C, in accordance with the conditions of this AHIP.

***Note:** a dictionary defining terms used in this document are in Appendix A.

COMMENCEMENT AND DURATION OF AHIP

This AHIP commences on the date it is signed unless otherwise provided by this AHIP. Unless otherwise revoked in writing, this AHIP remains in force for 10 years from the date of commencement.

PROPOSED WORKS

Modified Consent DA 60-03-2001 granted on 20 November 2001 provides approval for the continuation of underground mining of Dendrobium Mine Area A3, at the proposed Longwall 19A.

LAND TO WHICH THIS AHIP APPLIES

The land to which this AHIP applies is that area marked in red as shown in Attachment 1.

CONDITIONS

The conditions of this AHIP specify the actions that are permitted and/or required in relation to areas and Aboriginal objects, detailed in the schedules that follow.

Any requirement to provide written notice to Heritage NSW may be complied with by emailing the notice to heritagemailbox@environment.nsw.gov.au

General Conditions	
Condition Number	Condition
Persons undertaking actions or works covered by this AHIP	
1	The AHIP holder must ensure that all persons involved in actions or works covered by this AHIP (whether employees, contractors, sub-contractors, agents, or invitees) are made aware of and comply with the conditions of this AHIP.
2	A suitably qualified and experienced individual must be appointed as a project manager who is responsible for overseeing, for and on behalf of the AHIP holder, all the actions relating to this AHIP.
3	If an alternative to the nominated project manager is appointed, Heritage NSW must be notified of their contact details within 14 days of this appointment.
Notification of Registered Aboriginal Parties	
4	A copy of this AHIP must be provided to each Registered Aboriginal Party, within 14 days of receipt of the AHIP from Heritage NSW and at least 7 days before the start of works under this AHIP.
5	Where this AHIP is varied or transferred, a copy of the AHIP variation or transfer notice must be provided to each Registered Aboriginal Party, within 14 days of receipt of the notice.
Indemnity	
6	This AHIP holder agrees to indemnify and keep indemnified, the Crown in right of NSW, the Minister administering the Act, the Secretary of Department of Planning and Environment, and their employees, agents, and contractors, in the absence of any wilful misconduct or negligence on their part, from and against all actions, demands, claims, proceedings, losses, damages, costs (including legal costs), charges or expenses suffered or incurred by them resulting from: <ol style="list-style-type: none"> a. Any damage or destruction to any real or personal property; and b. Injury suffered or sustained (including death) by any persons arising out of or in connection with any actions undertaken pursuant to this AHIP.

General Conditions	
Condition Number	Condition
Breach of AHIP Conditions	
7	<p>The AHIP holder must notify Heritage NSW in writing as soon as practicable after becoming aware of:</p> <ul style="list-style-type: none"> a. Any contravention of s.86 of the Act not authorised by an AHIP, and/or b. Any contravention of the conditions of this AHIP. <p>Where Heritage NSW suspects that an incident has occurred which may have breached the Act or AHIP, Heritage NSW and/or Authorised Officer appointed under the Act may request a written incident report, which includes the following:</p> <ul style="list-style-type: none"> a. the nature of the incident b. the actual or likely impact of the incident on Aboriginal objects and/or Aboriginal places c. the nature and location of these Aboriginal objects/or Aboriginal places, referring to and providing maps and photos where appropriate d. any conditions of an AHIP which may have been breached, and e. the measures which have been take or will be taken to prevent a recurrence of the incident. <p>The incident report must be provided to the Heritage NSW office within the timeframe specified in the request.</p>
Human Remains	
8	All human remains in, on or under the land must not be harmed.
9	<p>If any human remains are discovered and/or harmed in, on or under the land, the AHIP holder must:</p> <ul style="list-style-type: none"> a. Not further harm these remains b. Immediately cease all work at the location c. Secure the area to avoid further harm to the remains d. Notify the local police and Department of Planning and Environment's 'Environment Line' on 131 555 as soon as practicable and provide any available details of the remains and their location, and e. Not recommence any work at the location unless authorised in writing by Heritage NSW.

Standard Conditions	
Condition Number	Condition
Prevention of Harm	
10	The measures outlined in the <i>Aboriginal Cultural Heritage Management Plan Longwall 19A Dendrobium Area 3A</i> (DOC23/780894-12), dated 26 September 2023 (inclusive of any future revisions) and prepared by Niche on behalf of South32-Illawarra Metallurgical Coal, must be implemented at all times while this AHIP is in force.
Harm through the proposed works	
11	The Aboriginal objects described in Schedule C may be harmed. Nothing in this condition authorises harm to Aboriginal objects described in Schedule A.
Aboriginal Site Impact Recording Form	
12	<p>An Aboriginal Site Impact Recording Form must be completed and submitted to the AHIMS Registrar, for each AHIMS site identified in Schedule C, in accordance with the specifications in the <i>Aboriginal Cultural Heritage Management Plan Longwall 19A Dendrobium Area 3A</i> (DOC23/780894-12), dated 26 September 2023 and prepared by Niche on behalf of South32-Illawarra Metallurgical Coal</p> <p>Note:</p> <ul style="list-style-type: none"> The Aboriginal Site Impact Recording Form must be updated with information about the site in each relevant field. Reference to a report is not an acceptable substitute for site information. The Aboriginal Site Impact Recording Form can be found here Contact details for the AHIMS Registrar can be found here



SCHEDULE A: ABORIGINAL OBJECTS THAT MUST NOT BE HARMED

A1. HUMAN REMAINS

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

A2. ABORIGINAL OBJECTS THAT ARE IDENTIFIED ON AHIMS

Not applicable.

A3. NO-HARM AREAS

Not applicable.

SCHEDULE B: ABORIGINAL OBJECTS THAT MAY BE HARMED THROUGH THE CERTAIN ACTIONS

B1. MOVEMENT ONLY

Not applicable.

B2. TEST/SALVAGE EXCAVATIONS

Not applicable.

B3. COMMUNITY COLLECTION

Not applicable.

B4. OTHER

Not applicable.

SCHEDULE C: ABORIGINAL OBJECTS WHICH MAY BE HARMED THROUGH THE PROPOSED WORKS

The Aboriginal objects described in this schedule may be harmed, but only in accordance with the conditions of this AHIP (excluding any Aboriginal objects described in Schedule A).

C1. HARM OF ABORIGINAL OBJECTS IDENTIFIED ON AHIMS

Portion of Site (whole or part)	AHIMS Site ID	Site Feature	Site Name	Restricted access (Y/N)	Easting	Northing	Datum
Whole	52-5-0273	Art (Pigment or Engraved); Artefact; Potential Archaeological Deposit (PAD)	Sandy Creek Road 21	N	292226	6192218	GDA 56
Whole	52-2-1645	Art (Pigment or Engraved)	Browns Road 31	N	291522	6191845	GDA 56
Whole	52-2-1646	Art (Pigment or Engraved); Potential Archaeological Deposit (PAD)	Browns Road 32	N	291379	6192168	GDA 56
Whole	52-2-3639	Art (Pigment or Engraved)	DM 15	N	291447	6192467	GDA 56
Whole	52-2-3644	Art (Pigment or Engraved); Potential Archaeological Deposit (PAD)	DM 20	N	291301	6235953	GDA 56

C2. AREAS WHERE HARM OF ABORIGINAL OBJECTS IS AUTHORISED

Excluding any Aboriginal objects described in Schedule A, all Aboriginal objects in, on or under the land, as in **Attachment 1: Land to which this AHIP applies**, but only in accordance with the conditions of this AHIP.



ATTACHMENT 1: Land to which this AHIP applies

This information has been redacted

For more information please contact South 32 Illawarra Metallurgical Coal.

APPENDIX A: Dictionary

In this AHIP, unless the contrary is indicated, the terms below have the following meanings:

Aboriginal object	has the same meaning as in the <i>National Parks and Wildlife Act 1974</i>
Act	means the <i>National Parks and Wildlife Act 1974</i>
AHIMS	means the Aboriginal Heritage Information Management System maintained by Heritage NSW, as defined in section 90Q of the Act
AHIP	means Aboriginal Heritage Impact Permit
AHIP holder	means the entity or person listed on the cover page under the heading "AHIP issued to"
Application	means the completed application form and all other documents in written or electronic form which accompanied the application when it was lodged, or which were subsequently submitted in support of the application
Community collection	means the collection of Aboriginal objects by one or more Registered Aboriginal Parties or their representatives
Community collection area	means an area described as a community collection area in relevant schedule
DPE	means the Department of Planning and Environment
No-harm area	means those areas described in relevant schedule
Proposed works	means the works described in the table at the front of this AHIP under "Brief description of proposal."
Public register	means the public register established under section 188F of the Act, that contains details of AHIPs issued by Heritage NSW, as described under the heading "Information about this AHIP"
Registered Aboriginal Parties	means Registered Aboriginal Parties listed in the application
Salvage excavation	means an archaeological excavation carried out in accordance with the methodology accompanying the application, as modified by the conditions of this AHIP. The purpose of salvage excavation is to recover a sample of Aboriginal objects as an archival record of Aboriginal life from a site that will be destroyed
Salvage excavation area	means any area described as a salvage excavation area in the relevant schedule
Test excavation	means an archaeological excavation carried out in accordance with methodology accompanying the application, as modified by the conditions of this AHIP. The purpose of test excavation is to collect a sample of Aboriginal objects and to assist in the assessment of management options for the site
Test excavation area	means any area described as a test excavation in the relevant schedule

Contact Us

Niche Environment and Heritage

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info@niche-eh.com

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Dharug Country
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QLD Head Office – Brisbane

Turrbal and Jagera Country
Ground Floor, Suite 3 North Tower
527 Gregory Terrace
Fortitude Valley QLD 4006

Sydney
Brisbane
Newcastle
Illawarra
Port Macquarie
Cairns
Canberra
Coffs Harbour
Central Coast
Gold Coast



Our services

Ecology, biodiversity offsets and natural capital

Terrestrial ecology
Aquatic ecology
Biodiversity offsetting
Strategic advisory

Heritage management

Heritage planning and advice
Archaeology
Cultural heritage management

Environmental planning, approvals and management

Planning and advisory
Assessment and approvals
Management and compliance

Geospatial and knowledge management

Spatial visualisation, storage and analysis
Insight and risk management
Field operations support