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Moolarben Coal
UG1 Longwalls 104-105 Extraction Plan
Aboriginal Cultural Heritage Technical Report
Ulan NSW

Local Government Area: Mid-Western Regional Council

Prepared for the Proponent: Moolarben Coal Operations Pty Ltd

Prepared by Niche Environment and Heritage | 14 February 2020

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Document control

Project number	Client	Project manager	LGA
5563	Moolarben Coal Operations Pty Ltd	Jamie Reeves	Mid-Western Regional Council

Version	Author	Review	Status	Date
D1	Jamie Reeves and Wade Goldwyer	Clare Anderson	Draft	30 January 2020
R1	Jamie Reeves and Wade Goldwyer	Clare Anderson, MCO	Final	14 February 2020
F1	Jamie Reeves and Wade Goldwyer	Clare Anderson	Final	27 February 2020

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Executive summary

This technical report presents the results of an Aboriginal cultural heritage and archaeological assessment of Longwalls 104-105 for the Moolarben Coal Complex, in the Western Coalfields of New South Wales. This report has been prepared to support an application to amend the current approved Longwalls 101-103 Extraction Plan to include LWs 104-105.

The Longwalls 104-105 Additional Assessment Area lies within hilly terrain comprised of simple slopes, ridge crests and first order drainage paths with low to steep slope gradients. On the margins of Longwalls 104-105 the hilly terrain gives way to footslopes and flat to undulating country that has been historically cleared for pasture.

The Longwalls 104-105 Additional Assessment Area has been subject to previous Aboriginal cultural heritage assessment and archaeological investigation during environmental assessment of major project approvals, exploration and due diligence activities and subsequently through modifications to project approvals. These investigations have adequately characterised the Aboriginal cultural heritage sites that may be expected to be present. However, one section of the Longwalls 104-105 area was determined to have landforms of Aboriginal heritage sensitivity that had not been previously surveyed. Additional survey was undertaken in this area to further inform this extraction plan.

There are 22 previously recorded Aboriginal heritage sites within the Longwalls 104-105 Additional Assessment Area, comprising of:

- 10 isolated finds;
- 8 artefact scatters;
- 4 rock shelters containing artefacts.

Of these sites, 14 Aboriginal heritage sites including seven isolated finds, six artefact scatters and one rock shelter containing artefacts have been salvaged under existing approvals and are no longer *in situ*. Of the remaining eight Aboriginal heritage sites seven have been assessed to be of low archaeological significance, and one is assessed to be of moderate archaeological significance.

Open sites containing artefact scatters and isolated finds can be potentially affected by cracking of the surface soils associated with mine subsidence movements. MSEC (2020) has concluded that it is unlikely that the artefact scatters or isolated finds themselves would be impacted by mine subsidence, however it is possible that these sites could be potentially impacted if remediation works to the surface areas around the archaeological sites was required.

MSEC (2020) also assessed potential subsidence impacts to Aboriginal rock shelters and concluded that there is potential for fracturing of sandstone and subsequent rock falls which have the potential to affect the artefacts and/or PADs associated with the rock shelters.

On the basis of the likely subsidence impacts as a result of secondary extraction of Longwalls 104-105 (MSEC 2020), it is recommended that site S2MC434 (a rock shelter with an artefact) be subject to salvage via surface collection and sites S2MC005 (open site with stone artefacts) and S2MC435 (a rock shelter with artefacts and of moderate significance) be subject to salvage via surface collection and test excavation consistent with the requirements outlined in the currently approved UG1 Extraction Plan Heritage Management Plan.

Table of Contents

List of Figures

List of Plates

List of Tables

1. Introduction

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfields of New South Wales (NSW) in the Mid-Western Regional Council Local Government Area (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd, Sojitz Moolarben Resources Pty Ltd and a consortium of Korean power companies). MCO and Moolarben Coal Mines Pty Ltd are wholly owned subsidiaries of Yancoal Australia Limited.

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and would continue to be carried out in accordance with NSW Project Approval (05_117) (Moolarben Coal Project Stage 1) as modified and NSW Project Approval (08_0135) (Moolarben Coal Project Stage 2) as modified.

Stage 2 at the Moolarben Coal Complex has commenced and at full development will comprise one open cut mine (OC4), two longwall underground mines (UG1 and UG2) and associated mining infrastructure.

Stage 2 UG1 Underground Mine commenced first workings in May 2016. The Stage 2 UG1 Optimisation Modification, including the Longwalls (LW) 101-103 Extraction Plan, was approved in October 2017. The LW101-103 Extraction Plan was amended to capture a LW 103 Plunge Panel in 2019. Extraction of LW101, 102 and 103 Plunge Panel has been completed and LW 103 is in progress.

MCO proposes to amend the approved UG1 LW 101-103 Extraction Plan to include LW104 and LW105.

Niche Environment and Heritage Pty Ltd (Niche) has been commissioned by MCO to undertake works to support a revision to the current LW101-103 Extraction Plan to include LW 104 and LW 105. These works include:

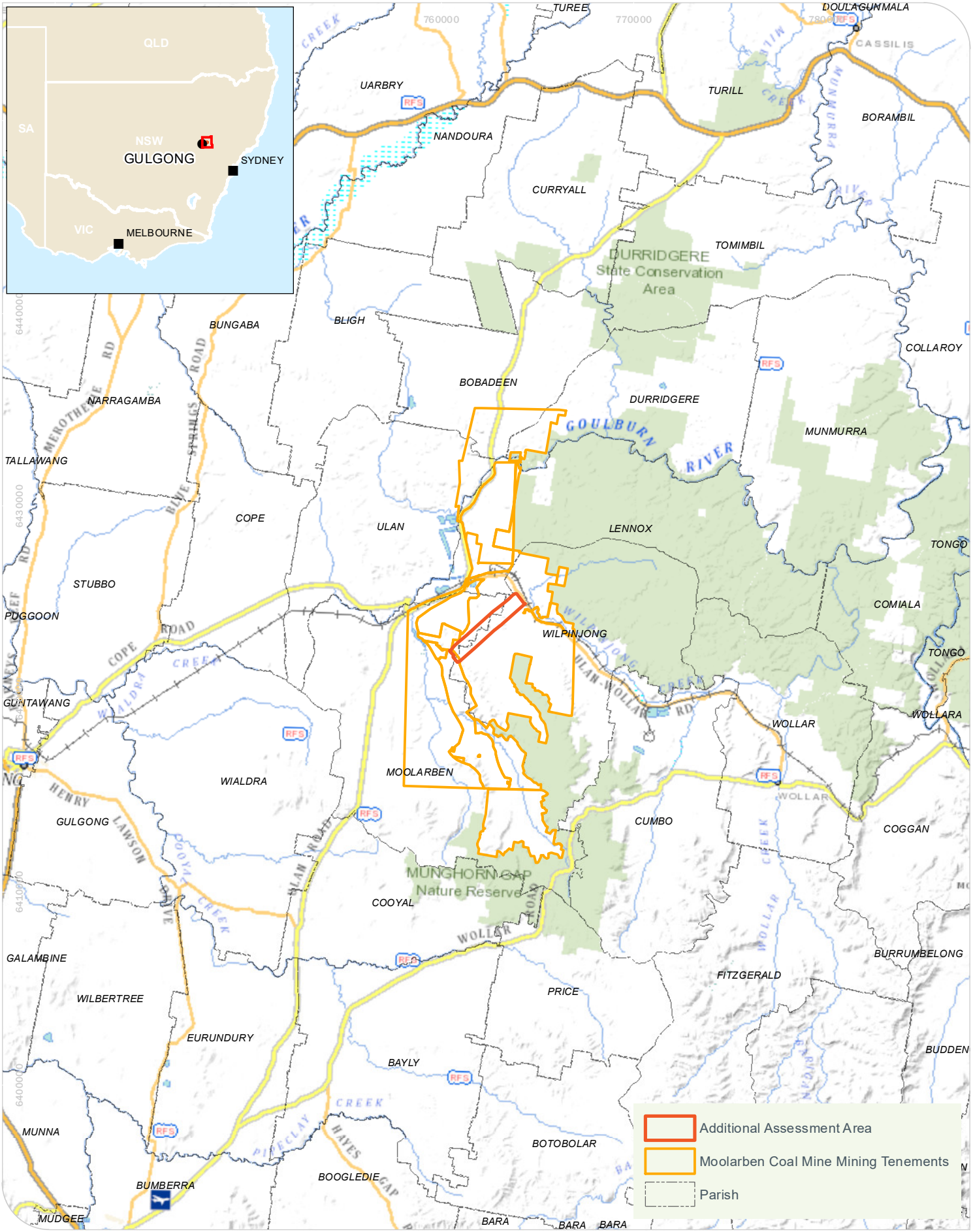
- Completing a heritage survey of areas within Underground 1 Longwall Panels 104 and 105 (Additional Assessment Area) which have not been previously surveyed in accordance with Section 5.3.2 of the Approved Moolarben Coal Complex Heritage Management Plan (HMP).
- Producing an Aboriginal Cultural Heritage technical report (this report) which:
    - Reviews subsidence predictions for LW104-105 (prepared by MSEC, 2020) and associated subsidence-related impacts in comparison to predictions from the UG1 modification;
    - Describes Aboriginal heritage survey work undertaken specific to the LW104-105 area;
    - Reviews the monitoring and management measures in the current approved Extraction plans are suitable for heritage sites within the Additional Assessment Area.

This technical report has been prepared by Jamie Reeves, archaeologist at Niche, in accordance with the Moolarben Coal Complex HMP with consideration for the following guidelines:

- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (NSW Department of Environment, Climate Change and Water [DECCW] 2010); and
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (NSW Office of Environment and Heritage [OEH] 2011).

The objectives of this technical report were to assess the potential impacts to Aboriginal heritage values from the approved underground mine layout for the UG1 Additional Assessment Area and to inform the UG1 Longwalls 104-105 Extraction Plan accordingly, by providing appropriate mitigation and management

recommendations, where required, in accordance with the currently approved Extraction Plan Heritage Management Plan.



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Regional location of the UG1 LW104-105 additional assessment area

MCO UG1 LW104-105 Extraction Plan

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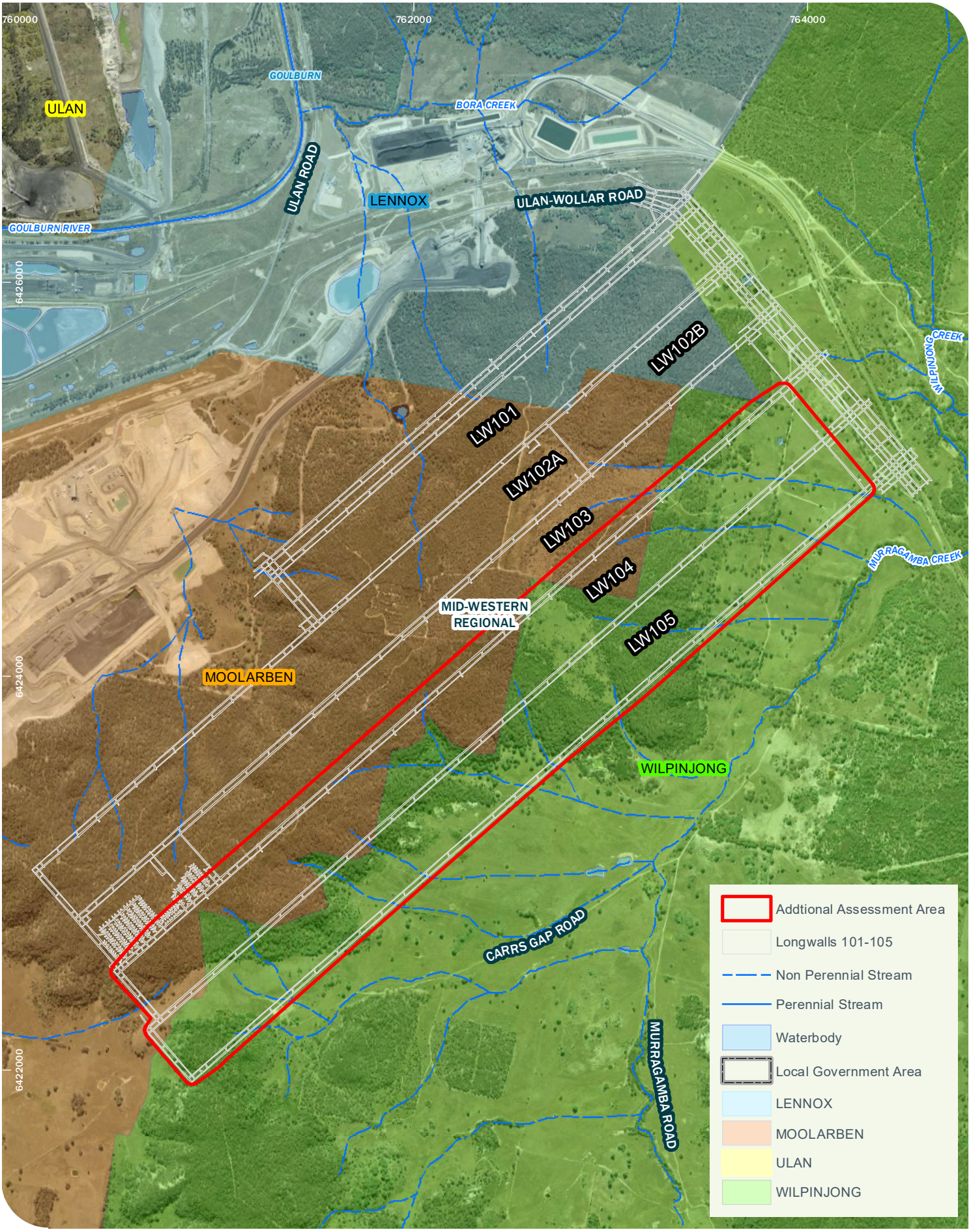
Figure 1



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Longwall 101-103 layout and UG1 LW104-105 addtional assessment area

MCO UG1 LW104-105 Extraction Plan

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Figure 2

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2. Previous archaeological work

The coal mining areas around Moolarben, Wilpinjong and Ulan have been subject to continuous Aboriginal cultural heritage assessment and archaeological study since the 1980s. The predictive model that has resulted from this previous work is discussed fully in Section 4. This section of the report looks more closely at the previous archaeological work relevant only to the UG1 Additional Assessment Area.

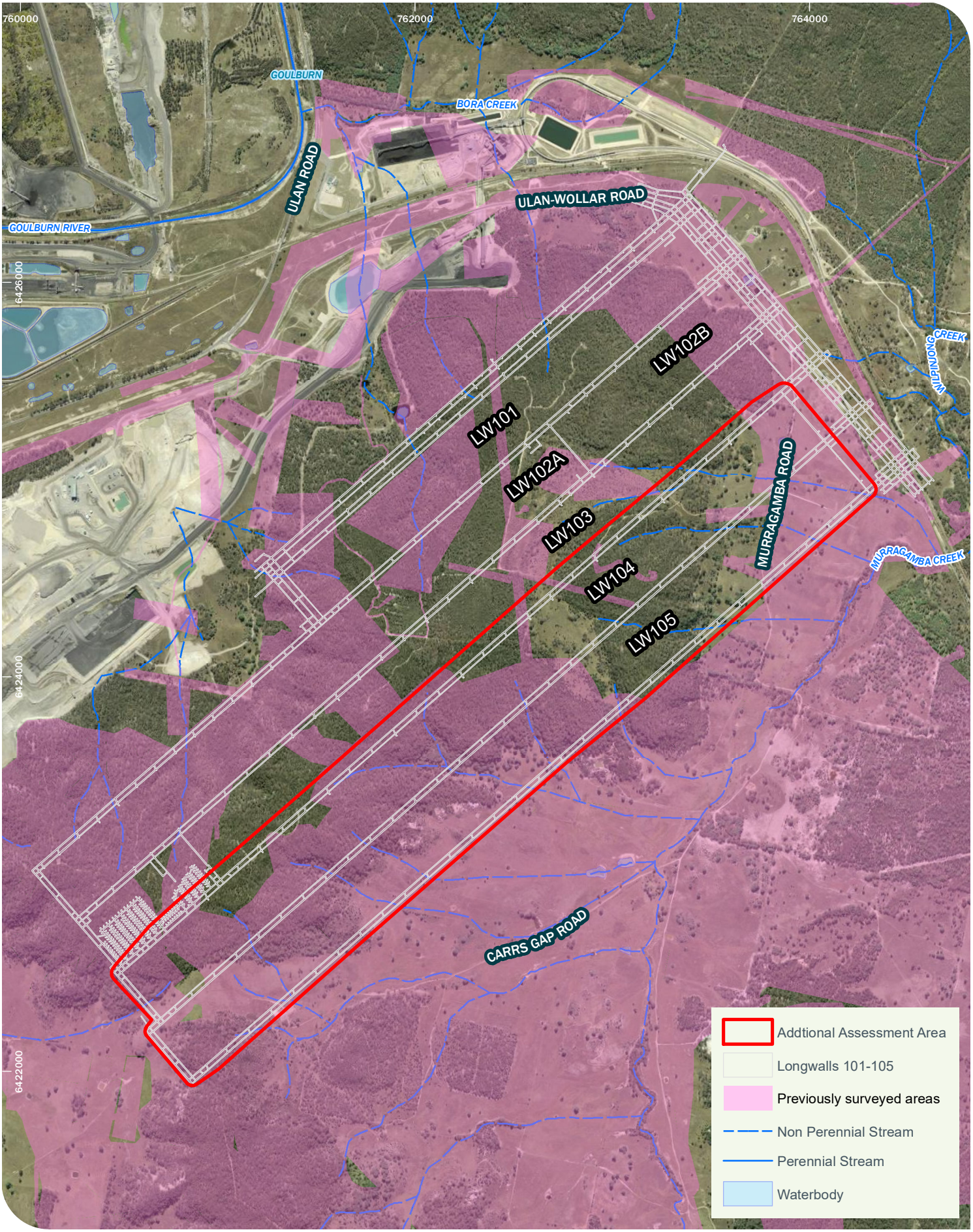
The UG1 Additional Assessment Area has been subject to previous Aboriginal cultural heritage assessment and archaeological investigation during environmental assessment of major project approvals, exploration and due diligence activities and subsequently through modifications to project approvals (Table 1). The previously surveyed areas in relation to the UG1 Additional Assessment Area are shown in Figure 3.

Table 1: Previous surveys within or adjacent to the UG1 Additional Assessment Area

Surveyor	Year	Purpose
Archaeological Risk Assessment and Surveys	2006	Stage 1 Project Approval
Archaeological Risk Assessment and Surveys	2008	Stage 2 Project Approval
AECOM	2011a	Stage 2 Project Approval
AECOM	2012	Exploration Work
AECOM	2011b	Exploration Work
South East Archaeology	2012a	Stage 2 Infrastructure Relocation
South East Archaeology	2012b	Stage 2 Ancillary Infrastructure Works
South East Archaeology	2013	Stage 1 Optimisation Works
Niche Environment and Heritage	2014	Exploration Work
Niche Environment and Heritage	2015a	Modification to OC4 Haul Road
Niche Environment and Heritage	2015b	Modification to UG1 Optimisation Project
Niche Environment and Heritage	2015c	Exploration Work
Niche Environment and Heritage	2016	UG1 Infill surveys
Niche Environment and Heritage	2019	Exploration Work (LW104-105)

UG1(LWs101-105) has been subject to previous survey for reasons such as major project approvals sampling surveys, approval modification surveys, exploration due diligence surveys and infrastructure area surveys (Table 1). The surveys have achieved a good level of effective survey coverage, and inspected all features such as potential rock shelters, boulders and or like structures that are present within the area surveyed for evidence of past Aboriginal land use.

The previous survey effort has covered the majority of the Additional Assessment Area (approximately 65%), with the exception of a woodland area in the north-east (Figure 3). This unsurveyed area is regarded as archaeologically sensitive as it contains two tributaries where rock shelters may be present. This area was surveyed in 2019.



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Previously surveyed areas of the UG1 LW104-105 addtional assessment area

MCO UG1 LW104-105 Extraction Plan

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Figure 3

Moolarben Coal maintains an Aboriginal Sites Database which provides an up-to-date database of all known Aboriginal cultural heritage sites at the Moolarben Coal Complex. The database was interrogated to provide a list of all known Aboriginal heritage sites within the UG1 Additional Assessment Area. In addition to this, an extensive Aboriginal Heritage Information Management System (AHIMS) Search (#263696) was conducted on 10 January 2020 (Annex 1). The Aboriginal Sites Database and AHIMS results were combined to provide the site list presented in Table 2. For consistency, the site classifications used for "Site Type" in Table 2 are the same as those used in the Moolarben Coal Complex Heritage Management Plan. The location of the previously recorded Aboriginal heritage sites within the UG1 LW104-105 Additional Assessment Area is shown in Figure 4.

There were 19 previously recorded sites within or adjacent to the UG1 Additional Assessment Area, comprising:

- 10 isolated finds;
- 8 artefact scatters;
- 1 rock shelter containing artefacts.

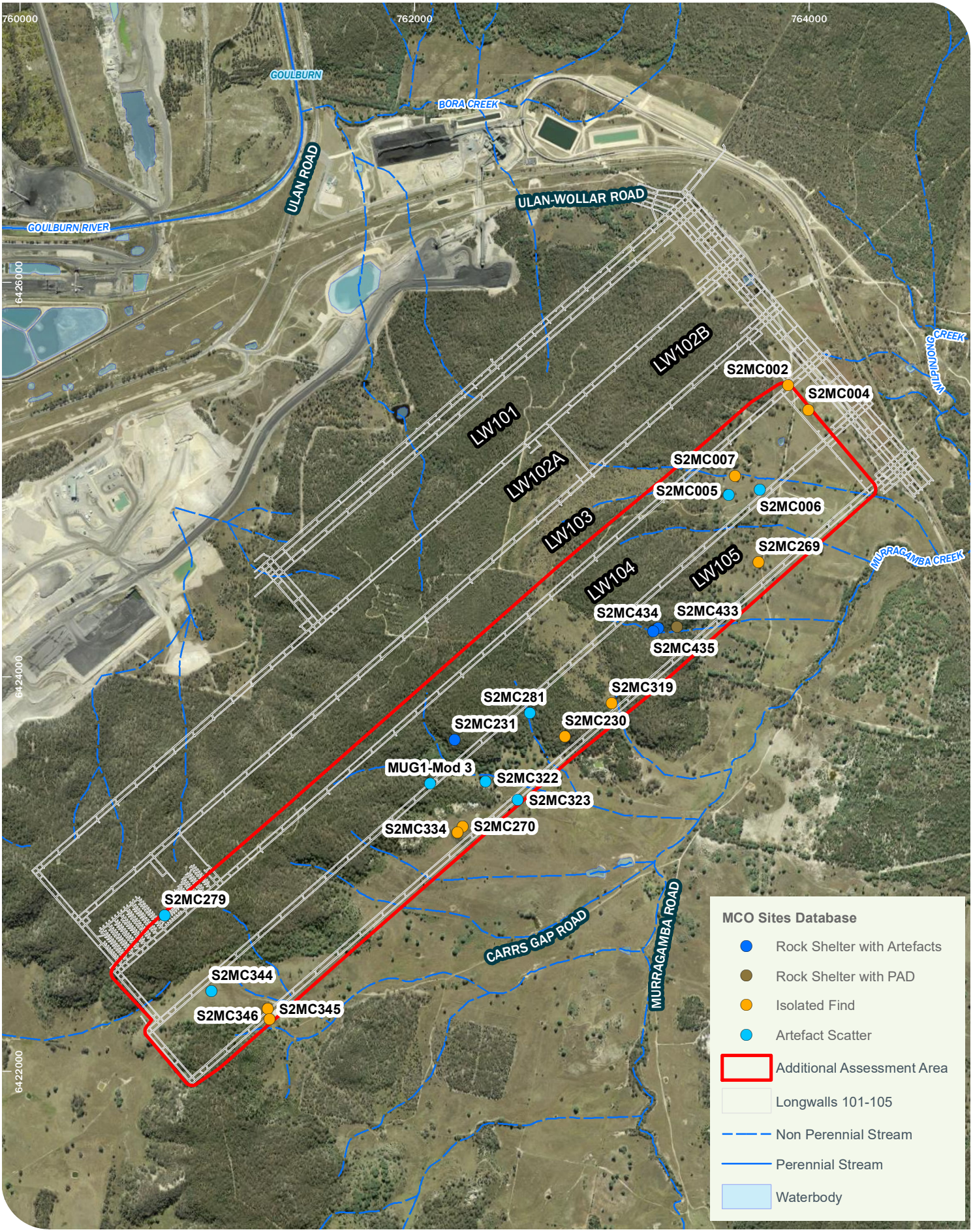
Of the 19 previously recorded sites, 14 have been salvaged under existing approvals and are no longer present within or adjacent to the UG1 LW104-105 Additional Assessment Area. For completeness, the salvaged sites are also presented in Table 2. The salvaged sites were all located in areas within or adjacent to the UG1 LW104-105 Additional Assessment Area that have already been developed as part of the Stage 2 Open Cut 4, UG1 Optimisation Modification or other ancillary facilities approvals.

Table 2: Sites within the UG1 LW104-105 Additional Assessment Area (derived from Moolarben Aboriginal Sites Database and AHIMS)

Site Name	AHIMS No.	Site Type	Archaeological Significance / Status
S2MC004	36-3-1153	Isolated Find	Low
S2MC005	36-3-1154	Artefact Scatter	Low
S2MC007	36-3-1156	Isolated Find	Low
S2MC279	36-3-3267	Artefact Scatter	Low
S2MC319	36-3-3058	Isolated find	Low
MUG1-Mod 3	36-3-3143	Artefact Scatter	Salvaged
S2MC002	36-3-1151	Isolated Find	Salvaged
S2MC006	36-3-1155	Artefact Scatter	Salvaged
S2MC230	36-3-1377	Isolated Find	Salvaged
S2MC231	36-3-1378	Rock Shelter with Artefacts	Salvaged
S2MC269	36-3-2654	Isolated Find	Salvaged
S2MC270	36-3-2653	Isolated Find	Salvaged
S2MC281	36-3-3271	Artefact Scatter	Salvaged
S2MC322	36-3-3060	Artefact scatter	Salvaged
S2MC323	36-3-3061	Artefact scatter	Salvaged
S2MC334	36-3-3053	Isolated find	Salvaged
S2MC344	36-3-3135	Artefact scatter	Salvaged
S2MC345	36-3-3134	Isolated find	Salvaged
S2MC346	36-3-3132	Isolated find	Salvaged

The sites that have not been salvaged are open stone artefact sites comprising three isolated finds, and two artefact scatters. The open sites present within the UG1 area are made up of small sites with only a single artefact or with a low frequency and low density of artefacts. All these sites have been previously assessed to be of low significance.

A targeted survey was conducted on the only remaining landscapes that may contain rock shelters (or other site types that may be susceptible to subsidence) that had not been surveyed, so it is unlikely there are unknown rock shelters remaining in the UG1 LW104-105 Additional Assessment Area (see Section 5).



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Aboriginal heritage sites within the UG1 LW104-105 additional assessment area (Source: AHIMS and MCO)

MCO UG1 LW104-105 Extraction Plan

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Figure 4

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3. Landscape context and regional character

Situated within the Central Tablelands region of NSW, the UG1 Additional Assessment Area lies within hilly terrain comprised of simple slopes, ridge crests and first order drainage paths with low to steep slope gradients. The hilly terrain gives way to footslopes and flat to undulating country that has been historically cleared for pasture. Generally speaking, the UG1 Additional Assessment Area consists of broad ridges, with steep sided gullies formed by short tributaries. There is low undulating country and footslopes in the north-eastern most portions, and an overburden emplacement area within the mid to south-western portion of LWs104-105.

There are four soil landscapes within the UG1 LW104-105 Additional Assessment Area: the Ulan, Lees Pinch; Bald Hill and Munghorn Plateau Soil Landscapes (Murphy and Lawrie 1998) (Figure 5). All these landscapes have been subject to previous survey. The summaries below are derived from the soil landscape descriptions provided by Murphy and Lawrie (1998) and provide a ready characterisation of the nature of the landscape in the UG1 Additional Assessment Area.

The lower elevations of the subject area are situated within the Ulan Soil Landscape, which is typically found in association with low undulating rises and creek flats on slopes between 2% and 10% gradients. The soils here have moderate to high levels of erosion. This soil landscape accounts for approximately 34% of the UG1 LW104-105 Additional Assessment Area, mostly in the north-eastern part of the UG1 Additional Assessment Area.

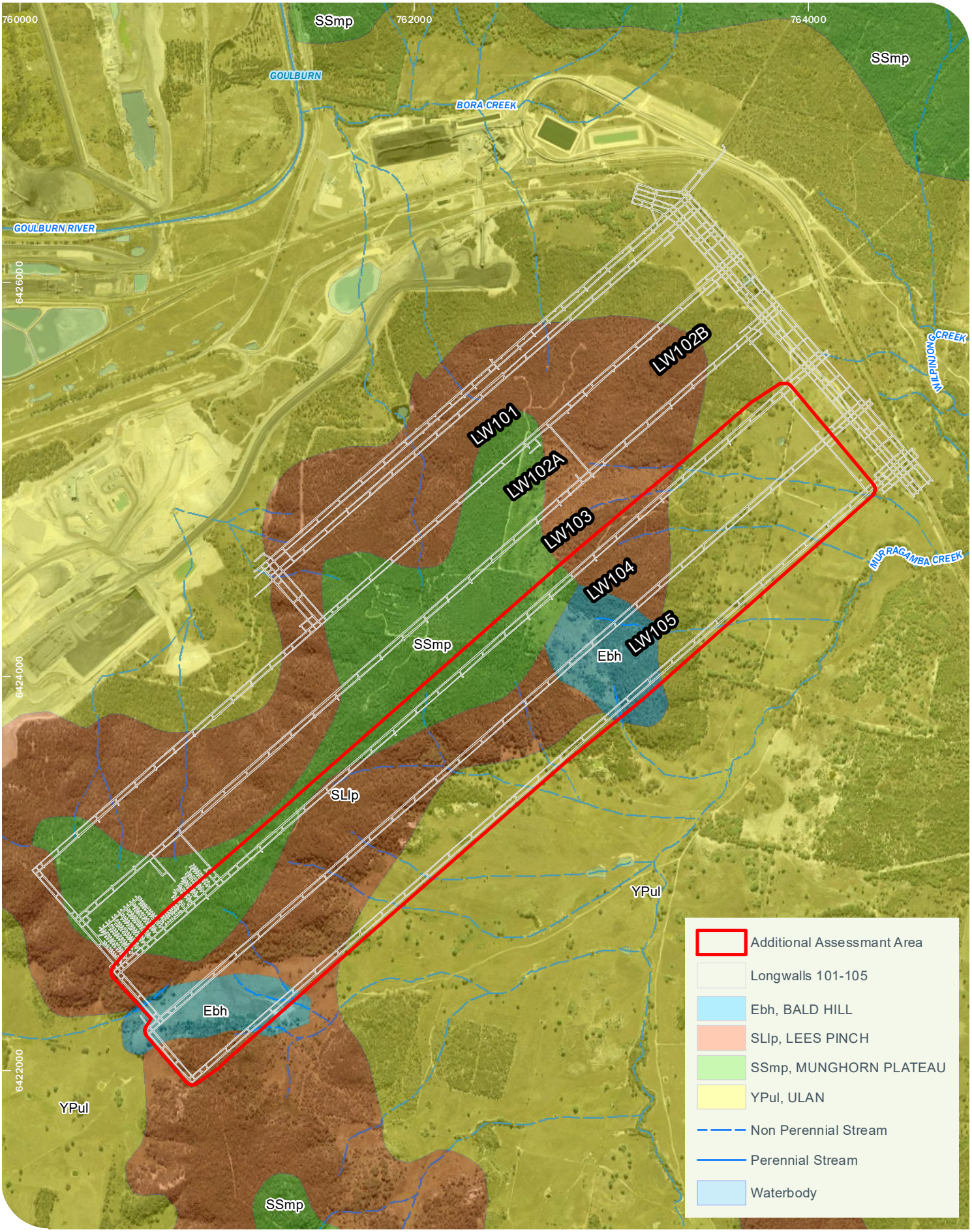
The Lees Pinch Soil Landscape, situated on the lower to mid-slopes of the UG1 Additional Assessment Area, is typically found in association with sandstone plateau and hillslopes with boulder debris and rock outcrops with slope gradients between 15% and 40%. Soils in the landscape are shallow siliceous sands, and the landscape is subject to high levels of downslope erosion. Approximately 39% of the UG1 Additional Assessment Area is located on this landscape, and this steep, rugged landscape is where rock shelters occur.

The upper ridgelines within the UG1 Additional Assessment Area are characterised by the Munghorn Plateau Soil Landscape which is typically characterised by low undulating hills forming plateaux with slopes between 3% and 10% gradient. Like the Lees Pinch Soil Landscape, soils in the Munghorn Plateau Soil Landscape include shallow siliceous sands. Rock outcrops are often present, but the relatively more flat country means rock shelters are less likely to occur here. Approximately 13% of the UG1 Additional Assessment Area is situated on this landscape.

Two separate areas of the upper ridge of the UG1 Additional Assessment Area are comprised of the Bald Hill Soil Landscape. This landscape is characterised by steep crests and hillslopes with gradients between 10% and 35%. Rock outcrop of small basalt boulders is common, there are no basalt structures large enough to form rock shelters. The chocolate soils derived from the basalt parent rock are a contrast to the surrounding siliceous soils. The Bald Hill landscape accounts for approximately 13% of the UG1 area.

For the most part the UG1 LW104-105 Additional Assessment Area has not been cleared of native vegetation, which consists of eucalypt and pine woodlands. There has been previous localised clearing for agricultural/pastoral use historically, and the ongoing development of localised works and infrastructure for the mine (such as the OC4 overburden emplacement area, roads, access tracks and the overland coal conveyor). There is no permanent water within the UG1 LW104-105 Additional Assessment Area, which falls within the upper reaches of the Murragamba Creek Catchment. The nearest permanent water sources

are the Moolarben and Murragamba and Wilpinjong Creeks. At the closest point, Murragamba Creek is located approximately 250m from LW 105. Drainage depressions in proximity to the UG1 Additional Assessment Area can be considered first or second order drainage lines and are unlikely to act as temporary sources of potable water (i.e. after rain, water may have temporarily collected in depressions in sandstone outcrops within the UG1 LW104-105 Additional Assessment Area).



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Soil landscapes of the UG1 LW104-105 additional assessment area

MCO UG1 LW104-105 Extraction Plan

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Figure 5

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4. Predictions and sampling strategy

The previous archaeological work at the Ulan, Moolarben and Wilpinjong Coal Mines represents a very intensive amount of study for a relatively small area. As such a good model of past Aboriginal land use and its archaeological traces has been developed by Kuskie (South East Archaeology 2009).

The model states that most evidence of occupation will date within the last 5,000 years though may have extended 30,000 – 40,000 years Before Present. The model determines three zones of resources: primary resource zones, secondary resource zones and a third zone that encompasses the land beyond primary and secondary resource zones (South East Archaeology 2009: 79-87).

Primary resource zones: areas of more abundant and diverse resource rich zones in north-east Wiradjuri territory including the junction of the higher order watercourses such as Goulburn and Talbragar Rivers would most likely be a focus of occupation. These zones may have supported nuclear and extended family base camps, community base camps and congregations of larger groups. This zone may have been subject to longer stays and more frequent occupation than other areas, such as, secondary resource zones. The model states that these zones would contain substantially higher counts and densities of artefacts, a greater range of stone materials and artefact types and a higher number of activity areas would be present.

Secondary resource zones: these are areas where resources such as watercourses, swamps and wetlands occur in proximity of higher order watercourses and associated flats and terraces. Examples of secondary resource zones in the Ulan area include higher order parts of Moolarben Creek. In the model these zones were utilised for regular but sporadic seasonal encampments of small parties, but occupations of the encampments would typically have been for short periods. Compared to the surrounding areas this resource zone will host moderately higher counts and densities of artefacts, a number of activity areas, and a relatively broad range of raw materials and artefact types (but much lesser range than sites in primary resource zones).

Outside primary and secondary zones: occupation is anticipated to be hunter gatherer activities with small parties of men, women or children. Movement across the landscape would be transitory between resource locations and may include special purpose journeys for ceremonial purpose or the procurement of stone. Utilisation of landforms such as simple slopes, ridge crests, spur crests and lower order watercourses would be far less intense than that found in primary and secondary resource zones. The evidence of this occupation would be low to very low artefact counts and densities, little range in the number of activity areas, and dates of sporadic occupation rather than continuous occupation. Evidence of stone quarries at sources may also be present.

In this model, activities that may have occurred in the landscape include food procurement and processing, food consumption, maintenance and production of tools, the building of shelter, children's play, ceremonial activity, spiritual activity, burials and social and political activity by Aboriginal people.

The bulk of these activities would be evidenced through the presence of material evidence; in particular through the stone artefact assemblage. For instance, food procurement and processing might be evident through the presence of usewear residue on stone tools. Ceremonial activities may be evident by the presence of carved trees, bora grounds and stone arrangements.

The archaeological model predicts that most stone artefacts will be made of quartz due to its ease of access and availability in the local landscape. The model hypothesises that the relative intensity of use of each of the materials will be dependent on the proximity of the original source of the stone. Most stone procurement is hypothesised to have occurred during normal daily and seasonal movement without the need for special purpose visits. As a result of the abundance of available local stone, the stone is less likely to exhibit intensive reduction as evidence of conservation of material.

Most stone technology will be basic and non-specific (e.g. complete and broken flakes) with low frequencies of microblade or microlithic technologies, bipolar knapping, backing and usewear.

Grinding grooves for the sharpening of ground edge axes may occur on exposed sandstone bedrock, but are unlikely to occur in high numbers. Where they occur in areas of hills and ridges these occurrences would most likely represent occasional activity and short-term activities rather than special purpose visits.

In summary the UG1 Additional Assessment Area is situated in a landscape location which the predictive model describes as outside primary and secondary resource zones. The predicted use of this area by Aboriginal people in the past is of transitory utilisation when moving between primary and secondary resource zones. Accordingly, the past traces of Aboriginal land use are predicted to reflect this, with relatively low numbers and diversity of sites, and sites that contain low numbers of artefacts and features. The Additional Assessment Area has the potential to contain both open sites containing stone artefacts and rock shelters with stone artefacts.

5. Field methods and results

5.1 Sampling strategy

The UG1 LW104-105 Additional Assessment Area has been subject to extensive previous survey and site management and collection under various approvals in accordance with the Moolarben Coal Heritage Management Plan. 230 ha of the 355 ha Additional Assessment Area, or approximately 65%, of the Additional Assessment Area has been surveyed (Section 2, Figure 3). A small portion of the unsurveyed part of the Additional Assessment Area was determined to have archaeological potential as it contained drainage lines in steep slopes. These geographic and topographic conditions are where rock shelters are known to occur in the Ulan and Moolarben area. Rock shelters have the potential to be a site type of moderate or high significance and in addition to this are usually more susceptible to subsidence impacts than open sites.

5.2 Field methods

The survey method involved a single survey team of three people conducting a transect along either side of the two drainage lines present in the previously unsurveyed area. This method meant that all potential rock shelters were identified and inspected for Aboriginal cultural heritage.

Non-differential GPS was used to record survey tracks and features and finds. A smart phone was also used to additionally record survey tracks and waypoints, and for photography.

5.3 Survey results

A survey of the area identified to be of archaeological potential was conducted on 5 December 2019. As per the proposed method the survey involved pedestrian transects walked down one side of a drainage line, and then walked back up the other side, inspecting a large area either side of each of the two drainage lines for rock shelters. Conditions for the survey were fine, and there were no constraints to the survey execution. Three previously unrecorded Aboriginal heritage sites were found by the survey. The survey results are summarised in Table 3 and Figure 6.

Table 3. Survey results

Site Name	AHIMS	Site Type/Features	Feature Count
S2MC433	36-3-3585	Shelter with PAD	-
S2MC434	36-3-3587	Shelter with Artefact	1
S2MC435	36-3-3586	Shelter with Artefacts	10

The survey discovered three new Aboriginal heritage sites, as described below.

S2MC433

This Aboriginal heritage site is a small rock shelter (3 m x 1 m) formed by cavernous weathering. It is situated at the base of the slope, adjacent to the valley floor. Block fall at the front of the shelter has trapped a small area of PAD, and boulders further out the front of the shelter trap more deposit. The deposit was <15 cm in depth. No artefacts were visible on the floor of the shelter, or in the drip-line.

Plate 1. View of S2MC433

Plate 2. PAD area of S2MC433

S2MC434

This Aboriginal heritage site consists of a single sandstone formation at the base of the slope with two separate rock shelter spaces immediately next to each other. One rock shelter consists of an elevated, cavernous space with a column joining the roof and floor of the formation. This large space measures 7 m x 4 m and has an uneven floor composed of pale, powdery deposit. Adjacent to this large cavern is a small, shallow overhang that has a floor area of 4 m x 1 m, with deposit trapped behind block fall and trees. A quartz core was present approximately 3 m distance downslope from the shelter. The deposit was a grey coloured sandy loam, less than <15 cm in depth, and no artefacts were present on the deposit surface or in the dripline.

Plate 3. View of S2MC434

Plate 4. Quartz core at S2MC434

S2MC435

This Aboriginal heritage site is a low shelter located on the mid-slope of the valley side. It measures 7 m x 3 m and has a dark, fine sandy deposit and a large, flat floor area. The shelter has been formed by block fall and cavernous weathering. No artefacts were present on the shelter floor or in the dripline, however ten artefacts were found across the area immediately downslope in front of the shelter and these were concluded to have eroded from the front edge of the deposit, some coming to settle on a break of slope that follows an ephemeral drainage line that runs adjacent to the shelter.

Plate 5. View of S2MC435, scale represents location of artefacts.

Plate 6. Artefacts at S2MC435

5.4 Survey coverage

The survey focussed on two previously unsurveyed drainage lines within the LW104-105 area. The area surveyed consisted of undisturbed woodland on crests and slopes and previously cleared areas on the valley flats below the slopes. The survey area and results are summarised in Figure 6 and Table 4.

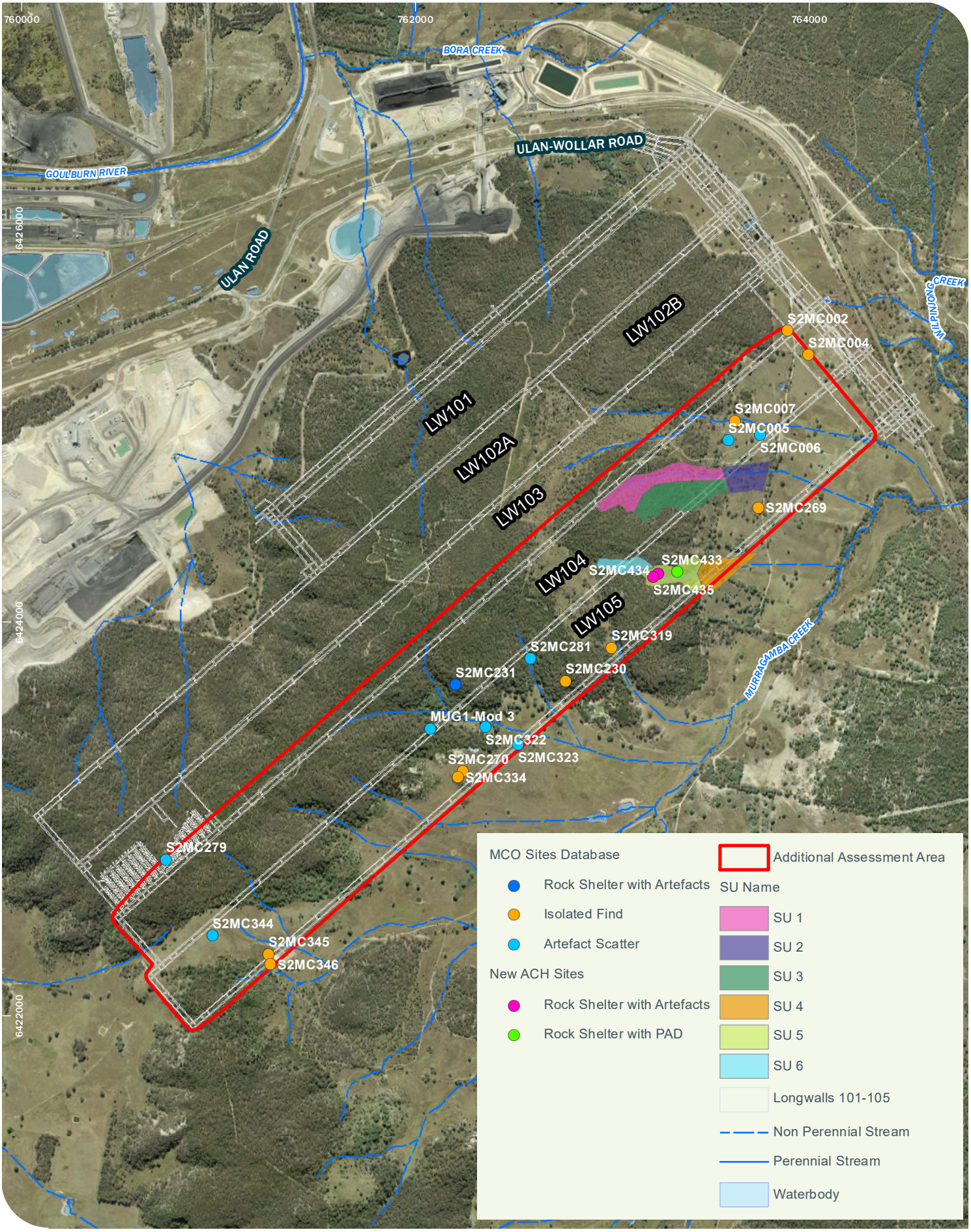
The northern drainage line consisted of a rocky sided ephemeral drainage line on a moderate slope. The rock formations on either side of this northern drainage line occasionally formed low steps and benches, however there were no formations of a scale that resulted in shelter formation. Benches and the creek bed were inspected for grinding grooves, but none were present.

The southern drainage line consisted of a narrow, flat bottomed gully with very steep rocky sides and frequent large sandstone formations, including rock shelters formed by block fall and cavernous weathering.

Plate 7. Typical landscape characteristics in the slopes of the northern drainage line

Plate 8. Typical landscape characteristics in the slopes of the southern drainage line

The survey coverage results are summarised in Table 4.



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Survey results

MCO UG1 LW104-105 Extraction Plan

Figure 6

Table 4. Survey coverage

Survey Unit	Landform	Survey Unit Area (ha)	Visibility %	Exposure %	Effective coverage area (ha)	Effective coverage %	Sites	Feature count
SU 1	Upper slope	5.88	30	40	0.71	12%	-	-
SU 2	Flat	2.96	50	20	0.30	10%	-	-
SU 3	Mid-slope	5.67	20	30	0.34	6%	-	-
SU 4	Flat	2.89	60	30	0.52	18%	-	-
SU 5	Lower slopes	3.26	30	40	0.39	12%	3	11
SU 6	Upper slope	1.61	20	30	0.10	6%	-	-
Totals:		*22.27*			*2.35*			

The survey provided an effective coverage of the surveyed area, and there are no areas remaining within the surveyed area or the UG1 LW104-105 Additional Assessment Area that have not been surveyed and where rock shelters are likely to occur.

As a whole the UG1 LW104-105 area comprises approximately 355 ha, subsequent to the current survey a total of approximately 252 ha, or 71%, of this area has been subjected to systematic cultural heritage survey.

6. Scientific values and significance assessment

6.5 Assessment framework

The Burra Charter (Australia ICOMOS 2013) defines the basic principles and procedures to be observed in the conservation of important places. It provides the primary framework within which decisions about the management of heritage sites in Australia should be made. The Burra Charter defines cultural significance as being derived from a number of values, each of which are discussed further below.

6.5.1 Social value

Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

6.5.2 Historic value

Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section.

A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

6.5.3 Scientific (archaeological) value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.

6.5.4 Aesthetic value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.

6.6 Assessment of archaeological significance

6.6.1 S2MC433

S2MC433 is a small shelter with a small area of potential archaeological deposit. The shelter has no identified social or historical values. The shelter has low archaeological value as its deposit is shallow and it is not rare, representative or likely to meaningfully inform our knowledge of Wiradjuri history beyond its recording and incorporation into the known assemblage of sites from the Moolarben and Ulan areas. As a shelter in a relatively undisturbed landscape the site has some aesthetic value.

For these reasons S2MC433 is determined to be of low archaeological significance.

6.6.2 S2MC434

S2MC344 is a twin pair of shelters with a small area of archaeological deposit and a single stone artefact. The shelter has no identified social or historical values. The shelter has low archaeological value as its deposit is shallow and is not rare, representative or likely to meaningfully inform our knowledge of Wiradjuri history beyond its recording and incorporation into the known assemblage of sites from the Moolarben and Ulan areas. As a quite uniquely formed and shaped shelter in a relatively undisturbed landscape the site has some aesthetic value.

For these reasons S2MC434 is determined to be of low archaeological significance.

6.6.3 S2MC435

S2MC435 is a small rock shelter on the midslope of the valley side. It contained a comparatively large area of archaeological deposit compared to the shelters in this gully. A total of 10 artefacts were observed eroded from the archaeological deposit, and the deposit itself was noted to be dark grey in colour and of a fine texture: characteristicstaken to be indicative of repeated cultural use of the shelter. The shelter has no identified social or historical values. While shelters are not locally or regionally rare, archaeologically, S2MC435 has value as a shelter with 10 surface artefacts which is above the median number of artefacts of 6 recorded for shelters during the MCO Stage 1 and Stage 2 assessments (the maximum number of surface artefacts in shelters was 45 and the minimum was 1). The deposit is undisturbed and there is a high potential for the site providing contributory information on the Wiradjuri use of the area, including the potential for identifying different time periods, giving the shelter both moderate representative and scientific potential value. The shelter may provide valuable information when compared to other shelters which have been excavated in the same and surrounding ridgelines. The shelter has some aesthetic value.

For these reasons S2MC434 is determined to be of moderate archaeological significance.

There is no change to the archaeological significance of the five remaining known Aboriginal heritage sites in the UG1 LW104-105 Additional Assessment Area. The significance of these Aboriginal heritage sites is recorded as low in the complex-wide Moolarben Coal Complex Heritage Management Plan.

Table 5. Summary of significance assessment results for UG1 LW104-105 Additional Assessment Area (excludes sites which have been previously salvaged)

Site name	AHIMS No.	Site Features	Significance
S2MC004	36-3-1153	Isolated Find	Low
S2MC005	36-3-1154	Artefact Scatter	Low
S2MC007	36-3-1156	Isolated Find	Low
S2MC279	36-3-3267	Artefact Scatter	Low
S2MC319	36-3-3058	Isolated find	Low
S2MC433	36-3-3585	Shelter with PAD	Low
S2MC434	36-3-3587	Shelter with Artefact	Low
S2MC435	36-3-3586	Shelter with Artefacts	Moderate

6.6.4 UG1 LW104-105 Additional Assessment Area – statement of significance

The UG1 Additional Assessment Area contained 22 known Aboriginal heritage sites, comprising open artefact sites and rock shelters with PAD and/or artefacts. Fourteen of the sites have been salvaged under the procedures of the Moolarben Coal Heritage Management Plan. The remaining sites comprise of seven sites of low archaeological significance and one site of moderate archaeological significance. The UG1

Additional Assessment Area exists in a landscape location that has been predicted to have been an area not intensively used by Aboriginal people in the past, and survey results have shown that generally the traces of past Aboriginal land use are indicative of transient or short-term repeated use, rather than long term camping or gathering. It could be reasonably assumed, and is somewhat borne out by known data, that all similar regional landscapes in areas with little resources (rocky ridges long distances from water) would have similar archaeological site assemblages. There have been no identified specific social or cultural values shown to exist in the UG1 Additional Assessment Area. For these reasons as a whole the UG1 Additional Assessment Area is assessed to have low archaeological value. Notwithstanding, consultation undertaken to date with the Aboriginal community indicates that all Aboriginal heritage sites at the MCC, known or otherwise, have high cultural significance.

7. Discussion and impact assessment

The UG1 LW104-105 Additional Assessment Area is situated on a rocky ridge and associated slopes and flats that has been historically partially cleared and has seen some development for open cut mining activities, and mining-related infrastructure. The area has been subject to systematic archaeological and cultural heritage survey—including salvage collection of 14 sites—and there are eight known Aboriginal cultural heritage sites remaining within the UG1 LW104-105 Additional Assessment Area. The sites comprise three open stone artefact sites, two rock shelters with artefacts and one rock shelter with PAD. Seven of the sites, and the UG1 LW104-105 Additional Assessment Area, have been assessed to be of low archaeological significance. The rock shelter with artefacts site S2MC435 was assessed to be of moderate archaeological significance. There are no identified sites of social/cultural value.

The proposed extraction of Longwalls 104-105 has the potential to harm the Aboriginal heritage sites within the UG1 LW104-105 Additional Assessment Area through subsidence induced changes to the ground surface. These changes may include (MSEC 2020):

- Opening of cracks at the ground surface in soil
- Buckling and deformation of soils at the ground surface
- Slumping or mass movement of soil and rocks on steep slopes
- Cracking of rock formations
- Rock fall

Because the open artefact sites and isolated finds occur in open contexts, it is unlikely they would be impacted or harmed by changes at the ground surface due to mine subsidence. However, it is possible that these sites may be harmed by any local remediation works to any subsidence effected areas (MSEC 2020).

The rock shelter sites are at risk of change from subsidence effects such as cracking or movement of rock strata, block fall or rock fall and mass movement on steep slopes (MSEC 2020). Because the rock shelter sites are all sites that contain PAD and/or artefacts, change that would be considered harm would need to be change that effects either the artefact or PAD, which would be changes such as partial collapse, mass movement or increased erosion rather than cracking or differential movement of strata.

MSEC (2020) has calculated the potential subsidence impacts at each of the Aboriginal heritage sites, as summarised in Table 6.

Table 6: MSEC subsidence predictions for Aboriginal heritage sites in UG1 Additional Assessment Area

Site	Description	Maximum Predicted Subsidenceb ased on the Extraction Plan Layout after LW104 (mm)	Maximum Predicted Subsidence based on the Extraction Plan Layout after LW105 (mm)	Maximum Predicted Tilt based on the Approved Layout (LW101-105) (mm/m)	Maximum Predicted Tilt based on the Extraction Plan Layout (mm/m)
S2MC004	Isolated find	< 20	< 20	< 0.5	< 0.5
S2MC005	Artefact scatter	2100	2200	6.0	6.0
S2MC007	Isolated Find	2100	2200	0.5	0.5
S2MC279	Artefact scatter	< 20	< 20	50	< 0.5
S2MC319	Isolated Find	< 20	775	55.0	55.0
S2MC433	Rock Shelter with PAD	< 20	2200	8.0	8.0
S2MC434	Rock Shelter with Artefacts (1 artefacts)	< 20	2200	< 0.5	< 0.5
S2MC435	Rock Shelter with Artefacts (10 artefacts)	< 20	2200	1.0	1.0

Open sites containing artefact scatters and isolated finds can be potentially affected by cracking of the surface soils associated with mine subsidence movements. The UG1 Subsidence Impact Assessment (MSEC 2020) concludes that “it is unlikely that the scattered artefacts or isolated finds themselves would be impacted by mine subsidence, it is possible that, if remediation works to the surface areas around the archaeological sites was required after mining, these works could potentially impact on the Aboriginal heritage sites”. This assessment is concurred with.

MSEC (2020) also assessed potential subsidence impacts to the Aboriginal rock shelters and concluded that there is potential for fracturing of sandstone and subsequent rock falls which have the potential to affect the artefacts and/or PADs associated with the rock shelters. Sites S2MC433, S2MC434 and S2MC435 are associated with geological formations of continuous lengths of rock outcrop. When subject to subsidence effects, impacts will be more likely at sites in these settings than they would be at isolated open artefact sites, or isolated rock shelter sites.

All areas of the Additional Assessment Area with the geological potential to have rock shelters were subject to archaeological survey. It is highly unlikely that there are further rock shelter sites in the UG1 LW104-105 Additional Assessment Area.

Open sites containing artefacts or isolated artefacts are the most common type of site, and can occur anywhere in the landscape (Section 4). It is possible there are further open artefact sites within the Additional Assessment Area. Risks to these unknown open sites from subsidence are minimal given MSECs (2020) assessment of potential impacts.

8. Management, mitigation measures and recommendations

The Moolarben Coal current approved UG1 Extraction Plan Heritage Management Plan (Moolarben Coal 2019) sets out the strategies, processes and requirements for management of subsidence and surface works impacts for the Moolarben Coal Complex. The below recommended management and mitigation measures are made consistent with the requirements of the approved Moolarben Coal Complex Heritage Management Plan.

8.1 Baseline Recording

Although subject to initial recording, prior to the commencement of secondary extraction of Longwalls 104-105, a detailed baseline record should be obtained for the site S2MC435.

All other Aboriginal heritage rock shelter sites within the UG1 LW104-105 Additional Assessment Area are considered to have been sufficiently recorded.

8.2 Monitoring of Aboriginal Heritage Sites

Appendix D of the Moolarben Coal Complex Heritage Management Plan identifies sites requiring monitoring for subsidence impacts. There are no sites in the UG1 LW104-105 Additional Assessment Area listed as requiring monitoring in Appendix D.

8.3 Previously Unrecorded Aboriginal Heritage Sites

Section 5.10 of the Heritage Management Plan describes protocols for the management for previously unrecorded Aboriginal archaeological sites. It says:

> 5.10.5: If the site is determined to be of 'high scientific significance' by the qualified archaeologist, proposed management actions will be discussed with the RAPs. Following these discussions, management actions will be implemented (e.g. salvage, excavation, subsidence monitoring and blast vibration monitoring) in accordance with the procedures outlined in this HMP appropriate for the type of site.
>
> 5.10.6: If the site is determined to be of 'low or moderate scientific significance', the qualified archaeologist will propose appropriate management of the newly identified site in accordance with the procedures outlined in this HMP, at which time a salvage team will be organised. MCO may utilise a salvage team that is already onsite to complete the salvage works depending on the priority of the work area in relation to the construction program.

Following the HMP the management actions for the rock shelter sites within the UG1 LW104-105 Additional Assessment Area are:

- S2MC435: Salvage and test excavation
- S2MC434: Salvage
- S2MC433: no action required

8.4 Collection and Salvage and Excavation

The Heritage Management Plan requires that S2MC005 be managed via surface collection and test excavation. Should test excavation result in the site being determined to be of high archaeological significance then salvage excavations should follow.

Rock shelter site S2MC435 is of moderate archaeological significance and in accordance with Section 5.10.5 of the Management Plan this site should also be subject to management via collection of surface artefacts,

sub-surface test excavation of the deposit, and if warranted salvage excavation of a representative sample of the archaeological deposit.

The Heritage Management Plan describes the process as follows:

> *Aboriginal archaeological sites that are considered to hold research potential and are scheduled to be impacted will undergo a two-phase program of archaeological excavation. This program will include an initial exploratory phase followed, when warranted, by a more targeted investigation of the site's research potential as follows:*
>
> 1. *initial subsurface testing using one or more linear transects of hand excavated, regularly-spaced shovel test pits (Section 5.6.1); and*
>
> 2. *controlled salvage excavation of areas with high research potential as identified through Phase 1 (the initial subsurface testing) (Section 5.6.2).*
>
> *If the initial program of shovel test pits determines that the site does not hold high scientific significance in accordance with the Burra Charter (Australia ICOMOS 1999) and the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011), then the second phase of investigation (i.e. open area excavation) will not be undertaken. For instance, if initial subsurface testing revealed evidence of poor spatial integrity at the site (e.g. ground disturbance, sheet erosion) or few subsurface artefacts, there will remain little value in a more detailed scientific investigation of the site through controlled salvage excavation.*
>
> ***5.6.1 Initial Subsurface Testing***
>
> *The objective of the initial phase of the archaeological excavation program is to determine the nature, extent and composition of each site. Data collected during this phase will be used to inform the need for a further controlled salvage excavation phase (where required), which is designed to target in situ concentrations of sub-surface cultural deposits.*
>
> *Following the initial subsurface testing (shovel test pits), any sites that reveal poor spatial integrity, significant ground disturbance, shallow soil profiles and/or few subsurface cultural material, will not be subject to further subsurface investigation (i.e. the second phase of more detailed investigation and controlled salvage excavation will not occur).*
>
> *Initial subsurface testing will be undertaken as follows:*
>
> - *One or more transects of shovel test pits spaced no more than 20 m apart will be excavated along the length and/or width of the site (as determined from surface expression of artefacts). Areas of grossly modified terrain (e.g. dams) will be excluded from the sampling process.*
> - *Approximately 0.5 m x 0.5 m (0.25 square metres [m²]) test pits will be dug by hand (shovel) at each designated shovel test pit point (approximately 20 m apart along the length of the transect).*
> - *For the initial subsurface testing, all excavated material will be sieved through 5 millimetre (mm) aperture screens.*
> - *The number of transects and shovel test pits may be reduced depending on the nature and scale of the site being assessed, subject to advice from a suitably qualified and experienced archaeologist and in consultation with the attending RAPs.*
> - *The spacing of transects and shovel test pits may be reduced depending on the nature and scale of the site being assessed, subject to advice from a suitably qualified and experienced archaeologist and in*

consultation with the attending RAPs. For example, when undertaking test pits within a rock shelter, testing will be undertaken in closer proximity.

5.6.2 Controlled Salvage Excavation

Where controlled salvage excavation is determined to be warranted in consultation with a suitably qualified and experienced archaeologist and the attending RAPs, the following process will be generally implemented at a level appropriate to the extent and nature of the site:

- *Controlled salvage excavation will be undertaken by a suitably qualified archaeologist(s), with assistance provided by the RAPs.*
- *All excavation will be carried out manually using trowels, shovels and mattocks (where appropriate).*
- *Open area excavation will proceed in 1 m² units.*
- *All excavation units (i.e. shovel test pits and open area 1 x 1 m2 squares) will be assigned an alpha-numeric identifier.*
- *The first excavation unit will be excavated and documented in 5 cm spits at each area – either PAD or site – being investigated. Based on the evidence of the first excavation unit, 10 cm spits or sediment profile/stratigraphic excavation (whichever is smaller) may then be implemented.*
- *Excavation will cease at culturally sterile units or bedrock in all instances – the identification of sterile stratigraphic units will draw upon a geomorphological understanding of the wider Moolarben Coal Complex.*
- *Photographic and/or scale-drawn records of exposed soil profiles in open area excavations will be made.*
- *If specific archaeological features (e.g. hearths) are identified, the entire feature will be excavated and recorded prior to the continuation of excavation. Features will be photographed and scale plans drawn.*

8.5 Ground Disturbance Permit Process

In the event that any surface disturbance works are required (e.g. in relation to subsidence remediation activities), MCO should apply the ground disturbance permit process outlined in the currently approved Moolarben Coal Complex Heritage Management Plan.

8.6 Summary of Management Requirements

For convenience Table 7 summarises the management requirements presented above for each site.

Table 7. Summary of management requirements for Aboriginal heritage sites UG1 LW104-105

Site	Description	Management requirements
S2MC004	Isolated find	No action required
S2MC005	Artefact scatter	Salvage via collection and test excavation
S2MC007	Isolated Find	No action required
S2MC279	Arteface Scatter	No action required
S2MC319	Isolated Find	No action required
S2MC433	Rock Shelter with PAD	No action required
S2MC434	Rock Shelter with Artefacts (1 artefacts)	Salvage via surface collection
S2MC435	Rock Shelter with Artefacts (10 artefacts)	Salvage via surface collection and test excavation

References

Archaeological Risk Assessments and Surveys 2006. *Moolarben Coal Project – Aboriginal Cultural Heritage Assessment.* Unpublished report prepared for Moolarben Coal Operations.

Archaeological Risk Assessments and Surveys 2008. *Moolarben Coal Project – Aboriginal Cultural Heritage Assessment Stage 2.* Unpublished report prepared for Moolarben Coal Operations.

AECOM 2011a. *Moolarben Preferred Project Report. Aboriginal archaeological and cultural heritage addendum.* Unpublished report prepared for Moolarben Coal Operations.

AECOM 2011b. *Due Diligence Assessment of Proposed Exploration Drill Sites EL6288*. Unpublished report prepared for Moolarben Coal Operations.

AECOM 2012. *Due Diligence Assessment of Proposed Exploration Drill Sites EL6288*. Unpublished report prepared for Moolarben Coal Operations.

Australian ICOMOS 2013. The Burra Charter: The Australian ICOMOS Charter for Places of Cultural Significance 2013. Australia ICOMOS.

MSEC 2020. Moolarben Project Stage 2 – Longwalls 101 to 105. Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan. Unpublished report prepared for Moolarben Coal Operations.

Moolarben Coal 2016. *Moolarben Coal Complex Heritage Management Plan.*

Murphy, B.W. and Lawrie J.M., 1998, Soil Landscapes of the Dubbo 1:250,000 Sheet, NSW Department of Land and Water Conservation, Sydney.

Niche Environment and Heritage 2014. *Moolarben UG1 Igneous Drill Area Modification - Aboriginal Objects Due Diligence Assessment*. Unpublished report prepared for Moolarben Coal Operations.

Niche Environment and Heritage 2015a. *Moolarben Coal Mine OC4 South-West Modification Aboriginal Cultural Heritage Assessment.* Unpublished report prepared for Moolarben Coal Operations.

Niche Environment and Heritage 2015b. *Moolarben Coal Complex UG1 Optimisation Modification Aboriginal Cultural Heritage Assessment*. Unpublished report prepared for Moolarben Coal Operations.

Niche Environment and Heritage 2015c. *Paleo A, Paleo B, Paleo C, NW01 and NW02 Exploration Boreholes Aboriginal Objects Due Diligence Assessment*. Unpublished report prepared for Moolarben Coal Operations.

Niche Environment and Heritage 2016. *Moolarben Coal Complex Longwalls 101 – 103 Aboriginal Cultural Heritage Assessment*. Unpublished report prepared for Moolarben Coal Operations.

NSW DECCW 2010. Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (NSW Department of Environment, Climate Change and Water [DECCW] 2010).

NSW OEH 2011. Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (NSW Office of Environment and Heritage [OEH] 2011).

South East Archaeology 2009. Ulan Coal Continued Operations. Aboriginal Heritage Assessment Volumes A and B. Unpublished report prepared for Umwelt Australia on behalf of Ulan Coal Mines.

South East Archaeology 2012a. Moolarben Coal Project Stage 2 – Preliminary Report on Aboriginal Heritage Survey of Proposed Ulan – Wollar Road and Country Energy 66kV Powerline Realignment. Unpublished report prepared for Moolarben Coal Operations.

South East Archaeology 2012b. Moolarben Coal Project: Preliminary Aboriginal Heritage Assessment of Proposed Temporary Workers Accommodation near Ulan, Central Tablelands of NSW. Unpublished report prepared for Moolarben Coal Operations.

South East Archaeology 2013. Moolarben Coal Project – Stage 1 Optimisation Modification near Ulan, Central Tablelands of NSW. Unpublished report prepared for Moolarben Coal Operations.

Annex 1. AHIMS Search Results

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 5563- Basic Search 1
Client Service ID : 476015

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0692	CE-16-IF	AGD	55	763631	6425794	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Lance Syme					Permits	2531	
36-3-0693	CE-17-OS	AGD	55	764072	6425106	Open site	Valid	Artefact : 3		
	Contact	Recorders	Mr.Lance Syme					Permits	2531	
36-3-1041	S1MC 225	AGD	55	761752	6425887	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-1042	S1MC226	AGD	55	761726	6426232	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-1043	S1MC227	AGD	55	761825	6426206	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-1059	S1MC243	AGD	55	762310	6424801	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0812	S1MC15	AGD	55	761252	6425269	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0822	S1MC25	AGD	55	761802	6425783	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0823	S1MC26	AGD	55	761766	6425183	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-0824	S1MC27	AGD	55	761828	6425100	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-0825	S1MC28	AGD	55	761627	6425002	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-0826	S1MC29	AGD	55	761619	6424707	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-0833	S1MC36	AGD	55	761255	6424616	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0834	S1MC37	AGD	55	761256	6424618	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0835	S1MC38	AGD	55	761279	6424617	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0836	S1MC39	AGD	55	761280	6424620	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-0837	PAD 1 Moolarben Coal	AGD	55	761452	6424581	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		

Report generated by AHIMS Web Service on 10/01/2020 for Wade Goldwyer for the following area at Lat, Long From : -32.2892, 149.7749 - Lat, Long To : -32.2684, 149.808 with a Buffer of 0 meters. Additional Info : To inform archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 63

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Page 1 of 4

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
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36-3-1143	S1MC306	GDA	55	762426	6426370	Open site	Valid	Artefact : 1		101600
	Contact	Recorders	Mr.Giles Hamm					Permits	3439	
36-3-2790	S1MC396	GDA	55	763700	6426207	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Peter Kuskie					Permits		
36-3-1150	S2MC1	GDA	55	763454	6426266	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1151	S2MC2	GDA	55	763893	6425480	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1152	S2MC3	GDA	55	764147	6425290	Open site	Valid	Artefact : 2		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1153	S2MC4	GDA	55	763996	6425355	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1154	S2MC5	GDA	55	763592	6424924	Open site	Valid	Artefact : 2		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1155	S2MC6	GDA	55	763750	6424949	Open site	Valid	Artefact : 26		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1156	S2MC7	GDA	55	763625	6425020	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1157	S2MC8	GDA	55	762810	6425021	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1158	S2MC9	GDA	55	762818	6424980	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1159	S2MC10	GDA	55	762899	6425019	Open site	Valid	Artefact : 3		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1160	S2MC11	GDA	55	762932	6425019	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1161	S2MC12	GDA	55	762928	6425072	Open site	Valid	Art (Pigment or Engraved) : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1162	S2MC13	GDA	55	763963	6424498	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1165	S2MC16	GDA	55	764356	6424682	Open site	Valid	Artefact : 2		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1136	WC-OS21 (Wollar)	GDA	55	764360	6425500	Open site	Valid	Artefact : 3		101681

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Page 2 of 4

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Your Ref/PO Number : 5563- Basic Search 1
Client Service ID : 476015

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Doctor Jodie Benton,OzArk Environmental and Heritage Management					Permits		
36-3-1210	S2MC63	GDA	55	763818	6426350	Open site	Valid	Artefact : 28		101603
	Contact	Recorders	South East Archaeology,Mr.Giles Hamm					Permits		
36-3-1394	S2MC249	GDA	55	764401	6426311	Open site	Valid	Artefact : 7		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1395	S2MC250	GDA	55	764346	6426273	Open site	Valid	Artefact : 2		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1396	S2MC251	GDA	55	764275	6426197	Open site	Valid	Artefact : 12		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-1397	S2MC252	GDA	55	763900	6425946	Open site	Valid	Artefact : 1		101603
	Contact	Recorders	Mr.Giles Hamm					Permits		
36-3-2603	S2MC263	GDA	55	763818	6426350	Open site	Valid	Artefact : 1		
	Contact	Recorders	South East Archaeology					Permits	3583	
36-3-2654	S2MC269	GDA	55	763744	6424582	Open site	Valid	Artefact : 1		
	Contact	Recorders	South East Archaeology					Permits		
36-3-3003	S2MC271	GDA	55	764384	6424916	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Peter Kuskie					Permits		
36-3-3004	S2MC272	GDA	55	764069	6424664	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Peter Kuskie					Permits		
36-3-3005	S2MC273	GDA	55	763778	6424129	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Peter Kuskie					Permits		
36-3-3027	S2MC347	GDA	55	762025	6424710	Closed site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		
36-3-3028	S2MC348	GDA	55	762027	6424745	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		
36-3-3029	S2MC349	GDA	55	761992	6424821	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		
36-3-3030	S2MC350	GDA	55	762036	6424934	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		

Report generated by AHIMS Web Service on 10/01/2020 for Wade Goldwyer for the following area at Lat, Long From : -32.2892, 149.7749 - Lat, Long To : -32.2684, 149.808 with a Buffer of 0 meters. Additional Info : To inform archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 63

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Page 3 of 4

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 5563- Basic Search 1
Client Service ID : 476015

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-3-3031	S2MC351	GDA	55	762001	6424823	Closed site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		
36-3-3041	S2MC324	GDA	55	762693	6425223	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3218	S2MC408	GDA	55	762045	6425394	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Niche Environment and Heritage,Niche Environment and Heritage,Ms.Caitlin Marsl					Permits		
36-3-3219	S2MC407	GDA	55	761975	6425325	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Niche Environment and Heritage,Ms.Caitlin Marsl					Permits		
36-3-3220	S2MC406	GDA	55	762518	6425721	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Niche Environment and Heritage,Ms.Caitlin Marsl					Permits		
36-3-3089	S2MC292	GDA	55	764085	6424219	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3090	S2MC291	GDA	55	764147	6424346	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3144	MUG1-Mod1	GDA	55	763495	6426122	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3145	MUG1-Mod2	GDA	55	763481	6425902	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3132	S2MC286	GDA	55	763865	6424247	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3265	S2MC277	GDA	55	763404	6426033	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3274	S2MC287	GDA	55	764194	6424630	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3275	S2MC288	GDA	55	764240	6424609	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3276	S2MC290	GDA	55	764112	6424510	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Caitlin Marsh					Permits		
36-3-3287	S2MC289	GDA	55	764142	6424572	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Mr.Balazs Hansel					Permits		

Report generated by AHIMS Web Service on 10/01/2020 for Wade Goldwyer for the following area at Lat, Long From : -32.2892, 149.7749 - Lat, Long To : -32.2684, 149.808 with a Buffer of 0 meters. Additional Info : To inform archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 63

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Page 4 of 4

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Our services

Ecology and biodiversity
Terrestrial
Freshwater
Marine and coastal
Research and monitoring
Wildlife Schools and training

Heritage management
Aboriginal heritage
Historical heritage
Conservation management
Community consultation
Archaeological, built and landscape values

Environmental management and approvals
Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting
Offset strategy and assessment (NSW, QLD, Commonwealth)
Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)