

Appendix 1

Ecological Impact Assessment

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December 19, 2009

Moolarben Coal Operations Pty Limited
Locked bag 2003
Mudgee NSW 2850

Attention: Mr Steve Peart

RE: Ecological Impact Assessment – Northern Bore field, Stage 1 Moolarben Coal Project, Ulan

Dear Steve,

I understand that a bore field designed to dewater the approved underground 4 for Stage 1 of the Moolarben Coal Project (MCP) is proposed within property described as Lots 30 and 31 DP 755439 Ulan-Cassilis Road Ulan, NSW (the site). The proposed bore field comprises the following infrastructure:

- Bores with pump stations and electricity supply. Vegetation clearing is 27m X 20m around each bore;
- Interconnecting water pipelines and electricity lines within a 20m wide cleared easement; and
- 4-5m track contained within the 20m wide cleared easement.

Figure 1 shows the extent of the site. **Figure 2** shows the extent of proposed works.

Background

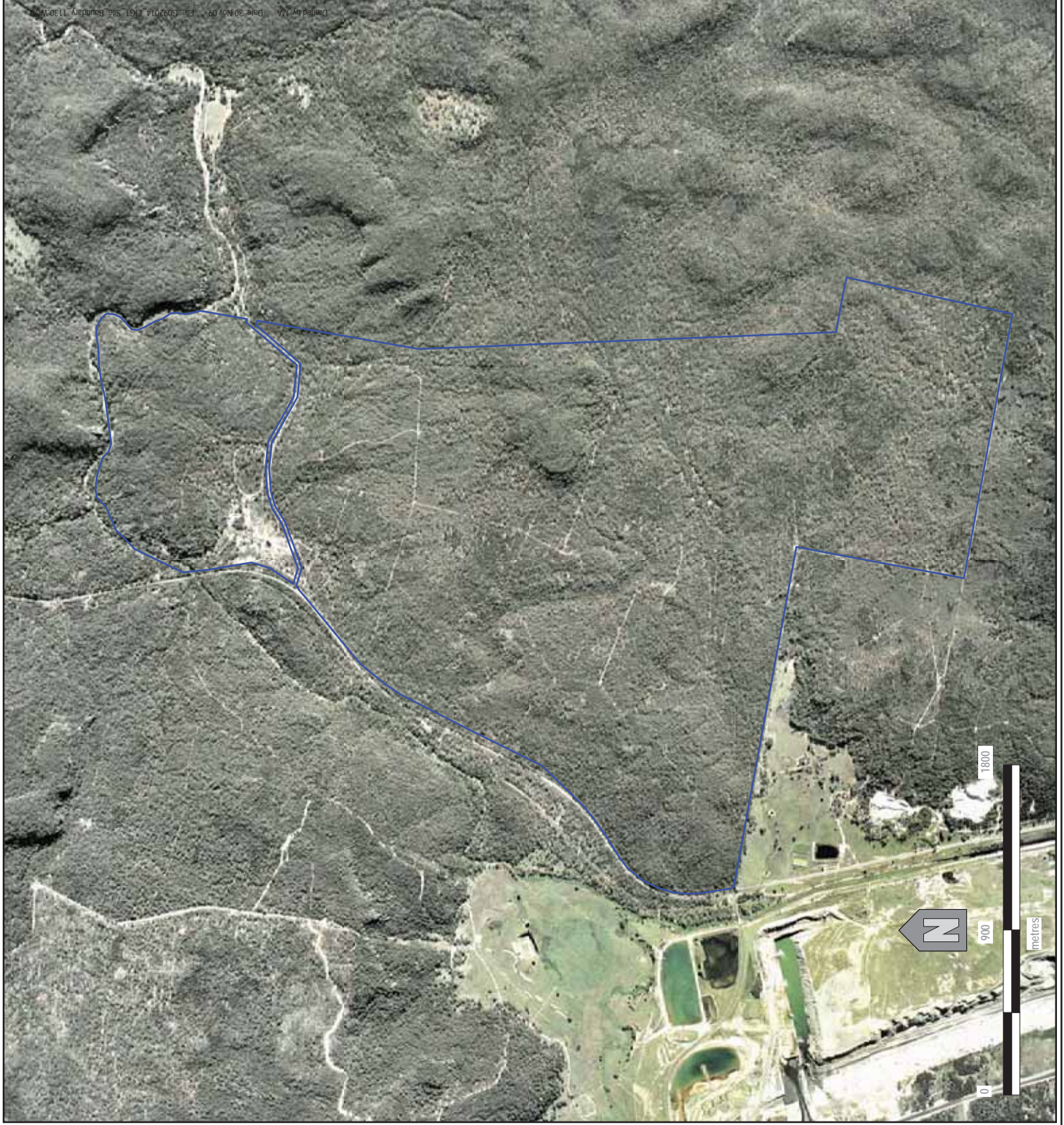
The site is located at the northern extremity of the Sydney Basin Bioregion, in a transitional zone between the western slopes of the Great Dividing Range and coastal NSW. It is located within the headwaters of the Hunter Central Rivers catchment management area (HCR CMA), more specifically in the Spring Creek sub-catchment at the headwaters of the Goulburn River. The Great Divide is located some 10 km to the west. Low variable rainfall patterns typify the area, with an average of 610 mm per annum recorded at Ulan. The average annual evapotranspiration of the Ulan area is high, at about 1657mm, with the comparatively wide differential between rainfall and evapotranspiration indicating the area to be semi-arid.

The sites geomorphology is typically characterised by Triassic aged sediments consisting mainly conglomerates forming topographical features such as plateaus, deeply incised ephemeral creeks and moderately sloping upper slopes with fragmented rocky outcrops. Permian aged sediments including claystones and carboniferous tuff occur beneath the massive conglomerate and outcrop at the base of localised steeper slopes.

Biologically, the Ulan area is part of a broad inter-regional transition zone where many plants, animals and/or communities are representative of the intergrading bordering regions. This is due in part to the sites geographic position (i.e. low 620 m AHD saddle in the Great Dividing Range – ‘east meets west’; ‘north meets south’), varied geological characteristics (i.e. Tertiary, Quaternary, Permian, Triassic, Jurassic and Carboniferous formations) and highly variable climatic conditions. The result is complex biodiversity values, with many species exhibiting distribution limits in the locality.

UNDERSTANDING
KEY ECOLOGICAL ELEMENTS
TO MAXIMISE
OPPORTUNITIES

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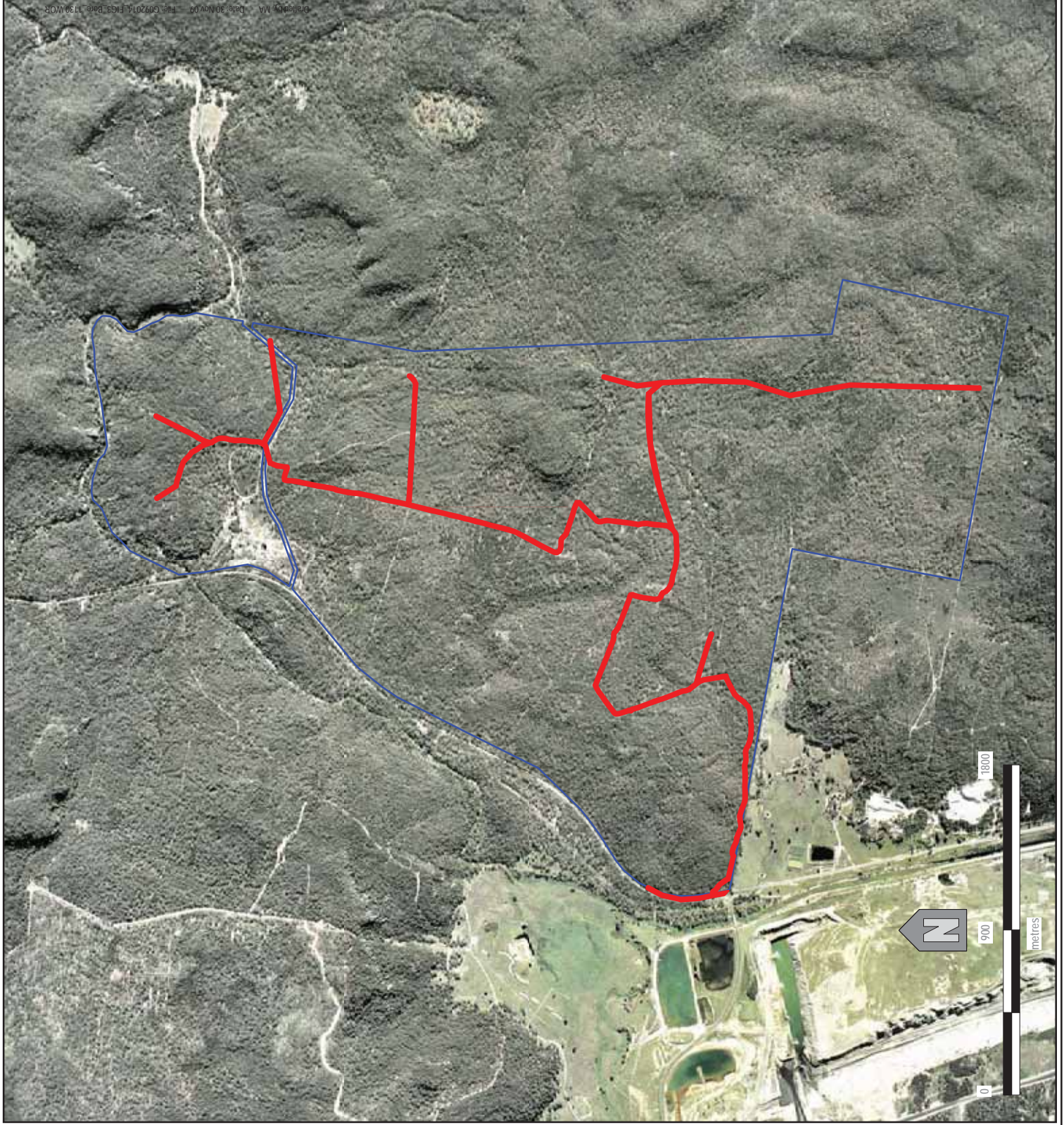


Legend

Site Boundary

FIGURE 1
The Site Boundary





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Legend

 Bore Field Pipeline

 Site Boundary

FIGURE

ro osed Bore Fei d



Assessment Framework

The focus of this Ecological Impact Assessment (EIA) is the effect of the proposed bore field on threatened species, endangered populations (EPs), endangered ecological communities (EECs) and their habitats (collectively referred to as *threatened biodiversity*) as listed on the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Other considerations presented in this report include relevant matters under the State Environmental Planning Policy No. 44 – Koala Habitat (SEPP 44). Assessment approach generally followed the “*Draft Guidelines for Threatened Species Assessment under Part 3A of the EP&A Act 1979*”.

Data Sources

Site specific studies supporting the preparation of previous assessment (Moolarben Biota, 2006; Ecovision Consulting, 2008) were completed in accordance with relevant survey methods specified in the Department of Environment Conservation’s (DECs) working draft *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC, 2004). These studies were used to define the biodiversity values of the area impacted by the proposed bore field, with supplementary investigations undertaken to validate prior findings.

A search of DECCs Wildlife Atlas (DECC, 2008a) and EPBC Act Protected Matters (DEWHA, 2008) databases was completed together with a spatial analysis of Wildlife Atlas database records against relevant Mitchell Landscapes/ vegetation types to support site survey results.

Ecological Values of the Site

The majority of the ridgelines and plateaus of the locality are vegetated on soils of low fertility; this attributed to the Triassic geological formation (Narrabeen sandstones and conglomerates). Two tree canopy dominants occur throughout this landscape, these being Scribbly Gum (*Eucalyptus rossii*) and Broad-leaved Ironbark (*Eucalyptus fibrosa*), each symbolising distinctly separate vegetation types within the broad ‘Dry Sclerophyll Forests (shrubby sub-formation)’ vegetation formation. Isolated occurrences of Permian geological formations occur, particularly along the western margin of the site, this suiting the presence of Yellow Box (*E. melliodora*) with other box gum canopy species. **Figure 3** shows the extent of the vegetation types within the site, with **Table 1** detailing the aerial extent.

Table 1 Biodiversity Vegetation Types on the Site

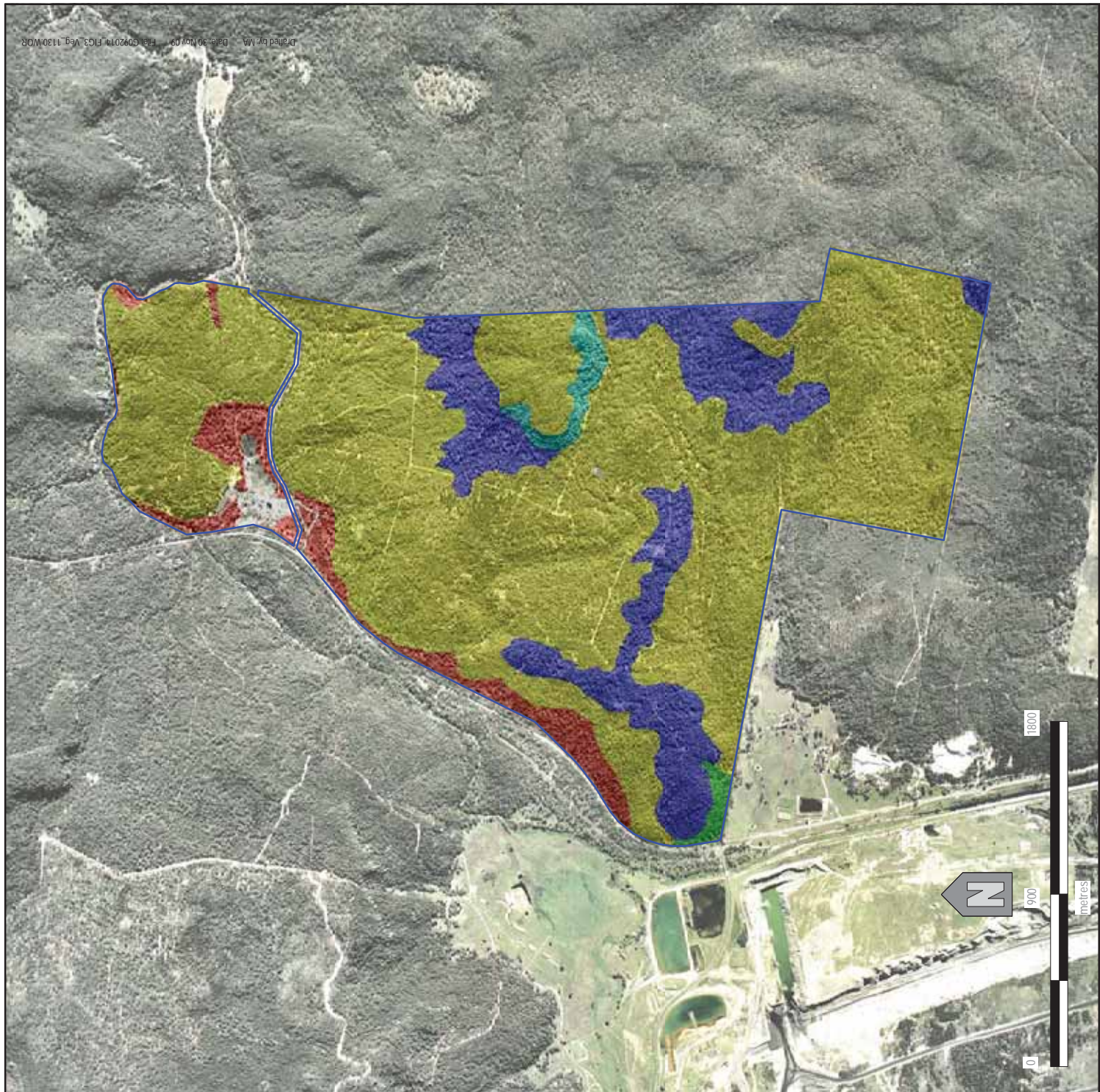
Biodiversity Vegetation Type	Area (ha)
Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin	135.44
Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South	657.33
Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin*	4.9
Blakely's Red Gum - Rough-barked Apple flats woodlands of the NSW western slopes (Benson, 281)*	47.7
Slaty Box - Grey Gum shrubby woodland on footslopes of the upper Hunter Valley, Sydney Basin	11.67
Highly Disturbed Areas (i.e. road verges, table drains, tracks, paddocks etc)	10.73

Note: * = Endangered Ecological Community (EEC)/ Critically Endangered Ecological Community (CEEC)

Vegetation types impacted by the project are identified as follows and described thereafter.

- *Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin (BioMetrics Code: HU552)*
- *Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South (BioMetrics Code: HU608)*
- *Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin (BioMetric Code: HN506)*

Drafted by: MA Date: 30 Nov 09 File: G092019_FIG3_Veg_1130.WOR



Legend

-  Scribbly Gum - Brown Bloodwood of the Southern Bigalow Belt
-  Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin
-  Blakely's Redgum - Rough-barked Apple fields woodland of the NSW western slopes, (Benson 281)
-  Slaty Box - Grey Gum shrubby woodland on footslopes of the upper Hunter Valley, Sydney Basin
-  Highly disturbed areas - road verges, table drains, road embankments, ploughed paddocks etc.
-  Blakely's Redgum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin

FIGURE 3

Vegetation of the Site



Descriptions for the remaining vegetation types not impacted by the development are found in DECC (2008b) or Ecovision Consulting (2008).

The first two vegetation types, as described below, are encountered on Triassic geological formations:

Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin (BioMetrics Code: HU552)

Shale enriched sandy soils are generally characterised by Ironbarks such as Narrow-leaved Ironbark (*Eucalyptus crebra*) and Broad-leaved Ironbark (*E. fibrosa*). Grey Gum (*E. punctata*) and Stringybark (*E. sparsifolia*) also occur in association with these species particularly in sheltered positions such as incised drainage lines. The predominantly shrubby understorey of this vegetation type is mostly dominated by prickly sclerophyllous species such as *Acrotriche rigida*. Black Cypress Pine (*Callitris endlicheri*) also occurs as an associate canopy species with the Ironbark dominated vegetation or as canopy dominant where the sandy soils are shallow to skeletal.

Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South (BioMetrics Code: HU608)

Shallow sandier infertile soils generally support woodland vegetation dominated by Scribbly Gum (*E. rossii*) and Narrow-leaved Ironbark (*E. crebra*). Rocky outcrops throughout these landscapes support localised occurrences of mallee dominated by Dwyer's Redgum (*E. dwyeri*) and various heath species. Creek lines within these landscapes are generally characterised by Scribbly Gum (*E. rossii*) and Parramatta Redgum (*E. parramattensis* ssp. *parramattensis*), particularly in the first order ephemeral drainage lines. Semi-permanent creeklines are generally supportive of Scribbly Gum (*E. rossii*), Rough barked Apple (*A. floribunda*) and Blakely's Redgum (*E. blakelyi*). Rocky outcrops upslope of these creek lines often support associations containing Blue-leaved Stringybark (*E. agglomerata*).

Fauna of the plateau and ridgetop vegetation types (i.e. both Grey Gum – Stringybark and Scribbly Gum – Brown Bloodwood) represent vegetation on infertile soils dominated by bird species such as Grey Shrike Thrush, White-eared Honeyeater, Rock Warbler, Southern Boobook, Sacred kingfisher, Eastern Yellow Robin, Musk Lorikeet and Glossy Black Cockatoo. Rocky outcrops support a diverse reptile assemblage including geckos, skinks and snakes. Mammals include the Red-necked Wallaby, Common Ringtail Possum and Short-beaked Echidna. Fauna diversity is high in both these vegetation formations, with lower diversity found in Broad-leaved Ironbark – Black Cypress Pine Woodlands/ Forests presumably due to the open character of this vegetation and absence of Grey Gum (i.e. tree hollows/ nectar).

The vegetation type containing Blakely's Redgum and Yellow Box was encountered on the Permian geological formation and is described as follows.

Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin (BioMetric Code: HN506)

The tree canopy is generally described as a Box – Redgum formation with various Box species (e.g. Yellow Box, White Box or Grey Box) being the typical characteristic canopy species with Blakely's Redgum (*E. blakelyi*) forming a minor associate. Locally, few stands contain White Box (*E. albens*) and/or Yellow Box (*E. melliodora*) with the occurrence of these species tied to localised elevated soil fertility and soil moisture. This vegetation type is characteristic of a transition between fertile/ infertile clays soils.

The understorey is generally shrubby with a predominantly herbaceous groundcover including *Styphelia triflora*, *Lissanthe strigosa* and Sifton Bush (*Cassinia arcuata*). Characteristic groundcovers include species such as *Goodenia hederacea*, *Calotis cuneifolia*, *Laxmannia gracilis*, *Dianella revoluta*, *Glycine clandestina*, *Hypericum gramineum* and *Stackhousia viminea* with many of these being indicative of transitional landscapes. Species widespread throughout landscapes characterised by sandy clays such as *Lomandra multiflora* subsp. *multiflora*, *Aristida ramosa* and *Cheilanthes seiberi* subsp. *seiberi* also occur.

Fauna species of these transitional Box – Redgum forests include burrowing frogs and forest/ woodland bird species such as the Fuscous Honeyeater, White-plumed Honeyeater, Hooded Robin, Brown Treecreeper and Diamond Firetail. Species capable of occupying vegetation of heterogenous structure and floristics such as the Grey Butcherbird, Laughing Kookaburra, Weebill, Common Bronzewing, White-browed Babbler, Western Gerygone, Rainbow Bee-eater, Red-rumped Parrot, Eastern Rosella are known to occur within this vegetation type (e.g. transitional zones and/or disturbed landscapes).

Threatened Biodiversity

Prior studies (Moolarben Biota, 2006; Ecovision Consulting, 2008), Database searches (DECC, 2008; BirdsAustralia, 2008) and literature reviews identified the occurrence of known habitat for 8 threatened fauna within the site. These species include the Brown Treecreeper, Speckled Warbler, Glossy-black Cockatoo, Powerful Owl, Large Bentwing Bat, Large-eared Pied Bat, Greater Long-eared Bat and Gilberts Whistler (see **Figure 4**). Each of these species has the capacity to forage and breed exclusively within the site.

No EPs or their habitats have been identified within the site. However, vegetation consistent with the definition for White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands EEC/ CEEC has been identified as coinciding with the developments impacts (i.e. *Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin*).

Threatened and declining woodland bird species are generally rare to absent within the site due to the soils low fertility and scarcity of water resources.

Ecological Condition, Connectivity and Function

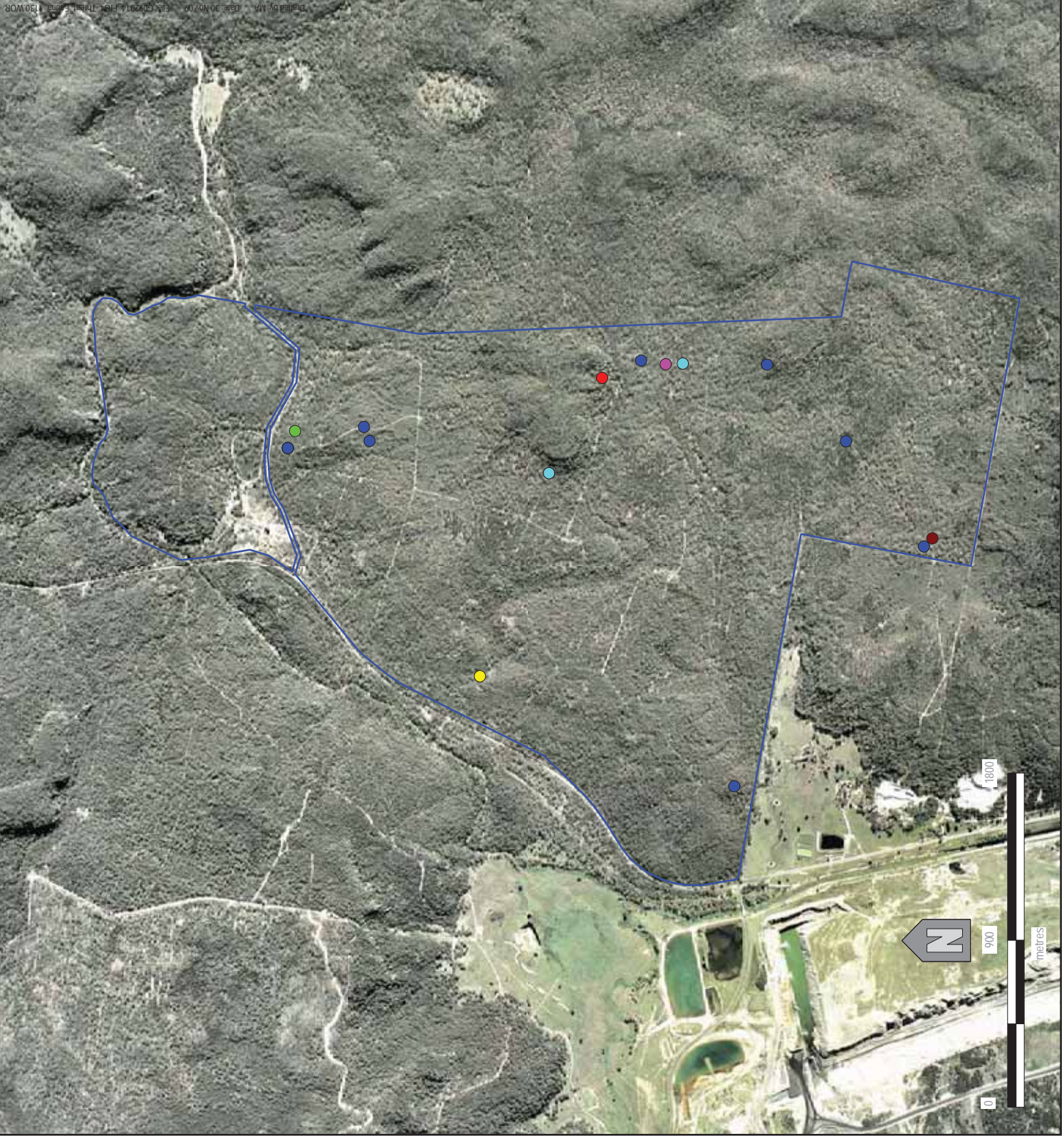
The sites current ecological values reflect that of a predominantly undisturbed landscape. Much of the sites vegetation is intact and free of exotic plant and animal populations, although, there is evidence of isolated exotic plant growths along tracks and feral pigs in the north.

Vegetation structure has been influenced by past tree felling for pit props for the Ulan underground coal mine; resulting in reduced tree canopy cover throughout selected parts of the site. Trees targeted for this purpose include straight ironbarks. However, the influence of these past disturbances has been moderated by the naturally greater abundance of unsuitable timber such as Scribbly Gum (*E. rossii*).

The vertebrate fauna of the sites low fertility woodland/ forest vegetation types is heavily tied to the presence of habitat features such as tree hollows, nectar, fallen timber, loose surface rock, rocky outcrops and insect populations. The spatial occurrence of these habitats is strongly biased towards drainages (i.e. areas of elevated soil fertility, depth and water availability); thereby implying a zoned habitat usage model (i.e. comparatively high utilisation of vegetation within drainages).

Tree hollow densities are strongly associated with drainages, where species such as Scribbly Gum (*E. rossii*), Blakely's Redgum (*E. blakelyi*) and Rough-barked Apple (*Angophora floribunda*) offering the greatest hollow densities. These resources support breeding habitat for a variety of species, notably many of the threatened species known to occur within the site (i.e. Powerful Owl and its prey; Glossy-black Cockatoo; Brown Treecreeper; Greater Longeared Bat). The disproportionate spatial extent of these habitat resources increases the sensitivity of hollow dependant species to environmental change.

The sites vegetation cover is an important component of an east-west and north-south wildlife corridor. These linkages are considered important at a local and regional level, with potential national importance also implied (i.e. Alps to Atherton Initiative). However, the value of this connected vegetation is restricted mostly to species that occupy vegetation formations such as Dry Sclerophyll Forests (shrubby sub-formations) rather than those associated with productive grassy woodlands such as the declining woodland birds.



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Legend

- Brown Treecreeper
- Gilbert's Whistler
- Glossy Black Cuckoo
- Greater Longeared Bat
- Large Bentwing Bat
- Large-eared Pied Bat
- Speckled Warbler

FIGURE

Ireatene Fauna of the Site



Within the above context resident plant and animal populations of the site must be adapted to a low energy landscape; this contrasting with fauna assemblages of the nearby valley floor grassy woodlands. Plant species are generally xerophytic giving rise to shrubby vegetation types (i.e. absence of grasses and soft herbs); a consequence of limited water availability and shallow to skeletal soils. As such grazing fauna such as macropods are generally absent (i.e. low value vegetation material and absence free water), with the vast majority resident fauna populations reliant on insect populations or in the case of the Powerful Owl smaller mammals and birds. Most resident fauna species observe low population densities with disproportionate habitat use dictated by the availability of water and soil fertility (i.e. drainages). Notwithstanding, reptile populations favour areas of elevated surface roughness (i.e. fallen timber and bush rock/ rocky outcrops), with soil fertility and water availability being of limited value.

Focal Impact Species

The sites ecological values and function is indicative of habitat for threatened fauna species with large home ranges of low energy landscapes. This is exemplified by the presence of known populations of the Brown Treecreeper, Glossy-black Cockatoo, Powerful Owl, Eastern Bentwing Bat, Greater Longeared Bat and Large-eared Pied Bat. These species are sensitive to the loss of trees with hollows, vegetation structure and floristics within drainages and broadscale land clearing.

Relative to the sites extent, the area of impact is comparatively small despite the long linear impacts implied by vegetation clearing for pipelines, roads, powerlines. The greatest potential for an adverse impact on threatened species of the site is the positioning of linear infrastructure corridors along drainages where the majority of important habitat features are at their greatest densities. This has been avoided and minimised through careful selection of the pipeline route, with the route following where possible existing tracks and ridgetop terrain.

The proposed development will not result in a loss of wildlife connectivity or cave roost sites, this rendering the Large Bentwing Bat and Large-eared Pied Bat as species with limited propensity for adverse development related impacts.

The proposed development will result in the loss of some trees with hollows, particularly within drainages (i.e. potential loss of breeding habitat for the Brown Treecreeper, Glossy-black Cockatoo, Powerful Owl and Greater Longeared Bat). Of these species, the Greater Longeared Bat has the least records within the site and locality, has the smallest home range and is also approaching its eastern limit of distribution.

Within the above context it is regarded that the Greater Longeared Bat is the species most sensitive to the potential adverse impacts arising from the proposed bore field and is thus considered the focal species for this assessment. Development impacts are predicted to reduce the extent of potential roosts sites (i.e. remove trees with hollows) and have some impact on foraging grounds (i.e. loss of drainage vegetation). The avoidance of a significant impact on this species will involve the deployment of avoidance and management actions.

Impact Analysis

The proposed bore field has an estimated impact footprint of 24 ha consisting of approximately 4 ha for the road/ bores and power poles (i.e. direct impact) and 20 ha for the electricity easement (i.e. indirect impact). A direct impact constitutes the permanent removal of native vegetation and associated habitats for at least term of the project. Indirect impacts constitute part removal of native vegetation and associated habitats such as the removal of trees, hollows, shrubs and fallen timber/ surface rock. Ground layer vegetation and habitats will remain albeit altered by changes to shrub and tree canopy cover.

In terms of the sites vegetation types the proposed development will result in the native vegetation losses/ modification as defined in the following table.

Table 1: Direct and Indirect Ecosystem Impacts by Vegetation Type

Vegetation Type	Area (ha)
Direct Impacts	
Cleared Lands (i.e. existing tracks/ secondary grasslands and shrublands)	3.5
Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South	0.5
Indirect Impacts	
Cleared Lands (i.e. secondary grasslands and shrublands)	0.5
Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin	2.0
Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South	17.0
Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin	0.5
Total	0

Direct impacts of the proposed bore field include the removal of the tree canopy and shrub understory (i.e. fauna habitat). Trees with hollows, fallen timber and surface rock are expected to be removed/ disturbed during construction/ operation. However, these losses have been minimised where practicable through ground truthing various proposed alignments prior to final route selection (i.e. avoidance of vegetated drainages, minimised through use of existing tracks).

Indirect impacts include the removal of the tree and shrub understory during the construction stage, with ongoing slashing used to maintain this structural change throughout the operation period. Known impacts include loss of biomass, with potential impacts being changes to plant species abundances and introduction of exotic species.

Suggested Impact Management

The focal species approach identified the Greater Longeared Bat as the species most sensitive to the direct and indirect impacts of the development. By addressing the needs of this species it is considered that the impacts of the proposed development on habitat will be sufficiently minimised to allow the persistence of most native flora and fauna species and more importantly the preservation of ecological function.

The expected impact of development on the sites ecological values resulted in the following suggested impact management actions:

- Apply the Land Management Plan for Stage 1 of the MCP to ensure suitable land clearing and habitat protection protocols are implemented for the construction and operation parameters of the bore field;
- Retain existing native vegetation cover throughout the majority of the pipeline easement (excluding tracks and immediate bore surrounds) in the form of grasses, herbs and low shrubs (<1m) through vegetation slashing rather than vegetation removal;
- Implement regular exotic plant monitoring and control activities to prevent the occurrence and spread of exotic plants introduced into adjoining native vegetation;
- Undertake tree hollow clearing activities sensitive to the breeding requirements of local threatened species, particularly the Greater Longeared Bat and Glossy-black Cockatoo (i.e. restrict clearing to February - March);
- Recover fauna habitats (e.g. trees with hollows and surface rock) and place on periphery of pipeline easement; and
- Install compensatory habitat features such as hollows, preferably natural hollows recovered from land clearing, to offset the loss of any tree hollows.

These suggested mitigation actions are considered best practice and necessary to achieve the 'maintain' outcome as specified in the original impact assessment for Stage 1 of the MCP. A limited uptake of these suggested impact management actions would compromise the validity of this and previous assessments.

Impact Assessment

EP&A Act

The breeding and foraging habitat requirements for each of the threatened species nominated in this EIA has been considered in the preparation of this impact assessment. The following is an account of these considerations.

How is the proposal likely to affect the lifecycle of a threatened species and/or population?

The proposed bore field will result in the permanent removal of native vegetation for the formation of the track, bore sites and installation of power poles (i.e. 0.5 ha direct impact on native vegetation). Routine slashing works throughout the pipeline easement for the purposes of risk management (i.e. bush fire generation/ asset protection) will result in an indirect impact on existing native vegetation (i.e. 19.5 ha), with this structurally modified environment consisting of grasses, herbs and small shrub cover. The area of native vegetation that is to be directly and indirectly impacted is estimated to be 20 ha. Development coincident with existing disturbed areas (i.e. tracks) is approximately 4 ha (i.e. impact envelope of 24 ha).

These activities have the propensity to result in the removal of hollow bearing trees and the tree canopy in general. This reduction of breeding habitat (i.e. hollows) and foraging habitat (tree canopy) has the potential to adversely impact many of the threatened species listed in this report (i.e. Powerful Owl, Glossy-black Cockatoo, Large Bentwing Bat, Greater Longeared Bat, Largeeared Pied Bat, Speckled Warbler and Brown Treecreeper).

Route selection was sensitive to these considerations, where possible, with avoidance of drainage line vegetation of high priority. The placement of the pipeline/ powerline easement within plateau/ ridgetop country greatly increased the avoidance of hollow bearing tree habitat as well as the more productive foraging grounds located along riparian corridors.

In terms of the focal species (i.e. Greater Longeared Bat), it is considered that the avoidance of trees with hollows, particularly those in close proximity to the solitary known record, has substantially lessened the potential for a lasting adverse impact. Mitigation including the provision of compensatory habitat for any trees with hollows removed by the development is considered adequate mitigation for this and other threatened species. This supported by the large quantum of native vegetation retained in an unaltered state throughout the site post development (i.e. 24 ha impacted vs 844 ha retained or 3% of the site).

The affect of the proposed bore field on threatened species is expected to be minor as a consequence of the avoidance strategies taken (i.e. avoidance of vegetated drainages and use of existing cleared tracks), mitigation offered and quantum of native vegetation retained.

How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

The linear nature of the proposed development has the propensity to remove specific habitat features of importance (i.e. trees with hollows) and part remove a small percentage of a species foraging area (i.e. most species assessed have a home range exceeding 100 ha). By avoiding, where possible, vegetation within drainages the potential for adverse impact on the habitat of threatened species has been substantially lessened, but not eliminated.

It is anticipated that through the re-installation of compensatory habitat and management of exotic plants that the breeding and foraging habitats of the site will be adequately maintained inline with the sites current/ existing ecological values. This is supported by the extent of native vegetation to be retained post development (i.e. 844 ha), of which the majority forms potential foraging habitat for locally occurring threatened species.

In addition to the impacts of the proposed development on threatened species, there will also be an impact on White Box Yellow Box Blakely's Redgum Woodland (WBYBBRW EEC). Approximately 0.5 ha of WBYBBRW EEC will be removed/ modified as a consequence of the proposed development. These losses are considered within tolerance limits, especially given the extent retained within the site (i.e. 52.1 ha).

Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Two species identified within the site have ranges that are approaching their natural limits within the site. Both the Greater Longeared Bat and Gilberts Whistler are typically western/ western slopes species. Records east from Ulan for these species are rare.

How is the proposal likely to affect critical habitat?

No areas of mapped critical habitat as gazetted under the TSC Act occurs, overlaps, adjoins or is connected in any meaningful way to the impacts posed by the proposed development.

Findings

The impact assessment concludes that the proposed development will have an impact on threatened species and WBYBBRW EEC. However the impact on threatened species, EPs, EECs, CEECs or their habitats provided the suggested impact mitigation actions are adopted.

SEPP 44 – Koala Habitat Protection

SEPP 44 applies to the Mid Western Regional Council Local Government Area and is therefore relevant to the site. Surveys identified the tree canopy to not constitute 'potential' koala habitat (i.e. preferred foraging species less than 15% total cover). No evidence of koalas or koala activity was detected within the site during the survey period. No further consideration of this matter is required under SEPP 44.

EPBC Act

The consideration of matters of national environmental significance (NES), which are known to occur within the locality, were assessed to determine whether further environmental investigation is warranted under this Act (i.e. Greater Long-eared Bat, Large-eared Pied Bat, White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands CEEC). Impacts on these matters are limited to the following:

Greater Long-eared Bat

Partial loss of breeding habitat (i.e. tree hollows) and foraging habitat (i.e. native vegetation). Losses are low when considering the amount of native vegetation retained post development (i.e. 844 ha) and avoidance of important habitat areas (where possible) such as vegetation in drainages and trees with hollows.

Large-eared Pied bat

Partial loss of foraging habitat (i.e. native vegetation). Losses are low when considering the amount of native vegetation retained post development (i.e. 844 ha) and avoidance of important breeding habitat areas such as cliff lines and cave roosts.

WBYBBRW CEEC

Partial loss of this CEEC from the site (0.5 ha) relative to 52.1 ha being retained. Minor loss that is within tolerance limits.

Assuming the implementation of the suggested mitigation actions, it is considered that adequate measures will be taken to offset the developments impact on threatened biodiversity, native vegetation cover and fauna habitats. Accordingly, it is considered that a referral to the Department of Environment, Water, Heritage and the Arts is not required, as the development of the site would have a low impact on relevant

'Protected Matters' of NES as listed on the EPBC Act. This conclusion is contingent on the implementation of the mitigation measures and prior approval conditions for Stage 1 of the MCP.

Conclusions

This EIA has considered the temporal and spatial impacts of the proposed development on the ecological values of the affected area, particularly in terms of threatened biodiversity, their habitats and ecological function (e.g. roost habitat for hollow dependant species). The assessments have concluded that the impacts of the proposed bore field will not have a significant irreparable impact on the natural environment provided mitigation actions are afforded to balance deleterious impacts. Within the context of the locality it is predicted that the proposed development will not be in conflict with SEPP 44 koala habitat and 'Protected Matters' of NES.

Should there be any queries regarding the content of this letter please do not hesitate contacting the undersigned for further assistance.

Regards.



Mark Aitkens *BApp/Sc (Env. Biol.)*
Principal – Ecovision Consulting

References

Moolarben Biota (2006). Ecological Impact Assessment for Stage 1 of the Moolarben Coal Project. Report prepared for Moolarben Coal Mines Pty Limited.

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Appendix 2

Aboriginal Cultural Heritage and Archaeological Assessment

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**Aboriginal Cultural Heritage
& Archaeological Assessment**

for

**Moolarben Coal Project
Stage 1 Northern Borefield Area**

A Report to Moolarben Coal Operations Pty Ltd

by

Giles Hamm
Cultural Heritage Consultant

December 2009

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1. INTRODUCTION & BACKGROUND

Archaeological Risk Assessment Services Pty Ltd was engaged by Moolarben Coal Operations Pty Ltd to conduct an Aboriginal Cultural Heritage assessment as part of a Section 75W (2) approval for a project modification of Moolarben Coal Project Stage 1.

The modification involves the building of a water pipe-line route connecting up a series of water bores. Each of the bores will have a pump powered by an energy supply from a power-line easement. This borefield is called the Northern Borefield.

The proposed borefield is to provide Moolarben Coal Project with a mine dewatering and water supply facility. A total of nine new water bores (M1, M4, M6, M7, M8, M9, M10, M11 and M12) will be built along with a pipe-line easement which is approximately 9.5km in length (*see* Appendix 1: Figure 1).

1.1 Project Description

The land to be developed is rural in character and has been previously developed for use in cattle grazing, horse agistment, horse grazing and timber extraction. The area to be impacted (i.e. cleared) within the proposed water pipe-line route is 9.5km long with a 20m wide easement, consisting of a 4m cleared access track, a 1m table drain, overhead power-line and 2m width for an above ground water pipe-line (*see* Appendix 1: Figure 2).

The area to be impacted (i.e. cleared) for the proposed water bore sites will consist of an area approximately 30m². This area will contain a cleared 4m access track, table drain 1m in width, overhead power-line, water pipe and transfer tank 3m in width and a 10m width asset protection zone (*see* Appendix 1: Figure 2).

1.2 Aims of the Assessment

The purpose of undertaking an Aboriginal Cultural Heritage and Archaeological Assessment is to carry out an assessment of the project, with the involvement of the Aboriginal community, to confirm the Aboriginal heritage values of the study area and define any constraints and opportunities in carrying out the Stage 1 project.

It is necessary for the current project to identify matters which are relevant in assessing whether a project, to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies, is likely to have an impact on Aboriginal cultural heritage. In order to comply with the above requirement, a proponent should consider the following when making an assessment:

- Justification for any likely impact(s), including any alternatives considered for the proposal;
- Any measures which will be implemented to avoid, mitigate or offset the likely impact(s); and
- Demonstration that the input by affected Aboriginal communities has been considered when determining and assessing impacts, developing options, and making final recommendations to ensure that Aboriginal cultural heritage outcomes can be met by the proposed development.

The aims of the study were to:

- Review any relevant existing Aboriginal Cultural Heritage information and relevant databases;
- Carry out an archaeological assessment to identify likely Aboriginal heritage issues on the ground and make an assessment of likely Aboriginal heritage potential;
- Advise on the appropriate level of Aboriginal consultation that may be required;
- Determine whether the proposed activity is likely to cause any additional damage to Aboriginal Objects other than any that may have occurred already;
- Provide advice as to the likely land use restrictions posed by Aboriginal Heritage Objects or potential Aboriginal Heritage Objects; and
- Provide recommendations for any further Aboriginal Cultural Heritage work at the development.

2. ABORIGINAL CULTURAL HERITAGE ISSUES & BACKGROUND RESEARCH

A review of the NSW Department of Environment and Climate Change (DECC) Aboriginal Heritage Information Management System was undertaken to determine if any known Aboriginal Sites were registered for the land proposed for development. The results of the register search show there are registered Aboriginal Sites or Objects located near the land proposed for development zone (*see* Appendix 1: Figure 2). These sites have been previously recorded by Hamm (2006 & 2008) as part of the Moolarben Coal Project Stage 1 & 2 Assessments.

Table 1 Known Aboriginal sites located within or near the study area within a 3–5km radius

*= located within the Stage 2 MCP study area

Ulan ID#	Site Name	DECC Site #	Site Type	Eastings	Northings	Landform
62	Identifier 62 or S4	36-3-040	artefact scatter	756000	6428000	Simple slope
65	Identifier 65 or S3	36-3-041	artefact scatter & grinding grooves	756510	6428030	Creek flat
66	Identifier 66		isolated find	756550	6428338	Simple slope
67	Identifier 67		isolated find	756552	6428448	Simple slope
68	Identifier 68 or F3		isolated find	756464	6428520	Simple slope
69	Identifier 69 or F1		isolated find	756545	6428599	Simple slope
70	Identifier 70 or S5	36-3-038	isolated find	756000	6428000	Simple slope
71	Identifier 71 or F4	36-3-038	artefact scatter	756660	6428867	Simple slope
72	Identifier 72		artefact scatter	756701	6428906	Simple slope
	Cook Gap	36-3-0015	axe grinding groove	760387	6415931	
	Ulan; Murragamba	36-3-0016	shelter with art	760796	6421957	
	Wollar	36-3-0020	shelter with art	777958	6415823	
	Cooks Gap	36-3-0027	axe grinding groove	7603873	6415931	
	Ulan	36-3-0039	scarred tree	760828	6427722	
	Ulan Creek; Site 2	36-3-0042	axe grinding groove, shelter with art, shelter with deposit	762944	6428010	
	Ulan; Wilpinjong Creek	36-3-0044	Bora/ceremonial, carved trees	771442	6420278	
	Ulan Creek; Site 18	36-3-0060	open campsite	760215	6426006	
	Ulan Creek; Site 19	36-3-0061	open campsite	760878	6426622	
	Ulan Creek; Site 21	36-3-0063	open campsite	761207	6428074	
	Bobadeen	36-3-0068	shelter with art	761661	6427966	
	Wollar; Gulgong	36-3-0074	open campsite	781478	6414502	
	Wattle Creek No. 2	36-3-0098	shelter with art	769880	6422760	
	Yawanna No. 2	36-3-0101	shelter with art	774740	6421270	
	Wilpinjong	36-3-0103	scarred tree	767950	6422190	
	Yawanna No. 1	36-3-0106	shelter with art	774780	6421260	
	Yawanna No. 3	36-3-0115	axe grinding groove	774800	6420900	
	Yawanna No. 4	36-3-0116	open campsite	775200	6420600	
	Deridgeree No. 3	36-3-0124	axe grinding groove	777480	6427480	
	Wattle Creek No. 1	36-3-0133	shelter with art	769500	6422630	
	*Murragamba No. 1	36-3-0134	shelter with art	761300	6421170	
	Moolarben Creek MC1	36-3-0222	open campsite	760420	6420820	Alluvial flat
	MC2	36-3-0223	open campsite	760420	6420880	Alluvial flat
	MC4	36-3-0241	artefact	763161	6421650	Alluvial flat
	MC11	36-3-0237	artefact	763384	6421070	Alluvial flat

Ulan ID#	Site Name	DECC Site #	Site Type	Eastings	Northings	Landform
MC10		36-3-0238	artefact	763226	6422860	Alluvial flat
MC8		36-3-0239	artefact	763193	6422680	Alluvial flat
MC6		36-3-0240	artefact	763113	6421940	Alluvial flat
WC/1		36-3-0287	art (pigment or engraved)	765680	6425480	Alluvial flat
*MC7		36-3-0337	open campsite	763136	6422480	Alluvial flat
N/A		36-3-0690	N/A	N/A	N/A	N/A
N/A		36-3-0691	N/A	N/A	N/A	N/A
N/A		36-3-0692	N/A	N/A	N/A	N/A
N/A		36-3-0693	N/A	N/A	N/A	N/A
N/A		36-3-0694	N/A	N/A	N/A	N/A
N/A		36-3-0695	N/A	N/A	N/A	N/A
N/A		36-3-0696	N/A	N/A	N/A	N/A
N/A		36-3-0697	N/A	N/A	N/A	N/A
N/A		36-3-0698	N/A	N/A	N/A	N/A
N/A		36-3-0699	N/A	N/A	N/A	N/A

2.1 Known Registered DECC Aboriginal Sites within MCP Stage 1 & 2 areas

The 18 registered DECC Aboriginal sites located near the study area are: 36-3-0016, 36-3-0134, 36-3-0237, 36-3-0238, 36-3-0239, 36-3-0240, 36-3-0241, 36-3-0287, 36-3-0337, 36-3-0690, 36-3-0691, 36-3-0692, 36-3-0693, 36-3-0694, 36-3-0695, 36-3-0696, 36-3-0697, 36-3-0698, 36-3-0699 (*see* Table 1 above). These sites are described in detail below.

2.2 Site Descriptions

36-3-0016 – This rock-shelter site with art was originally reported to Fred McCarthy by a Mr J Milliken Resident Engineer in the mid 1940's. McCarthy reports the site in his journal article for *Mankind* Vol. 3 No. 6 1944 (McCarthy 1944). It is described as Site Number 152, Murragamba, Gulgong Parish, Cave at Murragamba via Ulan. Known as *Hands in the Rock Cave*, it contains hands, iguana and emu tracks in red. Its condition then was described as faded and vandalised. The site was later re-recorded by Bluff in 1987 and given a new NPWS site number 36-3-0134.

36-3-0134 – This is the same site as was reported by McCarthy in 1944. Warren Bluff recorded it in November 1987 calling it *Murragamba 1*. The site was described as a large shelter in cliff-line with good deposit at northern end measuring 23m in length x 2.5m in height and 7m in depth with pencil charcoal paint over art names scratched in rock lying on floor. The owner was identified as Mr MJ Carlisle.

The site became known to local Aboriginal people in the mid 1980s and in 1999 the DECC investigated the site as part of a Ulan rock art conservation project (*see* Lambert 1999). Lambert reported that: *Being a remote site on private property, visitation levels are low and there is no recent visitor damage. The site is in need of management to control illegal practice of writing on the shelter walls.* The site is described as Wollar 1 but there was some confusion whether it had been previously recorded and registered. Lambert also comments that: *The cave provides adequate protection from surface water and no intervention in the form of artificial drip-lines are proposed. The art appears stable and in good condition* (Lambert 1999:4).

There was a discussion on how the site should be fully recorded given the amount of graffiti and its history. The local landowners expressed a view that the graffiti should not be removed without consultation with the local farming community families who might have an historical connection to the site.

36-3-0237 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located at the edge of a spur near Murragamba Road, approximately 170m from Murragamba Creek. It contains a scatter of 14 artefacts all made up of quartz material except one piece of green volcanic material. The assemblage is described as flakes, broken flakes and one retouched item (backed artefact).

36-3-0238 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba Road, approximately 70m from Murragamba Creek. It contains a scatter of six artefacts all made up of quartz material. The assemblage is described as flakes, flaked pebble and broken flakes.

36-3-0239 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba road, approximately 60m from Murragamba Creek. It contains a scatter of three artefacts made up of quartz material and tuff. The assemblage is described as core, flakes, and broken blade.

36-3-0240 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an isolated find located the edge of a spur near Murragamba road, approximately 15m from Murragamba Creek. It contains a single complete flake of white chert.

36-3-0241 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located on the edge of a spur near Murragamba Road, approximately 70m from Murragamba Creek. It contains a scatter of 19 artefacts principally made up of quartz and tuff material. The assemblage is described as flakes and broken flakes.

36-3-0337 – MC 7 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba road, approximately 50m from Murragamba Creek. It contains a scatter of 32 artefacts principally made up of quartz and tuff material. The assemblage is described as flakes and broken flakes with a flake tool.

36-3-0690 to **36-3-0699** – There is no information currently available from DECC about these sites or their site cards.

2.3 Registered Sites of Cultural Significance

A search of the DECC AHIMS show there are no known places or sites of cultural significance located near the study area. According to Glen Morris Senior Aboriginal Sites Officer with DECC, records from the NSW National Parks and Wildlife Service Sacred Sites Survey show that there were no living Aboriginal people interviewed in the 1980s who knew of places or sites of sacred value located near the study area (Glen Morris pers comm. 2005).

Site types that have been typically recorded in the general region include (see Appendix 1: Figure 3):

- Open campsites made up of stone artefacts dominated by tuff, silcrete and quartz assemblages and sometimes containing hearth material in the form of burnt or cracked sandstone heat retainers. These sites vary in complexity and density depending on their physical condition in the modern landscape and their proximity to major resource zones.
- Scarred Trees representing Aboriginal removal of bark material to make shelters, dishes, canoes, string, shields, boomerangs and carved trees. Within the study area most Aboriginal scars are found on River Red Gum (*Eucalyptus camaldensis*) or Blakely's Red Gum (*Eucalyptus blakelyi*), White Box (*Eucalyptus albens*) and Grey Box (*Eucalyptus largiflorens*). There is a strong correlation between large canoe type scars and more permanent river watercourses (i.e. associated with the use of the Goulburn, Cudgegong and Macquarie River flood plains).
- Carved Trees represent important Aboriginal ceremonial or burial marker locations. They are usually carved on high quality timber such as Red Gum. A slab of bark is removed and then the inner wood tissue is carved using a stone axe or heavy duty cutting tool. Common designs found on carved trees are diamond or linear cross hatching motifs.
- Burial sites are sites that show evidence of Aboriginal burial in discrete locations. Burials in the study region are usually associated with major areas of occupation found next to rivers, lagoons, lakes, waterholes and some creeks. Skeletal material is normally discovered eroding out of sandy deposits, where interment is easiest. Burials may occur in an isolated context or they may be part of a larger cemetery.
- Bora rings are sites containing an arrangement of natural stone to represent ceremonial or ritual practice. They are often found near traditional ceremonial grounds in areas of abundant surface rock. Rocks may be arranged in a circular fashion or oval shapes signifying important ritual meaning for a ceremony. Often bora rings are found isolated on ridge tops or flat hilltops overlooking a significant stretch of country.
- Art sites. These types of sites reflect Aboriginal use of sandstone outcrops for the purpose of painting, engraving or drawing traditional designs. Art sites are often found in areas where people are using country that has good sources of sandstone in the form of rock-shelters, which offer cover from the elements or may be located next to a stream or river.
- Common symbols found in art sites are hand stencils, figurative art representing animal or human forms, tracks of animals and patterns of lines or circles that may represent landscape elements to a traditional story.
- Axe grinding grooves. These types of sites are associated with Aboriginal people using sandstone outcrops to sharpen stone implements and in particular stone axes. Grinding grooves are usually 5-20cm in length and 2-3cm in depth depending on how often the person is using the groove section. Grooves may be found in clusters and are usually concentrated around a surface rock pool where people use water to assist them in sharpening an edge.
- Contact sites. A contact site is site where there is evidence of Aboriginal people living traditionally in close proximity to European settlement. Aboriginal people may be using European items in traditional hunting and gathering practices, for instance bottle glass as a substitute for stone, or metal as a substitute for bone or stone.

- Sites may be associated with Aboriginal people working for European settlers, such as gathering bark sheeting for bark slab huts. Often historic items associated with that contact would be found in certain traditional campsites.
- Waterhole / well. These types of sites, as well as being important places for obtaining water, may also be sacred places and of religious significance to living Aboriginal people.

2.4 Chronology of Aboriginal Occupation in the Central Western & North-West Slopes

Chronology of Aboriginal occupation within the broader region is known to be at least 29,000–34,000 years Before Present (BP) (Kamminga & Mulvaney 1999). The Pleistocene sites of Cuddie Springs and Tambar Springs provide some evidence of early human exploitation of open plain landforms which also contain megafaunal species (i.e. Diprotodonts). Attenbrow (2003) reports a date of 11,050 +/- 135 years BP for a rock-shelter site occupation (Loggers Rock-shelter Site) within the Upper Mangrove catchment.

In 1994, Patrick Gaynor obtained a date of 20,000 years BP from Crazy Man Rock-shelter in the Warrumbungle's National Park. In 1970 David Moore completed excavation of a small rock-shelter at Bobadeen. This excavation site adjoins but is not within the Moolarben Coal Mine exploration license (EL). The Bobadeen shelter excavation produced a basal occupation date of 5500 years BP (Moore 1970, 1981).

In 1961, Tindale completed an excavation at Noola Rock-shelter in the Rylstone area and suggested a date of approximately 12,000 years BP for basal occupation. Another site, Botobolar 5 has been dated to 5770 +/- 100 years BP. Excavations within the Ulan Mine Lease are limited to a salvage excavation and several test excavations. The age of occupation of the sites has been assessed as less than 5000 years old. Technological attributes of stone artefacts present at sites in Ulan have not been the subject of comparison with other sites in the Central Tablelands or Hunter Valley regions, with the exception of Moore's (1970) excavation at Bobadeen.

Moore's (1970) investigations also provide a date of 7000-8000 years BP for the Ulan region, while Pearson (1981) recovered an occupation date of 5500 BP at a shelter site at Botobolar (Kuskie & Clarke 2005).

Haglund's archaeological surveys, test excavations of rock-shelters and open sites and surface collection of stone artefacts were all completed within the Ulan mine lease area in the early 80s. A salvage of shelter site 36-3-177 was the first major sub-surface investigation within Ulan Coal Mine Lease areas.

2.5 Local Archaeological Studies

A majority of Aboriginal sites recorded in or near the MCP Stage 2 study area have been recorded by several different types of Aboriginal heritage assessment. These can generally be described as:

- Telecommunication and power-line environmental surveys such as those undertaken by David Maynard and Siobhan Lavelle for Telstra and Country Energy;
- Volunteer heritage site recordings such as those undertaken by Fred McCarthy of the Australian Museum and Mr Warren Bluff;
- Academic archaeological research undertaken by Dr Mike Pearson in 1981; and
- Environmental assessment of coal mining leases such as those undertaken by Haglund and Associates for Ulan Mine, Hamm for Moolarben Coal Project Stage 1 & 2, Navin / Officer for Wilpinjong Mine and Kuskie and Clarke for Ulan Coal Mine.

2.6 Ulan Coal Mine Lease Archaeological Assessment: Overview

Prior to 1980, three sites were listed by AHIMS in the immediate vicinity of the Ulan Coal Mine Lease (UCML). Since 1980, there have been a number of Aboriginal heritage assessments of the existing Ulan mining lease as part of EIA and other studies, resulting in the recording and registration of over 440 Aboriginal sites. Aboriginal Heritage investigations of the Ulan Mine Lease (i.e. Ulan Colliery and No. 2 Underground mine have been carried out (*see* Haglund 1980, 1981b, 1992 and Corkill 1991).

These archaeological assessments also reported archaeological site descriptions, as well as oral history, and describe test excavations carried out on rock-shelter sites and surface collections. Archaeological surveys of Ulan Coal's ML1468 by Haglund (1999a, 1999b) for the EIS have been reported. A salvage excavation was also undertaken within one rock-shelter site (Haglund 1996a). Archaeological surveys have also been carried out on the northward extension of underground mining, including Longwall Panels 11 and 12 (Haglund 1996b) and Longwall Panels 13-17 (Edgar 1997).

Archaeological salvage excavations have been carried out on SG5 rock-shelter site within Longwall Panel 13 (Haglund 2001a, 2001b, White 2001). Archaeological surveys have also been undertaken for areas west of the existing open cut mine, an irrigation area and other infrastructure facilities (Haglund 1999c, 1999d; Kuskie 2004; Kuskie & Clarke 2005a). Detailed archaeological surveys of portions of the ML1468 area in advance of underground mining, including Panels 18-22 (Kuskie & Webster 2001), Panels 23-26 and W1 (Kuskie & Clarke 2005b) and Panels W2 and W3 (Kuskie & Clarke 2007).

2.7 Haglund's Assessment Studies: 1980–99

Haglund and Associates completed a series of archaeological assessments at Ulan Coal Mine covering a period of almost 20 years. Parts of the Ulan mine were previously surveyed by Haglund (1980, 1981a, 1981b, 1992 and 1999d). Haglund's initial assessment (1980) involved a preliminary archaeological survey of the Ulan Colliery and No. 2 Underground Mine areas. Six Aboriginal sites and numerous isolated finds were identified, largely within the area proposed for open cut mining.

Between 1980–1981 and 1991–1992 Haglund carried out a series of archaeological surveys of mine leases covering parts of the Ulan Mine Exploration area. She identified at least 60 Aboriginal archaeological sites within UCML mining leases.

Corkill (1991) undertook an archaeological survey along a 4km route of a proposed coal conveyor belt and an area to be impacted by mine infrastructure development. Two artefact scatters and one isolated find were located during the survey. One artefact scatter (UC1), located on *a level bench on the west bank of Ulan Creek in the vicinity of the confluence with an unnamed tributary*, comprised 50–100 artefacts, predominantly of quartz and chert (Corkill 1991).

The other artefact scatter site (UC2) comprised four artefacts on a long exposure adjacent to a road junction and was not to be impacted by the proposed works (Corkill 1991). Chert and quartz were also present at this site which had a high level of disturbance due to earlier road works.

An isolated find (distal end of a quartz flake) was located on a track. Corkill recommended that the full recording of site UC1 be completed and arrangements made to ensure the protection of the site during construction (Corkill 1991) of the Ulan lease area. Haglund commented that large portions of existing lease area had yet to be inspected. Table 2 below summarises her findings.

Table 2 Sites recorded as a result of Haglund's 1990s assessments

Report Code	Field Code	Land Form	Size	Boundary Criteria	Deposit Type	Visible Artefacts	Materials represented	Condition	Comments
WV/8	Kwk4	Hill crest; low hill in valley	N/A		Sandy with leaf litter, vis<10%				
MC6	Kbd2	Valley floor and foot slopes			Pale sand with grass	1C, 5F	2 quartz, 1 chert, 2 quartzite, 1 petrified wood	Many wombat holes	Patchy visibility
MC7	Kbd4	Valley floor			Sand with grass	Not recorded		Many wombat holes	Not recorded due to failing light
MC8	Bt2	Hill slope	c.30m	Fence & edge of track	Decaying rock and red sand	c.20 fragments	Quartz and chert	Trampled, eroded, disturbed	Visible artefacts damaged, site may continue beyond fence (woodland)
MC10	Mc13	Valley floor and foot slopes	10m x10m	Track & erosion scar	Eroding B horizon	1C, 3F	3 chert, 1 quartz	Graded, wash, eroding	Site may continue both sides of track, poor visibility
MC12	Mc12	Hill slope	c.10m x10m		Sandy, rocky	2F, >3FF	Chert	Wash, ploughing	Probable remains of minor knapping event
MC13	Kht1	Creek banks, hill slope	C30m diam.	Edge of clearing	Coarse sand and rock frags = lag	>50 C, F, Ff	Quartz	Severe erosion, disturbed	Severely affected by logging erosion. <10 artefacts/m square
MC14	Kht2	Hillside	c.60m (?)	Track	Eroding colluvium	F, Ff	Quartz	Track, severe erosion and wash	Appears to relate to MC13 nearby; 1 artefact? 5-10m of track
MC15	Mc14	Ridge crest	x20m diam	Tracks (intersecting)	Sandy, silty soil, A2-B horizon	C, F, Ff & traffic prod.	Quartz	Traffic, graded, eroded	Some artefacts crushed, many traffic products
BO1	Kl1	Hill slope	50m x20m	Exposures	Topsoil, degrading	C & F (sample recording)	Quartz	Parts much disturbed, road, ploughing	Low lying areas may retain good deposit
BO2	Krm3	Hill slope	c.5m x2m	Exposure on track	Topsoil, degrading	2C, 4F & 1Fp	Quartz	Track worn, slope cleared	Single knapping event. Small area, extends beyond track
BO3	Krm2	Hill slope	c.6m x2m	Patchy exposure	Topsoil, degrading	2F	Quartz	Disturbed by post clearing	Minor knapping/ discard event?
BO4	Krm1	Hill slope	c.30m x2m	Exposure along track	Topsoil, degrading	Core, 3F	Quartz, chert	Soil profile disturbed by road ploughing	Remains of minor, disturbed scatters of background scatter?
BO8	Bc/11	Creek bank and footslopes	c.100m x50m	Exposure along track and near dam	Topsoil, degrading	1C, 2F, 7FF	Quartz, chert	Surface graded, possibly ripped	Areas between track and creek may retain some less disturbed deposit
BO9	Area1	Flat crest of low ridge	Crest c.350m x50m	Patchy exposure	Degrading surface	1C, 1F	Quartz	Severely eroded	Very sparse, little or no potential for research
DUB	Area 2	Rock platform above deep gullies & minor creeks	c.300m x20m	Exposed rock platform	Bare rock	Sample of c.40 artefacts recorded: C, F, FF backed pieces, hammer & anvil stones	Quartz, chert, basalt, quartzite, petrified wood	Exposed to wash	Represents repeated activities? Probably linked to shelter site just below western end

Note: C=Core, F=Flake, Ff=Flake fragment, Fp=Flaked piece

Haglund's studies aimed to collect available background information, including oral history, and to get at least 50% survey coverage of surfaces affected by the proposed open-cut mining and associated works. She explains that:

A less intensive sampling of other areas aimed to define the types of sites likely to be present, patterns of distribution and, if possible, probable frequencies. Three levels of intensity of survey coverage were aimed for: 100% survey of open sites and some selected areas and, in some areas, 25% survey or single traverse to assess topography, visibility and similarity to areas of more detailed survey.

Samples of stone artefacts were collected from sites which would be destroyed by the proposed mining activities, and selected rock-shelters adjacent to the proposed open-cut mine were tested for the presence of stone artefacts, but no extensive excavation had been carried out within the mine area prior to the 1996 salvage excavation; ... (Haglund 1997:34)

In these two years, Haglund reported on the results of two surveys conducted in the existing mine and proposed open and underground operations at Ulan. The areas examined are located north-west of the Goulburn River, encompassing land units featuring a limited alluvial plain cut by minor tributaries of that river and prominent high ridge structures of sandstone outcrops.

As a data set, these results apply to past habitation in relatively close proximity (800–2500m) of a major waterway and accordingly have potential for setting up comparative insights for the Moolarben Coal Project. To the south of the mine is a subset of habitation phenomena in the ephemeral catchment that makes up the head waters of this major river system.

In 1992, Haglund also surveyed a proposed access route, an area proposed for surface facilities for an extension of the underground mine as well as carrying out sample surveys of three areas of different topography, concentrating on valleys bordered by cliff faces. One of the sample areas overlapped somewhat with the present study area.

She explains that:

As survey conditions were different during the 1996 season, a portion of the overlap was re-surveyed (= the east part of the Brokenback Unit). The surface scatters of stone artefacts identified within CCL 741 during previous surveys were found mainly within cleared, often cultivated, areas.

The scatters were seen on and in yellow podsollic soils and yellow earth soils which both form firm and well drained surfaces which may be affected by sheet-flooding and severe erosion, but are unlikely to become unpleasantly boggy. In these cleared areas the surface often seemed lowered by deflation of surface wash. The artefacts were mostly exposed on the surface or covered by a thin layer of accumulated debris and turf, except on alluvial flats close to the creek bank or in minor sandy patches where the cover could be deeper and exposure occurred mainly in the sides of small gullies or erosion scars.

Some of the erosion was possibly recent, and due to prolonged droughts. However, some artefacts with a heavy growth of lichen must have been exposed for considerable amounts of time. Given the soil characteristics, there was and is little chance of finding organic archaeological material in these open sites; ... (Haglund 1997:25)

Haglund (1996b) conducted the salvage excavation of DECC site #36-3-177, a rock-shelter site situated in the vicinity of longwall panels 10 and 11 which was considered necessary because longwall mining of these panels was scheduled to take place and the potential for the site to be detrimentally affected by subsidence could not be discounted. Salvage excavation was conducted over three days and a total area of 10m² was excavated (Haglund 1996b). A total of 391 lithic artefacts and 374 flaking debris items were recovered from this excavation; predominantly quartz (68%) then with chert (28%) and igneous rock and petrified wood which were also present. The bulk of the excavated assemblage comprised flakes (52%) and flake fragments (26). Other artefact types recovered included cores, core fragments, flaked pieces and modified flakes (Haglund 1996b).

Haglund's investigation of reduction sequences at site #36-3-177 largely followed Witter's (1992) technological analysis methodology, and using this occupation model analysed the stone tool assemblage in terms of the profiles forwarded by Witter (1994). The assemblage recovered from the excavation most resembled that described for a '*vantage point / crafts station*'. Haglund concluded, however, that the assemblage did not fit any one suggested model in particular (Haglund 1996b).

Haglund's interpretation of the Aboriginal heritage evidence recovered from site #36-3-177 was one of sporadic occupation associated with artefact manufacture and/or repair and that the shelter may represent a vantage point site at which casual manufacture took place (Haglund 1996b). The age of the site was assessed as being within the last 5000 years, although there was no datable material such as charcoal (Haglund 1996b).

Haglund (1996a), during another survey, located an isolated find northwest of site #36-3-177. This was a quartz flake with retouch and use-wear and was interpreted by Haglund (1996a) as representing an item lost or discarded in transit.

Haglund (1996c) also recorded eight rock-shelters and three artefact scatters which had the potential to be affected by longwall mining subsidence and the construction of a pumping station, access track and power line associated with Longwall Panels 11 and 12; and recommended sub-surface testing for the open camp sites to be impacted and altering the route of the access track with an application for section 90 Consent for sites to be disturbed. Further investigation and consultation was recommended.

2.8 Site Location Modelling

Based on her three main Ulan survey assessments, Haglund (1997) argues that Ulan site location modelling can be explained in the following way:

...it is likely that at least some water-holes, springs and soaks could be found to be closely associated with archaeological material. It is also possible that more extensive and intensive investigation will reveal examples of additional site types; ... (Haglund 1997: 26)

She further explains that:

It should be noted that previous investigations have concentrated on two landforms, ridge slopes and/or valley floors, depending on what type of topography was most likely to be affected by particular proposed developments. These landforms are also, according to present models, those most likely to contain Aboriginal sites. However, judging from sample surveys in adjoining areas, open sites are likely to occur also on ridge crests, and quarry sites where there are outcrops of suitable rock, e.g. basalt; ... (Haglund 1997: 26)

Both Edgar (1997) and Haglund (1999a) presented a complementary Aboriginal occupation model for the Ulan region involving:

- Regular seasonal occupation by a local Aboriginal group, resulting in evidence of a range of economic activities associated with repeated long-term occupation, including hearths, stone tool manufacture and curation;
- Intensive but short-term occupation by Aboriginal people from the surrounding regions for special ceremonies. Stone tool assemblages would reflect intensive food gathering and preparation, extensive art and other special activities; and
- Ephemeral occupation resulting from travel through the area between the coast and further inland regions.

Edgar (1997) considered that the results of his survey support aspects of each of these occupations models and recommended that further work be conducted. A later survey by Haglund (1999a) provides evidence which primarily supports the first model of regular occupation.

2.9 Limitation of Sampling Methods & Previous Archaeological Assessment

Several factors from previous archaeological work are likely to affect the assessment of archaeological landscape values within the study area:

- The absence of any form of analysis of data sets to elicit discard patterning in the study area or indeed illuminate any of the primary characteristics of the archaeological record itself or the behavioural systems behind it.
- Site areas, density values, industrial attributes, tabulations of material types, landscape delineation, and similar elements in archaeological investigation that are designed to underscore the significance of cultural materials that may be lost if in fact the mine proposal proceeds as proposed are not adequately described.
- Haglund's overall assessment of significance is not comparable because she has too many lines of evidence which are fragmented and not discussed in any holistic way.
- Sites are discussed but not at an intersite level where comparability can be analysed.

2.10 Ulan Coal Mine Extension; Archaeological Assessment after 2000 Kuskie & Associates

Following on from the work of Haglund, Ulan Coal Mine engaged Peter Kuskie through his company South-East Archaeology Pty Ltd to undertake a series of archaeological assessments within parts of the Ulan Coal Mine that were being expanded for future development.

Kuskie and Webster (2001) comprehensively surveyed Longwall Panels 18-22 in ML1468, a 498ha area, over 12 days in June and July 2001, involving direct coverage of 57.8ha (12% of the study area), resulting in an effective survey sample of about 4.7ha (1% of the study area). This area was subdivided into 205 survey areas, with all different environmental contexts sampled. Vegetation was noted as being the primary detection-limiting factor (Kuskie & Webster 2001).

Some 58 Aboriginal heritage sites were identified; 56 artefact scatters, one rock-shelter with archaeological deposit and one ochre quarry. Three sites (BO10, #36-3-205 and #36-3-207) previously reported within the area were included in this total. Another three previously recorded sites (Haglund 1999a) within the area (BO2, BO3, BO4) could not be relocated. In addition, six potential archaeological deposits were also identified. Artefacts were identified at a very low mean density of 0.0025 artefacts per square metre of effective survey coverage across the entire study area sample (Kuskie & Webster 2001).

Kuskie and Webster (2001) identified and recorded in detail a total of 117 stone artefacts during the investigation. The lithic item assemblage was dominated by quartz (79%), with six other stone materials occurring in much lower frequencies. Sandstone outcrops, alluvial and colluvial gravels, quartz, quartzite, volcanics and ochre were noted within the study area. A total of 14 lithic item types were recorded, comprising thirteen categories of artefacts and lithic fragments, items that could not be positively identified as artefacts.

The lithic item assemblage was dominated by flakes and portions of flakes (51% of combined artefact total) and cores (26%). This evidence represented the dominance of non-specific stone flaking activities within the study area. Evidence of microblade manufacturing was very low, comprising 6% of the total assemblage. A very low frequency of utilised and/or retouched flaked artefacts was present (2% of the combined assemblage). Very low frequencies of tools indicative of other activities were identified. The flaked artefacts tend to be small in size (often less than 30mm in maximum dimension (Kuskie & Webster 2001).

This evidence indicates that Aboriginal utilisation of the Longwall Panels 18-22 study area was of a very low intensity and was probably infrequent and involved low numbers of people. Occupation was more likely focussed in surrounding areas where major watercourses and/or rock-shelters suitable for habitation are located (Kuskie & Webster 2001). Scientific significance of evidence within the Longwall Panels 18-22 study area was assessed as ranging from low to high within a local and regional context. Some 55 of the artefact scatter sites were assessed by Kuskie and Webster (2001) as being of low scientific significance in a local context.

Following minor archaeological surveys in 2003 and 2004, in 2005, Kuskie and Clarke completed an assessment of an area of the Western Open Cut for Ulan. During the initial surveys the then proposed western open cut extension area was subdivided into a total of 54 archaeological survey areas.

The total survey coverage of these survey areas equated to approximately 33,420m² or 3.3ha of ground. The total effective survey coverage of this sample area equated to about 3582m².

Surface visibility ranged between means of 10 and 20% in the survey areas. Archaeological visibility also ranged between means of 10 and 20%. Vegetation was the factor that typically limited surface visibility (Kuskie & Clarke 2005).

Following reinspection of the physically marked boundaries of the proposed new works, it was concluded that:

- No identified Aboriginal heritage sites are located directly within the *clean water diversionary dam study area*, west of the open cut, although site/locus OCE1/A and Haglund's Site S4 (Ulan ID #62, DECC #36-3-40) are situated within close proximity.
- One identified Aboriginal heritage site/locus, OCE1/A, extends marginally within the current *western open cut extension study area*, and another site/locus, OCE2/A, is situated within close proximity (Kuskie & Clarke 2005).

The sites west of the open cut are dominated by tuff, with quartz, chert and quartzite stone materials also present. However, the small size of the sample is noted.

Tuff is particularly notable west of the open cut in survey area OCE1 and west of the present study area in survey areas OCE34, 38, 39, 40 and 51 (South East Archaeology 2004), which include broad simple slopes, spur crests descending from the adjacent elevated terrain, and the main drainage depression. It occurs as tabular surface outcrops and has become incorporated into the gravels of the main watercourse (OCE40). In the lower portions of the simple slope (OCE34) tabular tuff is eroding from 0.15–0.20m below the present surface, and represents another source of the material. Many samples of the tuff examined were of sufficient quality for stone knapping (Kuskie & Clarke 2005).

In the then proposed western open-cut area examined by South East Archaeology in 2002 and 2003, a high frequency of tuff artefacts exhibited cortex, including 39% (of the tuff artefact total) with the tabular variety and 8% with a rougher, terrestrial cortex. A relatively high frequency of tuff cores were identified (26% of tuff artefacts), including many larger cores. The cores exhibiting cortex (80% of tuff cores) are particularly large, ranging from a maximum dimension of 60-200mm.

Many of the tuff flakes exhibiting cortex (39% of tuff flakes) are also large in size (size classes 6-10). All of these factors are strongly indicative that the tuff used for artefact manufacturing was procured from a local source. The evidence is also indicative of procurement and at least initial reduction of tuff at several sites, particularly at the loci OCE1/A and OCE34/B. At the later locus, it could even be speculated that Aboriginal digging for the high quality tuff that is in abundance 15-20cm below the surface has occurred, possibly causing the formation of the erosion scour (Kuskie & Clarke 2005).

Quartz pebbles were noted in several localities within the study area and it is common in the pebbly sandstone of the adjacent elevated terrain. It can be inferred that this material was procured from colluvial gravels available within or in the immediate vicinity of the study area. Chert was a favoured material for manufacturing artefacts, as it breaks by the process of conchoidal fracture (breakage through force being applied stone on stone) and provides flakes that have sharp, durable edges. Chert is present in the local Illawarra Coal Measures. Several artefacts were comprised of quartzite, and boulders of this material occur throughout the Ulan area and these may represent Permian era glacial erratics (Kuskie & Clarke 2005).

The small sample of lithic items recorded in or immediately adjacent to the western open-cut extension area predominantly includes flakes, cores and flake portions. These items represent

general or non-specific knapping activities. However the presence of cores at site OCE1/A may relate to lithic procurement and reduction. The remainder of the items from the western open cut area include a chert utilised flake and a tuff utilised microblade – proximal portion. The utilised microblade portion and utilised flake are indicators of activities other than knapping, such as processing plant food or maintaining wooden implements (Kuskie & Clarke 2005).

The identified sites loci west of the open cut occur on all three of the landform units present (simple slope, spur crest and drainage depression). This result is consistent with the nature of the area, but does not indicate a particular focus of occupation within a particular environmental context. Evidence is distributed widely across the locality in typically very low numbers and densities (Kuskie & Clarke 2005).

Given the virtual absence of clear activity areas – locations where focused human activity has occurred – it can be argued that the evidence within the western open cut study area is predominantly indicative of low density background discard (Kuskie & Clarke 2005).

Kuskie & Clarke (2005) inferred on a preliminary basis from the evidence at the Aboriginal sites recorded within the present study and from other sources that:

- Members of the Wiradjuri people predominantly occupied the study area, within the past 5000 years. Members of neighbouring cultural groups (particularly the Kamilaroi) may also have sporadically occupied the area and occupation may have extended as far back as 30,000–40,000 years (although it is uncertain that any evidence for this may remain).
- Aboriginal people used the entire study area, but at a very low intensity.
- Focused occupation was more likely to have occurred in rock-shelters or overhangs on the scarps and on the major creek flats, but even this may have been relatively sporadic or of low intensity.
- Sandstone bedrock within the main ephemeral tributary of Ulan Creek close to the western open-cut study area was used for the shaping and/or maintenance of ground-edge hatchets.
- The stone materials tuff and quartz were favoured for stone-working activities.
- The manufacturing of stone tools, particularly flaked implements for use in making or maintaining wooden tools or butchering or processing foods, was generally a casual or opportunistic activity. Non-specific stone flaking was a common activity (Kuskie & Clarke 2005).

2.11 Regional Context

The nature of the evidence from the study area can be compared with other studies and sites in the region, although such a comparison is constrained by the limited sample sizes. Some of the notable similarities, particularly within the Longwall Panels 18–22 assessment of Kuskie and Webster (2001) and surveys of Haglund (1999a, 1999b), include:

- Stone artefacts being the dominant form of Aboriginal heritage evidence;
- Quartz being one of the dominant stone materials;
- A generally low mean density of artefacts;
- Dominance of non-specific stone flaking in the overall assemblage;
- Similar range of artefact types; and
- Estimated antiquity of the evidence.

Some of the notable differences, particularly with the studies in the elevated sandstone terrain but also the open lowland terrain investigated by Kuskie and Webster (2001), include:

- The dominance of tuff and presence of tuff sources and potential tuff lithic quarries;
- Absence of rock-shelter art and/or occupation sites; and
- Lower numbers and densities of artefacts than in several areas.

The majority of the items or context located within the study area do not appear to be unique in the region, with the possible exception of the evidence of tuff procurement and initial reduction (Kuskie & Clarke 2005).

2.12 Reassessment of Predictive Model of Site Location

In view of the survey results, the predictive model of site location can be reassessed. The results provide no evidence to contradict the assessments that burial, carved tree, scarred tree, stone arrangement, mythological and rock-shelter with art and/or occupation deposit sites have a low to very low potential to occur within the study area (Kuskie & Clarke 2005).

No grinding groove sites were identified; hence the potential for grinding groove sites within the study area can be revised downward to very low. The potential for lithic quarry sites was initially assessed as low. However, during the course of the investigation, sources of the stone material tuff were identified in widespread locations west of the open cut, including survey area OCE1 within the present study area. In at least one location, Aboriginal site OCE1/A, the evidence is indicative of procurement and possibly at least initial reduction of tuff.

This is consistent with Hiscock and Mitchell's (1993:32) general definition of a lithic quarry site as a *location of an exploited stone source*. However, within the revised study area boundaries, the potential for further evidence of lithic procurement to occur is considered to be low, although elsewhere west of the open cut where tuff of sufficient quality for knapping occurs this potential may be higher (Kuskie & Clarke 2005).

The prediction that artefact scatters have a moderate to high potential to occur across the level to gently inclined portions of landform elements (e.g. spur crests and simple slopes), particular adjacent to watercourses has been confirmed during this survey. Evidence was located in these contexts (Kuskie & Clarke 2005).

There remains potential for further stone artefact evidence to occur across virtually the entire study area, albeit typically in low density consistent with background discard, interspersed by occasional areas of higher density in which localised activity areas have occurred. At site OCE1/A, positioned largely between the western open-cut extension and diversionary dam study areas, there remains potential for deposits of sufficient integrity to be of research value (cf. Koettig 1989; Kuskie & Kamminga 2000).

However, in virtually all of the western open-cut extension and diversionary dam study areas, the potential for sub-surface deposits that are *in situ* or of possible research value appears to be low, considering the levels of ground disturbance, shallow upper soil unit and predictive model (Kuskie & Clarke 2005).

In 2007, Kuskie and Clarke, carried out an archaeological assessment of an area defined as SMP (*Subsidence Management Plan*) Area Longwall Panels: W2-W3 measuring approximately 478ha within the Ulan Coal Mine Lease. This development approval was part of an underground coal mine assessment. 21% of the study area was effectively sampled.

Twenty eight Aboriginal heritage sites were identified within the Longwall Panels W2-W3 SMP area, comprising a total of 22 artefact scatters (including 'isolated artefacts'), two rock-shelters with grinding grooves and artefacts, two rock-shelters with grinding grooves, and two rock-shelters with artefacts. Thirteen rock-shelters with Potential Archaeological Deposits (PADs) were also recorded (Kuskie & Clarke 2007).

Only 80 stone artefacts were recorded and Kuskie and Clarke concluded that:

Artefacts occur at a very low mean density of 0.0022 artefacts per square metre of effective survey coverage (accounting for visibility), across the sampled area. This evidence indicates that Aboriginal utilisation of the study area was of a very low intensity. It was probably infrequent and involved low numbers of people. Occupation is more likely to have been focused in surrounding areas where major watercourses and/or rock-shelters suitable for habitation are located; ... (Kuskie & Clarke 2007:3)

Three of the six rock-shelter sites were assessed as having low to moderate scientific significance within a local context, with one site (BB14/F) being assessed to be of moderate scientific significance within a local context, one site (MC1) as being of moderate to high significance within a local context, and one (MC2) as being of high significance within a local context and low to potentially moderate scientific significance within a regional context (Kuskie & Clarke 2007).

2.13 Site Descriptions & Significance Ratings

Kuskie and Clarke (2007) describe each of the sites, which are reproduced below in Table 3 along with their original scientific descriptions.

Table 3 Sites recorded by Kuskie and Clarke in 2007 for UCML SMP Study (after Kuskie & Clarke 2007)

Site Name	DECC #	Ulan ID#	Site Type ¹	MGA Eastings	MGA Northings	Scientific Significance ²
BB14/A PAD [^]			Rock-shelter with PAD	755121	6436503	-
BB14/B [^]			Artefact Scatter	755333	6436458	Low
BB14/F [^]			Rock-shelter with Artefacts	755125	6436393	Moderate
BO33/B [^]			Artefact Scatter	757870	6436419	Low
BO36/A [^]			Rock-shelter with Artefacts	757579	6436530	Low to Moderate
BO37/A			Artefact Scatter	758617	6436885	Low
BO38/A			Artefact Scatter	758465	6436824	Low
BO39/A			Artefact Scatter	758085	6437602	Low
BO40/A			Artefact Scatter	757917	6436956	Low
BQ3	36-3-292		Artefact Scatter	756425	6437144	Low

¹ Artefact scatter refers to both scatters (multiple identified artefacts) and isolated finds (single identified artefact). Four rock-shelters (MC46A-D) and an artefact scatter (MC41/C) recorded during the present survey but outside of the SMP area are excluded. Potential Archaeological Deposits (PADs) in rock-shelters are listed but their significance is not assessed due to the absence of identified evidence.

² Preliminary assessment of scientific significance within a local context based on the criteria outlined in Kuskie and Clarke (2007).

Site Name	DECC #	Ulan ID#	Site Type ¹	MGA Eastings	MGA Northings	Scientific Significance ²
MC1		163	Rock-shelter with Artefacts & Grinding Grooves	756157	6437582	Moderate to High
MC2		164	Rock-shelter with Artefacts & Grinding Grooves	756191	6437687	High
MC32/C	36-3-376		Artefact Scatter	756541	6436881	Low
MC33/A PAD [^]			Rock-shelter with PAD	755299	6436592	-
MC34/A			Artefact Scatter	756458	6437087	Low
MC34/B			Artefact Scatter	756207	6437247	Low
MC34/C			Artefact Scatter	756033	6437212	Low
MC35/A			Artefact Scatter	755030	6437043	Low
MC36/A			Artefact Scatter	755524	6437155	Low
MC37/A			Artefact Scatter	755200	6436999	Low
MC38/A			Artefact Scatter	755443	6436931	Low
MC39/A			Rock-shelter with Grinding Grooves	755269	6437104	Low to Moderate
MC40/A PAD			Rock-shelter with PAD	755026	6437199	-
MC40/B PAD			Rock-shelter with PAD	755068	6437177	-
MC40/C PAD			Rock-shelter with PAD	755072	6437188	-
MC40/D PAD			Rock-shelter with PAD	755012	6437162	-
MC41/A			Artefact Scatter	756063	6437732	Low
MC41/B			Artefact Scatter	756102	6437830	Low
MC41/D			Rock-shelter with Grinding Grooves	756106	6437785	Low to Moderate
MC41/E			Artefact Scatter	756387	6437713	Low
MC41/F PAD			Rock-shelter with PAD	756156	6437710	-
MC41/G PAD			Rock-shelter with PAD	756119	6437744	-
MC41/H PAD			Rock-shelter with PAD	756102	6437753	-
MC42/A			Artefact Scatter	756358	6437617	Low
MC43/A PAD			Rock-shelter with PAD	755868	6437774	-
MC44/A			Artefact Scatter	757155	6437367	Low
MC44/B			Artefact Scatter	756788	6436906	Low
MC45/A PAD			Rock-shelter with PAD	755518	6437429	-
MC45/B PAD			Rock-shelter with PAD	755492	6437462	-
MC45/C PAD			Rock-shelter with PAD	755417	6437443	-
MC45/D			Artefact Scatter	755037	6437856	Low

[^] Site occurs in previously approved SMP Area (W1) area of overlap with SMP Area (W2-W3).

2.14 Rock-shelter Sites

Site MC1 (Mona Creek 1)

Site MC1 is a large cavernous north-east facing rock-shelter with two openings at either end. It had previously been recorded by Haglund (1999b). A potential archaeological deposit was recorded during the Kuskie & Clarke 2007 survey and is considered to have high research potential. The sandstone surfaces of the shelter are subject to some exfoliation and disturbance to the deposit is potentially moderate, with animal burrows and a silty and sandy floor. Twenty-four artefacts were located within and around the shelter during the Kuskie & Clarke 2007 survey. Site MC1 also hosts a floating sandstone slab in the northern portion of the shelter, approximately 700mm in length, with three clearly defined grinding grooves. The grooves measure between 40–50mm wide and 300–400mm long. The grooves are shallow and clear, but slightly weathered.

Site MC2 (Mona Creek 2)

Site MC2 is a large cavernous south facing outcropping rock-shelter in a massive boulder. Site MC2 had previously been recorded by Edgar (Haglund 1999b). A potential archaeological deposit was recorded during the Kuskie & Clarke 2007 survey and is considered to have a moderate to high research potential. The sandstone surfaces of the shelter are stable, while disturbance to the deposit and surrounds is potentially moderate and primarily arises from animal burrowing and erosion. No visible artefacts were noted during the Kuskie & Clarke 2007 investigation. However, Haglund (1999b) noted three small quartz flakes. Haglund (1999b) also briefly reported the subsequent identification of a rare wooden implement, a boomerang, within the shelter. This item was not relocated during the present investigation and its precise provenance is uncertain.

Site MC2 also hosts a large floating sandstone slab in the central portion of the shelter, approximately 2m in length, with three clearly defined grinding grooves. The grooves identified measure between 60-90mm wide and 350-480mm long. The grooves are shallow and clear, but slightly weathered.

Site MC39/A

Site MC39/A is a south-westerly facing overhang, with substantial rubble overlying largely sandy and silty soils. Two grinding grooves occur on a freestanding/floating sandstone slab in the centre of the shelter. There is potential for further grooves which may be presently covered with silt. The grooves identified measure between 45-50mm wide and 240-260mm long. The grooves are shallow and clear, but slightly weathered. There is only potential for a shallow sub-surface deposit in a relatively small area, which may not be of research potential. No visible flaked stone artefacts are associated with site MC39/A.

Site MC41/D

Site MC41/D is a small westerly facing low shelter with a rocky and sandy floor. Two grinding grooves occur on a small, potentially portable freestanding/floating sandstone slab in the centre of the back of the shelter. The grooves identified measure between 35mm wide and 200-280mm long. The grooves are shallow and clear, but slightly weathered. There is low potential for a sub-surface deposit, particularly one that may be of research value. No visible flaked stone artefacts are associated with site MC41/D.

Site BB14/F

Site BB14/F is an exfoliating rock-shelter in a high sandstone rock formation, previously recorded by Kuskie and Clarke (2005b). A relatively shallow (c. 0.15m) potential archaeological deposit was recorded and is considered to have moderate to high research potential. The sandstone surfaces of the shelter are exfoliating, exposed and weathered, while disturbance to the deposit and surrounds is apparently moderate and primarily arises from animal burrowing and erosion. A single quartz flake portion was located approximately 3m west of the shelter opening.

Site BO36/A

Site BO36/A is a pair of moderately sized cavernous rock-shelters in a low-lying sandstone rock formation, previously recorded by Kuskie and Clarke (2005b). A relatively deep (c. 0.6m) potential deposit was recorded of the western shelter and is considered to have low to moderate research potential. The research potential of the smaller eastern shelter is assessed as limited. The sandstone surfaces of the shelter are predominantly stable, while disturbance to the deposit and surrounds is apparently moderate and primarily arises from animal burrowing and vegetation. Eighteen artefacts were located within and around the western shelter.

Lithic Artefact Scatter Sites

A total of 22 artefact scatter sites (incorporating '*isolated artefacts*') (BB14/B, BO33/B, BO37/A, BO38/A, BO39/A, BO40/A, BQ3, MC32/C, MC34/A-C, MC35/A, MC36/A, MC37/A, MC38/A, MC41/A-B, MC41/E, MC42/A, MC44/A-B and MC45/D) occur in or within 50m of the Ulan Coal SMP area (W2-W3).

Nineteen of these sites were located and recorded during the Kuskie and Clarke 2007 survey. One site (MC32/C) was recorded by Kuskie and Clarke (2005b) on the margin of the current study area but could not be relocated during the present survey. Another two sites are situated in the portion of the Ulan Coal SMP area that overlaps with the previously approved Ulan Coal SMP area (W1).

The sites recorded by Kuskie & Clarke range up to 2000m² in area (visible extent of evidence). Approximately two-thirds of the 'artefact scatter' sites comprise a single lithic artefact, which have been referred to in previous studies as 'isolated finds'. The remaining sites comprise two or more lithic items. Typically 'isolated artefacts' represent the only visible evidence of larger artefact scatters, in which low conditions of visibility have prevented the detection of further items.

A total of 80 lithic items were identified during the Kuskie and Clarke 2007 survey, including 40 artefacts in open artefact scatters and 24 artefacts associated with rock-shelters. This total includes 16 artefacts within the four rock-shelter sites (MC46/A-D) which lie marginally outside of the Ulan Coal SMP area. Artefact numbers range from 1 to 10 within each artefact scatter site recorded.

In general terms, the artefact densities identified within the study area are low by south-east Australian standards and indicate a generally low-intensity utilisation of the locality. The overall spatial distribution and nature of evidence is largely consistent with background discard, manuport and artefactual material which is insufficient either in number or in association with other material to suggest focused activity in a particular location (cf. Rich 1993; Kuskie & Kamminga 2000). This is interspersed by occasional focalised areas of slightly higher artefact density where activities or repeated activities have occurred.

2.15 Wilpinjong Coal Mine Assessment: Navin / Officer 2005

In 2003, Excel Coal through its subsidiary Wilpinjong Coal Pty Limited, undertook to develop the Wilpinjong Coal Mine Operation. This new coal mine was located approximately 2km to the east of the current Stage 2 Moolarben Coal Project. Part of this assessment included an assessment of Aboriginal cultural heritage and likely open cut mine and associated infrastructure impacts (i.e. Coal Handling and Preparation Plant).

The mine development covered approximately 2800ha or 28km² in area and is generally described as the 'project disturbance area'. An Aboriginal cultural heritage survey was conducted by Navin Officer and members of the local Aboriginal community (i.e. Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islander Corporation and Warrabinga Native Title Claimants Aboriginal Corporation. Approximately 2510ha (25km²) of the Wilpinjong Coal Exploration Licence area were surveyed, including comprehensive survey of the Project Disturbance Area and sample survey of other areas adjacent to the Project Disturbance Area.

A total of 235 Aboriginal sites and objects were recorded as a result of the assessment. These Aboriginal sites and objects are described as:

- Isolated finds and artefact scatters in open contexts;
- Rock-shelters with surface artefacts (may also contain potential or confirmed archaeological deposits);
- Rock-shelters with potential or confirmed archaeological deposits;
- Rock-shelters with rock art;
- Possible and probable Aboriginal scar trees;
- Potential archaeological deposits in an open context; and
- Reported places of Aboriginal cultural significance (reported by some Aboriginal people but disputed by others).

In addition, three non-Aboriginal scarred trees were recorded.

Table 4 Aboriginal Sites & Objects Identified in the Wilpinjong Project Area (after Navin Officer 2005)

No. of objects & sites recorded	Site Type Recorded
70	Open artefact scatters
1	Open artefact scatter and procurement site
64	Isolated finds
19	Rock-shelters with surface artefacts (may also contain potential or confirmed archaeological deposit)
21	Rock-shelters with potential archaeological deposit (only)
3	Rock-shelters with rock art (may also contain surface artefacts and confirmed or potential archaeological deposit)
24	Possible Aboriginal scarred trees
15	Probably Aboriginal scarred trees
3	Surveyor's scarred trees (undebated European origin)
3	Probably surveyor scarred trees (debated origin)
1	Indeterminate tree feature (debated origin)
3	Other (debated origin) scarred trees
2	Potential archaeological deposits (PAD) (open context)
2	Reported places of Aboriginal cultural significance (disputed by some other Aboriginal representatives)
3	Springs/natural pothole ('waterhole' recorded at the request of an Aboriginal representative)
4	Other (debated origin) isolated finds, lithic scatters or stone arrangements

Navin Officer summarise the main archaeological findings of their investigations in the following way:

*There are three sites with artefact densities of between 51 to 100, and 101 to 500 estimated on the surface. These sites are located near the banks of **Cumbo** and **Wilpinjong Creeks**, as well as some basal slope contexts. Two sites were recorded with more than an estimated **500 artefacts**. Both occur along the banks of **Wilpinjong Creek** and outside of the Project open cut mine and contained infrastructure area. The margin of one of these sites would potentially be disturbed by realignment of an electricity transmission line.*

Three rock-shelter sites with rock art were identified during the field program. All occur outside of the Project disturbance area and within sandstone and conglomerate rocks. Identifiable motifs include upward pointing tridents or arrows shapes, and red hand stencils.

*Approximately **half** of the **recordings** identified during the survey are located within the Project Disturbance Area and would be subject to direct disturbance during the life of the Project. Approximately 10% of recordings are located within the Project Disturbance Area on the boundaries of the Project open cut pits and are also likely to be disturbed, subject to the detailed mine design.*

One site of high archaeological significance (within a local context) occurs within the Project Disturbance Area. This is a large open artefact scatter with more than 500 artefacts that may be impacted on its margin by the realignment of an electricity transmission line. No other recordings of high archaeological significance occur within the Project disturbance area. Eight stone material categories were recorded during the survey. The dominant categories were quartz (noted in 75% of all artefact occurrences), and tuff (36%).

Just under half of the recorded Aboriginal sites occur within valley floor contexts, a third within basal valley slope contexts, 19% occur on mid valley slope contexts and 4% in upper valley contexts; ... (Navin Officer: Fii-iii 2005)

2.16 Moolarben Coal Project Assessment of Stage 1: Hamm

In 2005 and 2006 Hamm (2006) undertook an assessment of Aboriginal cultural heritage values for the proposed Moolarben Coal Project Stage 1, located in the western coal fields of NSW, 40km north-east of Mudgee and 25km east of Gulgong. The study covered an area of approximately 35km² of low undulating hills and hill slopes from 400-680m above sea level on sandstone plateaus with extensive rock outcrop. Narrabeen Sandstone is the dominant parent rock. Parts have lower colluvial slopes of sandstone plateaus escarpments with low undulating rises and creek flats. Moolarben Creek flows through part of the study area. The landscape is heavily vegetated with some clearing for pastoral activity around the village of Ulan, and the locality of Moolarben along the Moolarben Creek. Approximately 4.2km² of land was foot surveyed from approximately 6.8km² of land available to be surveyed due to available surface visibility.

The assessment located and recorded a total of 1598 Aboriginal objects (302 sites). This cultural record was made up of: 63 open stone artefact scatter sites of varying densities, 219 individual stone artefact isolated finds, 18 rock-shelter sites, a grinding groove site and a scarred tree site. A majority

of this record (87%) is made up of exposed stone artefactual material eroding from areas of bare soil exposure with less than five artefacts in density.

The most concentrated occupation areas located within the Stage 1 study area were:

- Central Moolarben Creek Alluvial Flats: Mayberry Property at Open Cut 3
- Southern Moolarben Creek Alluvial Creek Flats and Ridges: Stokes Property Open Cut 3 Extended
- Underground No. 4 Northern Ridge Lines: Westwood Property
- Bora Creek Alluvial Flats: Ulan Coal Mines Property

The principal Aboriginal objects recorded in the assessment were stone artefacts. A total of 1597 stone artefacts were recorded. Quartz raw material dominated all assemblage components for MCP Stage 1 sites, accounting for 81.6% of the total raw material count. The next most commonly used raw material was Tuff, accounting for 10.6% of the total assemblage count. Silcrete was also used, but in much lower proportions.

A majority of surface assemblages recorded were made up of Broken Flakes, followed by Flaked Pieces and Complete Flakes. Retouched or used items only accounted for 2.2% of the total assemblage contents. Cores made up approximately 8.5% of the total assemblage content. A majority of cores were multi-platform type made from quartz and tuff materials. A total of four backed pieces (i.e. geometrics) were identified with three being recorded, within Transect 4 Underground No. 4. All three backed pieces are made from Tuff material.

A majority of flakes (Complete and Broken Proximal) contained approximately 75% broad platforms with 18% containing focal platforms. Cortex is found on approximately 12% of all stone artefact items. A comparison was made of the size of Complete Flakes. Graphing shows that a majority of quartz Complete Flakes recorded were between 10-40mm in length and 10-25mm wide. Whilst the Complete Flake size distribution for Tuff was much broader, showing a more diverse flake selection process operating.

Of a total of 302 sites recorded for the Stage 1 project area, eight sites (i.e. S1MC: 103, 230, 264, 280 (36-3-0042), 282, 283, 286, 287) are considered to be of high archaeological significance. However, given some of these sites are located within a disturbed context, further archaeological investigation may not be warranted. The remaining 294 sites were considered to be of medium or low archaeological significance. From an Aboriginal cultural assessment point of view, the most sensitive Aboriginal cultural landscape is located within the northern area of Underground No. 4 (i.e. near 'The Drip'). However, general Aboriginal community consultation advice has stated that all sites (archaeological or cultural) are of value, but none of the community members interviewed objected to the mining proposal going ahead.

A significant percentage of open alluvial plains and flats assessed in MCP Stage 1 have been disturbed due to historic farming practices, especially broad acre clearing for ploughing and pasture improvement. As a result of this activity, approximately 80% of Moolarben Creek's modern day channel has been heavily affected by sheet erosion as a result of agriculture. It is argued that this long-term impact may also be responsible for a lack of intact rich open sites which are more common along Murragamba and Wilpinjong Creeks. The presence of natural springs and soaks is

likely to have heavily influenced the location of major open space Aboriginal sites occupation for the Moolarben Creek catchment and surrounding ridgelines.

Although rock-shelters were used by Aboriginal people in the MCP Stage 1 study area they were more specific in their purpose (i.e. to carry out rock art and ceremony) and less likely to contain significant long term occupation evidence.

2.17 Moolarben Coal Project Assessment of Stage 2: Hamm

In 2006, Archaeological Risk Assessment Services Pty Ltd (ARAS) was engaged to undertake an assessment of the Aboriginal cultural heritage values of the proposed Stage 2 Moolarben Coal Project (MCP) area (Hamm 2008), located in the western coal fields of NSW, 40km north-east of Mudgee and 25km east of Gulgong. The Stage 2 study area is approximately 37km² in size, being located to the immediate east of the approved Stage 1 MCP site.

Stage 2 MCP investigation area consists of two proposed Underground Mines (UG 1 and UG 2) and a large Open Cut Mine (Open Cut No. 4). The total area of potential mine impact is approximately 2260ha or 22.6km².

The most dominant environmental feature of the Stage 2 investigation area is the Murrumbidgee Creek Valley and the surrounding sandstone ridgelines which run in a north-south direction creating a series of elongated valleys. Approximately 7.65km² (20.6%) of the study area was assessed on foot by a team of qualified archaeologists and local Aboriginal community members over a 30 day period in 2006. A total of 49 survey foot transects were completed.

This assessment located and recorded a total of 4836 Aboriginal objects. This cultural record is made up of: 150 open stone artefact scatter sites of varying densities, 103 individual stone artefact isolated finds, four rock-shelter sites, a grinding groove site and 33 Potential Archaeological Deposits (PADS). A total of 258 Aboriginal sites have been identified in the investigation area. There are 18 existing Department of Environment and Climate Change (DECC) sites which have been re-recorded in light of this assessment and assigned their own S2MC site number.

A majority of this record (90%) is made up of exposed stone artefactual material eroding from areas of bare soil exposure with less than 50 artefacts in density. However, 33 of these open sites also contain PADs which are principally concentrated within the Murrumbidgee Creek catchment. There are 10 sites that contain over 100 artefacts within their surface assemblage. Eleven sites were recorded as being of High Scientific Significance with one registered DECC site (37-3-0134) containing painted rock art that is assessed to be of regional significance. Twenty-nine sites were assessed to be of Medium Scientific Significance and 218 were assessed to be of Low Scientific Significance. The Murrumbidgee Creek Valley and adjacent Moolarben Ridge (Carr's Gap Ridge) are considered to be significant cultural landscape features.

The assessment of Aboriginal cultural values was by expression of interest through letters and community meetings. Several people were interviewed about places of cultural significance near the proposed Stage 2 MCP development area. Parts of the Munghorn Nature Reserve located to the south-east of Stage 2 MCP development area are considered to be significant from a contemporary Aboriginal cultural perspective.

No one was identified within the existing four Aboriginal groups as having cultural knowledge about the proposed Stage 2 MCP development area. Whilst local Aboriginal people generally expressed an interest in archaeological sites and their protection, there were no objections to the proposed coal mine project going ahead on cultural assessment grounds.

2.18 Site Definition & Problems of Site Recording

A significant issue in recording hunter-gatherer open space occupation is how to define an occupation location or 'site'. The NSW Department of Environment & Climate Change (DECC) advise developers and Consultants that the term 'site' is used to group objects or define a location where a relic or cultural item occurs. The general criterion used to define sites is set out below. Sites may be:

- Exposures where archaeological evidence is revealed;
- Topographic or land form units where occupation evidence has been recorded. This may be an entire landform unit (ridge, creek, valley) or part of a landform unit (saddle on ridge, creek bank);
- Locations having physical boundaries defined by rocks (stone arrangement), or earthworks (mounds) or cleared land (ceremonial ground);
- Locations having cultural significance to Aboriginal community groups;
- Locations having an arbitrary boundary or the assignation of a boundary for the convenience of recording (in cases where the site would probably be much larger if based on the criteria above). Arbitrary criteria include the use of a fence-line, dirt track or gully as a boundary. In some cases the area may simply be designated as 50m x 50m, or as a smaller sample plot, on the basis of convenience; and
- Locations having a specific artefact density. In some cases a site boundary may be defined by the average number of flakes per square metre. This is a specialised type of arbitrary criterion and justification of the rules used must be made explicit.

The chosen definition of a site or isolated find needs to be specified for the study. It is the Consultant's responsibility to decide on an appropriate definition, suited to the particular project, the research goals and comparability with other regional studies. DECC requires site forms to be completed for isolated finds.

In addition to the above, the *NPW Act 1974* (amended) also defines an Aboriginal object as:

any deposit, object, or material evidence (not being a handicraft for sale) relating to indigenous and non European habitation of the area that comprises New South Wales being habitation both prior to and concurrent with the occupation of that area by persons of European extraction and includes Aboriginal remains; ... (NPW Act 1974, Section 5: Part 1 pp: 8–9)

Other issues concerning site integrity, site formation and factors of disturbance have been argued by a number of authors. The work of Schiffer (1987) helped describe the patterns of transformational processes, both cultural and non-cultural that create the archaeological record. Following on from this Hurst Thomas (1991) argues four distinct cultural processes that affect the final condition of the archaeological record (i.e. especially for open space occupation).

These processes are defined as *deposition, reclamation, disturbance and re-use* (Hurst Thomas 1991:132). These processes are briefly described below:

Deposition – These are actions, usually cultural in origin, that cause the accumulation of the archaeological record. This can be simple discard of cultural material at a site, burying the dead or the construction of a hearth. Size of cultural objects is one major influence on the way cultural objects are incorporated into the cultural deposit. This is called the ‘size-sorting effect’.

Reclamation – This is the process whereby archaeological material is reincorporated back into a systemic context. Examples of this would be people re-using occupation areas or new people settling on an old campsite location that has been abandoned by another family group.

Disturbance – This process mainly refers to human or natural actions, which transform the archaeological record from its origin depositional context. Human actions would refer to prehistoric land-use patterns where materials are swept away or moved from a campsite to clear the ground. Modern human actions would be: Vegetation clearing on hill-slopes increasing sheet erosion and removing small artefacts that are redeposited on lower slopes and flats. Removal of old trees containing scars or carvings on them. Dam building and road building causing an increase in surface erosion and possible destruction of buried deposits. Cattle walking across sites causing artefacts to be scuffed, broken or working edges damaged. Trees falling over causing displacement of sub surface artefacts. Bushfire causing a heat distortion effect with surface artefacts and the collection of charcoal. Natural processes can refer to down slope slippage, gully and sheet erosion, and bioturbation by tree roots and insects.

Re-use – This process usually refers to how people may re-use cultural objects in a different way for a different purpose. An example could be stone tools used for another purpose or hearth stones used as anvils etc.

Given the above site disturbance factors, any comparison of open sites and their content can only be used as an indication of land-use in land unit context. The comparison will be limited in determining the true extent of occupation, unless ground exposure is uniform across several land units and measured at a consistent scale.

2.19 Stone Technology & Its Variability

Hunter gatherer occupation sites or campsites (i.e. rock-shelter or open space) are likely to have a broad range of tool types due to the variety of activities undertaken at a site over a certain period of time. These types of sites are contrasted to the more specialised sites where food gathering or hunting requires a more restricted range of tool kit. Tools that are broken or exhausted are often found at these types of sites as well as resharpening flakes from a tool user carrying out tool maintenance (Kooyman 2000).

Lithic analysis can also lead to information about where a tool may have been manufactured and why it was discarded. The analysis of lithic debitage can also provide information on whether the tool was manufactured close to a quarry site or transported from a distance. Evidence such as the amount of decortification flakes, unmodified or broken flakes or flakes with specific types of platform can all lead to an understanding of the stages of tool manufacture.

Modelling of prehistoric hunter gather behaviours using lithic analysis has led some researchers to speculate on the level of sedentism or mobility. The assumption that mobility of a group limits the type of the toolkit has been put forward by a number of researchers (Walker 1978, Bleed 1986, Bamforth 1986). Conversely, greater sedentism usually means groups will have a greater range of resources to choose from at one site and thus their toolkits will contain more variety (Odell 1994). The more mobile a group is the more likely it is to standardise its core technology (Odell 1994).

Curation of tools is another important consideration in assessing lithic variability. Odell (1996) argues that curation will usually reduce the need for raw material supply. This leads on to the concept of gearing up or preparing tools in advance of use. This further raises the question of the functionality and versatility of tool types that may or may not tell us something about how prehistoric hunters maximised opportunity when using a range of landscape in the past.

2.20 Sample Size Considerations & Inter-Site Comparisons

An article by Hiscock (2001) on the effects of sample size on the interpretation of archaeological patterning of Holocene stone artefact assemblages requires some consideration in comparing sites across landscapes. The central issue for most consulting reports is the recording of rarer types of artefacts (i.e. backed artefacts) in relation to the entire site assemblage. Comparing the variation of assemblages between sites and using this to define site function may be refuted on the grounds that the sample sizes of site assemblages are too small to provide statistically valid comparisons.

Hiscock explains his proposition by using a hypothetical example:

Even in sites where only one specific kind of knapping activity takes place, such as the manufacture of backed artefacts, the various objects employed and created will be probably discarded at different rates. For instance, many flakes will be rapidly discarded, cores are likely to be discarded less frequently, backed artefacts less frequently still, and hammerstones may be rarely thrown away.

These differences in the likelihood of discard relate to a number of factors, including the length of 'use-life' of each kind of object. When only a few of these objects have been discarded it is likely that the assemblages will be dominated by only those classes of object that are discarded frequently such as flakes and cores in this example. As occupation of the site continues and the size of the assemblage grows with further discard of material, it is likely that objects such as backed artefacts and hammerstones may be eventually discarded; ...

(Hiscock 2001:50)

Hiscock further argues that a sample required to contain all possible categories of artefacts in a particular locality is proportional to the relative abundance of the rarest artefact type. Thus while some sites or regions with sample sizes of between 50-100 may be adequate, sites in other regions with 1000-10,000 may be too small to provide a more complete assemblage composition. As Orton (1992) has put it, there is no absolute sample size in which all sites or regions are likely to contain an adequate sample of the total variation in assemblage composition.

3. ENVIRONMENT & LAND-USE HISTORY

The study area falls within the Sydney Basin physiographic land system (Murphy & Laurie 1998). Generally the land is described as having low undulating hills and hillslopes from 400–680m above sea level on sandstone plateaus with extensive rock outcrop. Narrabeen Sandstone is the dominant parent rock. Parts have lower colluvial slopes of sandstone plateaus escarpments with low undulating rises and creek flats. The Munghorn Plateau soil landscape is the dominant soil landscape found within the study area and is describe in Table 5 below.

Table 5 Munghorn Plateau Soil landscapes of the study area
 After Jammell Environmental Planning Services (2005)

Landscape	Landform	Lithology	Typical soils	Limitations
Munghorn Plateau	Low Undulating hills form plateaux from 600–700m. Slopes from 3–10% & local relief varies from 20–60m	<i>Narrabeen Group & Illawarra Coal Measures</i> Sandstone, Wollar sandstone, conglomeratic sandstone, chert, shale coal, torbanite	Shallow siliceous sands, shallow acid soils, yellow earths, yellow podzolic soils	High to very high erosion hazard when ground cover is low. Low soil fertility and low water holding capacity.

Source: Adopted from DLWC (1998) & Jammell (2005)

There is no significant natural watercourse found within the study area, although some areas do contain run-off points in lower parts of the landscape. Prior to European settlement, the vegetation community in the study area would have been defined as woodland. The existing vegetation community has been classified by Aitkens (2006) as cleared remnant woodland. Many of these remnant woodlands and forests are floristically variable, with some being characterised by White Box (*E. albens*), Yellow Box (*E. melliodora*) and Blakely’s Redgum (*E. Blakelyi*).

The community characterised by these species is listed as endangered under the *TSC Act* and *EPBC Act* (Grassy White Box Woodland). Woodlands dominated by Rough-barked Apple (*Angophora floribunda*) are commonly found along the creek lines, often in association with Yellow Box (*E. melliodora*) and Blakely’s Redgum (*E. Blakelyi*). The adjoining sandy terraces of the Permian geological period also host monotypic communities dominated by Rough-barked Apple (*A. floribunda*). More clayey soils support Grey Box (*E. moluccana*) dominated communities.

The study area’s ridge-line vegetation community has only seen minor clearing of mature eucalypt and cyperus pine trees for agricultural land-use and caused the growth of Sifton Bush (*Cassinia arcuata*) across midslopes. Regrowth of mainly Ironbark species such as, Narrow-leaved Ironbark (*E. crebra*) and Broad-leaved Ironbark (*E. fibrosa*) and Black Cyperus Pine (*Callitris endlicheri*) has also occurred in places. Other common mature species found within the study area are Scribbly Gum (*E. rossi*) and Grey Gum (*E. punctata*) and Stringybark (*E. Euginooides*). A number of cleared forestry tracks occur across the study area with a few small farm dams located towards the northern western end of the project area.

4. ABORIGINAL CONSULTATION

As part of the Aboriginal community stakeholder consultation process, the following MCP Stage 1 Aboriginal stakeholder groups were notified about the proposed assessment and invited to participate in the archaeological work:

- Mudgee Local Aboriginal Land Council based in Mudgee;
- Murong Gialinga Aboriginal & Torres Strait Islander Corporation based in Mudgee; and
- Warrabinga Native Title Claimants Aboriginal Corporation based in Kandos.

One Aboriginal Community Stakeholder representative per group was invited to participate in the survey assessment (*see* Appendix 4).

5. SURVEY ASSESSMENT METHODS

I was provided with a basic site plan showing the location of the proposed Northern Borefield study area (*see* Appendix 1: Figure 1 & Figure 2). Some of the proposed pipe-line route was marked with pink flagging tape and survey pegs. I conducted a survey assessment of the proposed water pipe-line route and bore sites with three Aboriginal field officers and an assistant between 24 and 27 November 2009.

The most likely sites to occur within the land proposed for development area are isolated finds, open campsites and scarred trees. Rarer sites may include grinding grooves, carved trees, bora grounds (stone arrangements) and burials.

6. ASSESSMENT COVERAGE & SURVEY RESULTS

The most significant constraint in carrying out the survey assessment was lack of ground surface visibility. Some land units did contain vehicle tracks and small patches of sheet erosion caused by land clearing around existing farm sheds and fence-lines. Access to foot transects were often by existing forestry logging tracks (*see* Appendix 2: Plate 1 - Plate 6). Average visibility across the study area would have been between 0% and 25%. Foot coverage across the study area was 100%. Orange flags were used to mark potential cultural features for detailed recording (i.e. Aboriginal Objects).

Field conditions were good. The survey team consisted of three people walking slowly across the study area spaced 5m apart. Potential artefacts or cultural material were flagged by the foot surveyor and then assessed by an ARAS archaeologist. A total of nine foot transects were investigated June 2009 (*see* Appendix 1: Figure 3).

Areas which contained evidence of ground surface exposure were investigated thoroughly. The original vegetation community can be described as open forest / woodland with ironbarks dominant. The pipe-line easement was investigated using a 20m wide corridor.

Table 6 explains which areas were sampled and what physical evidence were located during the survey assessment.

Table 6 Archaeological assessment sample unit & results – June 2009 (see Appendix 1: Figure 2)

Transect	Location of transect		Environment	Land-use	Survey Results
	Eastings	Northings			
NB T1	762194	6429185	Ridge slope (70%) & Spur (30%) with gentle to moderate slope. Drainage- ephemeral channel.	Vehicle access track / fire trail (25%). Natural bushland (75%).	5x Isolated finds (NB3, NB5, NB6, NB7, NB8) & 3x artefact scatters (NB1, NB2, NB4). NB4 also contains a PAD. All sites likely to be impacted.
	761819	6429071	Lees Pinch soil landscape. Exposure type – bare soil patch on the vehicle track. Transect visibility 0-25% off the vehicle track (75% of transect) & 75-100% on the track (25% of transect).		
	761030	6429256			
NB T2	762181	6429180	Ridge crest (25%) & ridge slope (75%) with simple slope. No drainage. Lees Pinch soil landscape. Exposure type – sandstone bench/outcrop & bare soil patches. Transect visibility 0-25% off the vehicle track (75% of transect) & 75-100% on the track (25% of transect).	Vehicle access track / fire trail (25%). Natural bushland (75%).	No cultural material found.
	762957	6429474			
NB T3	763121	6429962	Ridge crest (60%) & ridge slope (40%) with simple slope. Drainage – none. Lees Pinch soil landscape. Exposure type – bare soil patch on the vehicle track. Transect visibility 0-25% off the vehicle track (75% of transect) and 75-100% on the track (25% of transect).	Vehicle access track / fire trail (25%). Natural bushland (75%).	No cultural material found.
	762957	6429474			
NB T4	762961	6429459	Ridge crest (100%) with simple slope & flat terrain. Drainage – none. Lees Pinch soil landscape. Exposure type – bare soil patches (<20%). Transect visibility – 0-25% owing to leaf litter/vegetation.	Natural bushland – regrowth 100%.	No cultural material found.
	763088	6429504			
	763695	6428835			
NB T5	763714	6428721	Ridge crest (20%) & flat (80%) with flat terrain. Drainage – none. Lees Pinch soil landscape. Exposure type – bare soil patch (<5%). Transect visibility – 0-25% over 95% of the transect & 50-75% over <5% of the transect owing to dense vegetation.	Natural bushland – regrowth 100%.	1x isolated find (NB9) & 1x artefact scatter (NB10) located. Both sites likely to be impacted.
	763726	6427600			
NB T6	763101	6429976	Ridge crest (80%) & Ridge slope (20%) with flat & simple slope. Drainage – none. Lees Pinch soil landscape. Exposure type – sandstone bench/outcrop (5%) & bare soil patch (25%). Transect visibility 0-25% off the vehicle track (75% of transect) & 75-100% on the track (25% of transect).	Vehicle access track / fire trail (25%). Natural bushland (75%).	1x isolated find relocated & re-classified as an artefact scatter & PAD (SIMC 255: 36-3-1071). Site is likely to be impacted.
	763115	6430868			
NB T7	763110	6230871	Ridge crest (25%) & ridge slope (75%) with simple & moderate slope. Drainage – none. Lees Pinch soil landscape. Exposure type – sandstone bench/ outcrop (<5%) & bare soil patch (20%). Transect visibility 0-25% off the vehicle track (80% of transect) & 75-100% on the track (20% of transect).	Vehicle access track / fire trail (20%). Natural bushland (80%).	No cultural material found.
	763323	6431632			
NB T8	763415	6431626	Ridge slope with flat & gentle slope. Drainage – none. Lees Pinch soil landscape. Exposure type – bare soil patch (15%). Transect visibility 0-25% off the vehicle track (85% of transect) & 75-100% on the track (15% of transect).	Vehicle access track / fire trail (15%). Natural bushland (85%).	2x isolated finds located (NB11 & NB12) More cultural material likely to exist in the surrounding area. Both sites are likely to be impacted. Site material is likely to be part of SIMC 272: 36-3-1088
	763211	6432107			
	763139	6432217			
NB T9	763323	6431632	100% flat with no drainage. Lees Pinch soil landscape. Exposure type – bare soil patch (15%). Transect visibility 0-25% off the vehicle track (75% of transect) & 75-100% on the track (25% of transect).	Vehicle access track / fire trail (25%). Natural bushland (75%).	No cultural material found.

7. RESULTS & DISCUSSION

A total of 12 Aboriginal Sites (making up a total of 15 Aboriginal Objects) and one existing site S1MC 255 (with 4 Aboriginal Objects) were located as a result of Aboriginal cultural heritage assessment of the proposed Northern Borefield project area. This cultural record is made up of seven Isolated Finds and three Artefact Scatters (two containing Potential Archaeological Deposits). The archaeological evidence represents stone artefact material being exposed by natural surface erosion processes and road work activities.

The Aboriginal Objects located on the surface are principally concentrated on a broad spur/ridge crest features (*see* Appendix 1: Figure 3). The 12 new sites (Sites S1MC 313–S1MC 324) and existing site S1MC 255: 36–3-1088 are described in Table 7 below.

Table 7 MCP Stage 1 Proposed Northern Borefield Aboriginal Site Descriptions

Site Name	Site Features	Comments
S1MC 313 (T1) NB 1	Artefact Scatter. Ridge slope. Bare soil patch: 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a mid-slope feature. The site is in poor condition.	Two quartz artefacts. 1. Quartz crystalline. Unmodified. Flaked Piece. L:36mm W:25mm T:16mm. No cortex. 2. Quartz crystalline: Broken Flake medial fragment L:15mm W:11mmT:4mm. No cortex E:0762188 N:6429182
S1MC 314 (T1) NB 2	Artefact Scatter & PAD. Drainage Channel. Bare soil patch: 13m x 101m. Potential Archaeological Deposits present on Eastern bank of drainage –line (30m x 3m). There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track between a terrace and mid-slope feature. The site is in poor/fair condition.	Two quartz artefacts. 1. Quartz crystalline. Unmodified. Distal Broken Flake. L:20mm W:15mm T:5mm. No cortex. 2. Quartz crystalline: Broken Flake medial fragment L:21mm W:19mmT:9mm. No cortex E:0761819 N:6429071
S1MC 315 (T1) NB 3	Isolated find. Ridge Crest. Bare soil patch: 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flake. Quartz. Unmodified. Broken Flake. L:17mm W:11mm T:3mm. Proximal fragment. No cortex. E:0761959 N:6429047
S1MC 316 (T1) NB 4	Artefact Scatter. Ridge slope. Bare soil patch: 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a mid-slope feature. The site is in poor condition.	Two quartz artefacts. 1. Quartz crystalline. Complete Flake possible usewear on distal end. L:29mm W:19mm T:13mm. No cortex. 2. Quartz crystalline: Complete Flake L:13mm W:22mmT:8mm. Platform cortex. E:0762039 N:6429072
S1MC 317 (T1) NB 5	Isolated find. Ridge Slope. Bare soil patch: Firetrail. 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flaked piece. Quartz. Unmodified. L:29mm W:19mm T:13mm. No cortex. E:0762078 N: 6429120
S1MC 318 (T1) NB 6	Isolated find. Ridge Crest . Bare soil patch: Firetrail. 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track. The site is in poor condition.	A single isolated flake. Quartz crystalline. Complete Flake. L:31mm W:13mm T:9mm. No cortex. Feather termination. E:0762107 N: 6429141

Site Name	Site Features	Comments
S1MC 319 (T1) NB 7	Isolated find. Ridge Slope. Bare soil patch: 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated broken flake. Quartz. Unmodified. Broken Flake. L:15mm W:18mm T:7mm. Distal fragment. No cortex. E:0761634 N:6429082
S1MC 320 (T1) NB 8	Isolated find. Ridge Slope. Bare soil patch: Firetrail. 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flake. Quartz crystalline. Complete Flake. L:31mm W:13mm T:9mm. No cortex. Feather termination. E:07610447 N: 6429251
S1MC 321 (T5) NB 9	Isolated find. Ridge Crest. Bare soil patch: 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track. The site is in poor condition.	A single isolated broken flake. Grey silcrete. Unmodified. Broken Flake. L:15mm W:18mm T:7mm. Distal fragment. 5 % cortex. E:0763728 N:6427662
S1MC 322 (T5) NB 10	Artefact Scatter & PAD. Soakage. Bare soil patches: 2m ² . 200m x 100m Potential Archaeological Deposits present on Southern side of soakage area. There is no hearth or visible bone material associated with the site's contents. The site is located on a sandy flat. The site is in poor/fair condition.	Three quartz artefacts. 1. Quartz crystalline. Unmodified. Distal Broken Flake. L: 12mm W:8mm T:5mm. No cortex. 2. Quartz crystalline: Flaked Piece L:25mm W:13mmT:9mm. No cortex 3. Quartz crystalline. Unmodified. Distal Broken Flake. L: 8mm W:5mm T:3mm. No cortex. E:0763693 N:6428813
S1MC 323 (T8) NB 11	Isolated find. Ridge Slope. Bare soil patch: Firetrail. 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flaked piece. Quartz crystalline. Flaked Piece. L:45mm W:25mm T:15mm. No cortex. E:0763211 N: 6432118
S1MC 324 (T8) NB 12	Isolated find. Ridge Slope. Bare soil patch: Firetrail. 1m ² . No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated broken flake. Quartz crystalline. Proximal Flake. L:32mm W:15mm T:8mm. No cortex. E:0763245 N: 6432104
*S1MC 255 (T6)	Artefact Scatter & PAD. Ridge Crest. Bare soil patches: 2.65m x 8.7m Potential Archaeological Deposit present on vehicle track but eroded. There is no hearth or visible bone material associated with the site's contents. The site is located on a sandy flat. The site is in poor/fair condition. Note: *This site was originally recorded as an Isolated Find.	Four silcrete artefacts. 1. Grey Silcrete. Unmodified. Distal Broken Flake. L:17mm W:9mm T:3mm. No cortex Feather termination. 2. Grey Silcrete. Unmodified. Distal Broken Flake. L: 23mm W:17mm T:7mm. No cortex, Feather termination. 3. Grey Silcrete. Unmodified. Distal Broken Flake. L: 16mm W:12mm T:3mm. No cortex Feather termination 4. Grey Silcrete. Unmodified. Complete Flake Broad platform. L: 27mm W:24mm T:6mm. No cortex Feather termination E:0762962 N:6430307

7.1 Site Age & Subsurface Potential

Without evidence of buried hearths (i.e. ancient fireplaces), rock-shelter deposits containing dateable carbon material are the only evidence that could be dated directly. None of the open sites recorded in the study area can be directly dated. This obviously means that true age cannot be known. Another technique of indirect dating is seriation. Hiscock (1986) has set out the main stone tool reduction sequence for the Hunter Region and is further refining this through research looking (Eastern Sequence Project) to identify the nature and directionality of technological changes in stone artefact assemblages in Aboriginal sites within the Sydney Basin. The study is also looking to compare temporal trends between and within sub-regions of the Hunter Region and the Sydney Basin.

Surface artefactual assemblage data recorded in proposed bore locations and water pipe-line route study area and overall for MCP Stage 1 & 2 Aboriginal sites show stone tool manufacture being associated with a backed technology sequence principally designed for geometric and bondi point production. It is likely that the surface assemblages recorded in the water pipe-line study area can be generally described as being part of the Eastern Regional Sequence of backed technology, first proposed by Fred McCarthy in the 1940s (Hiscock & Attenbrow 2002).

In terms of direct dating, the surface evidence is likely to be only a few hundred or thousand years old. One can only speculate, given the extent of erosion and likely disturbance along Goulburn River and surrounding landforms that most sites are probably not more than 500-2000 years old.

Although a majority of the soils are shallow over much of the study area and likely to have been heavily bioturbated, there is some alluvial soil development within the immediate Bora and Wilpinjong Creek catchments. This, coupled with the fact that human occupation is likely to have been concentrated within a certain distance from creek margins, show there may be some potential for buried open deposits. Within the immediate study however skeletal soils are dominant and deposition is limited to where slope gradients are above 10% and washouts common.

7.2 Limitations of the Data

Based on previous surveys carried out for MCP Stage 1 within the Underground No. 4 area, the most significant limitation of the survey data is the lack of ground visibility on the tops of spur-lines and ridge crests. Due to the above, more archaeological evidence was expected in areas closer to the Goulburn's River's catchment. Although road works have no doubt removed potential sub-surface deposits in some alluvial land units, more buried evidence would be expected to be found where occupation material has accumulated over a long period of time. The survey transects varied in their land unit potential and given ground surface conditions.

Table 6 shows that the poorest survey transects in terms of ground visibility and coverage were Transects 4 and 5. Transect 5 had the lowest ground surface visibility assessed in terms of site detection and the lowest site numbers. Whilst vehicle track exposure was usually 100% across the foot transect some background gravels and leaf litter reduced this visibility to less than 25% in places (see Appendix 2: Plate 5 - Plate 9).

7.3 Landscape Setting

The 12 new sites recorded are as expected in their current topographical setting. Archaeological material is especially concentrated on elevated ridge crest land units north of Bora Creek. The highest concentration of occupation evidence is located on ridge crests which are likely to have been used as transport corridors between certain valleys and drainage features (i.e. a north-south corridor between the Goulburn River and Bora Creek).

The evidence provides additional information which shows that Aboriginal occupation is broadly spread across ridge-lines within the Moolarben mine lease area but concentrated at key points in the landscape which have a number of resource and campsite benefits (i.e. fresh water, access to grasslands and hunting grounds, access to rock shelter which may be used for making art).

As cultural features, these new sites they represent low level Aboriginal occupation of the ridge-lines north of Bora Creek valley. Artefacts found in isolation are likely to have represented discard events associated with short-term fringing occupation. This may have been associated with a small ridge-crest campsite or site-specific activity events (i.e. stone tool manufacturing and discard events). Due to the level of soil disturbance across the study area, the possibility of dating individual artefacts has been lost.

Within a broader context, the sites in their landscape setting are not identified as being rare or significant when compared with other geomorphic or archaeological landscape features in the Moolarben and Ulan region.

8. SIGNIFICANCE ASSESSMENT

The consultant has based his Significance Assessment of the MCP Stage 1 Rail Loop cultural resource on the following criteria:

- NSW National Parks and Wildlife Service Guidelines
- Australian Heritage Commission National Estate criteria
- Archaeological significance assessment
- Aboriginal social significance
- Educational value

It is important to state that not all cultural heritage sites or places are equally significant or important and consequently worthy of long-term preservation. A detailed discussion of significance criteria and how it has changed over time has recently been undertaken by Byrne et al (2001). The most important criteria for the assessment of the MCP Stage 1 water pipe-line route study area Aboriginal cultural resources are:

- Aboriginal social significance
- Scientific archaeological significance
- Educational significance

Excluding Aboriginal social significance, these specific criteria are defined below.

8.1 Aboriginal Social Significance

Moolarben Coal Operation Pty Ltd has undertaken to consult directly with all Aboriginal community stakeholder groups affected by this development proposal. As such, the relevant groups will be providing their own statement of Aboriginal significance to accompany this report (see Appendix 4).

'Scientific significance' is defined as: *The scientific or research value of a place. This 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 substantive information.* (Byrne et al 146:2002).

In the Sydney Basin context, I have used following archaeological assessment criteria concerning Aboriginal history and past land-use, which are represented by the following headings:

- Information & Research Potential
- Regional Research Priorities
- Representativeness
- Rarity
- Educational Potential
- Cultural Landscape Value

8.2 Information & Research Potential

This criterion is relevant to assessing an area's research potential in understanding Australia's cultural history or human occupation of Australia. An area's cultural resource may have the potential to provide information that will contribute to understanding past human behaviour. Three factors are considered important in assessing a site, suite of sites or cultural object as having research potential:

- A place or site's intactness or integrity (this may include the state of preservation of a site or cultural remains). An intact site or place may reveal a greater amount of cultural evidence for past human behaviour. Sites in poor condition may be limited in what they can contribute to further research.
- Whether a site or Aboriginal Object may demonstrate connectedness to other sites within a landscape or within a regional context.
- The chronological potential of a site or suite of sites to provide dates of human history for that particular evidence of occupation. This includes whether the site or place has potential for dateable deposits or strata.

8.3 Regional Research Priorities

This research criterion is important for assessing the significance of when information will contribute on a regional level and will assist other researchers in the understanding of past human behaviour. It is usually understood in the context of regional research priorities. Some priorities may be focused on chronology, others on technological variability, while others may be looking at site function.

8.4 Representativeness

This archaeological assessment criterion is based on a conservation objective. It is particularly relevant when assessing what a site or place may contribute if it were to be preserved for future generations. The concept has to be assessed in a regional and local context. If very little of this type of site or suite of sites has been conserved, then it becomes a conservation priority. The aim for cultural resource managers is to conserve a representative sample of sites or places for future generations and research.

The main problem of this criterion is that much of the comparative data for site conservation, especially on a regional scale, has not been systematically gathered by many conservation agencies. Defining 'variability' may be an aim for cultural resource managers, but if nothing is known about what has been destroyed or lost due to natural or human development processes then comparisons concerning representativeness are meaningless.

Without the above information, archaeologists are encouraged to assess representativeness based on their field experience and on their reading of the representative literature.

8.5 Rarity

This concept of significance criteria concerns the issue of how distinct a site or cultural object may be compared to other similar sites or objects. 'Rare' implies that sites or objects of this nature have not been readily reported or assessed in a local or regional context before. The criterion of rarity may be assessed at a range of levels including local, regional, national, state or international.

8.6 Educational Potential

Sites or places that help educate the broader public about Wiradjuri Aboriginal history are a valuable resource. It is usually the level of information retrieved from sites or objects that can really assist in enlightening the public about what happened at a particular place in the past. This educational potential comes from the work of the archaeologist in translating their findings or research results into everyday language that people can understand.

The educational outcomes may be presented in newspaper articles, books, video presentations, lectures, radio broadcasts and information brochures. The information may be displayed as part of a local or regional museum. A mining company may use the research results to inform their employees about Aboriginal cultural history and occupation of a local area. The Aboriginal community may take the information and use it in local schools to teach and educate children about Wiradjuri Aboriginal history and culture.

8.7 Cultural Landscape Value

This value combines the concept of aesthetic and social significance in the broader context of how living Wiradjuri Aboriginal people perceive the local landscape and their sites or cultural objects within it. This Aboriginal concept may be connected to the understanding of religious and scenic values where places and natural features may contain inherent Wiradjuri cultural landscape values.

Sites or Aboriginal Objects found within a landscape which is 'untouched' or has natural scenic beauty may be important when assessing cumulative impact or broader landscape disturbance. Aboriginal people will place a value on an entire landscape (with all its natural features) and how that may be affected by development impact.

9. SIGNIFICANCE RESULTS

9.1 Information & Research Potential

There are no sites or Aboriginal objects considered to have any research potential based on their local contents and condition.

9.2 Regional Research Values & Representativeness

There are no sites or Aboriginal objects considered to have any regional research value.

9.3 Rarity

There are no sites considered rare based on their content, landscape aspect and research potential.

9.4 Educational Potential

There are no sites or Aboriginal Objects considered to have any educational potential.

9.5 Cultural Landscape Values

There are no sites recorded which contain Aboriginal cultural landscape values.

9.6 Scientific Significance Rating

Based on the above significance criteria, Table 8 below summarises the main significance rating for each site. It shows level of scientific significance assessed for Aboriginal sites / objects located within the project area.

Table 8 Level of scientific significance assessed for Aboriginal sites / objects located within MCP Stage 1 Northern Bore Field area

Low	Medium	High
51MC: 313,315-321,323-324	51MC: 314,255, 322	None

10. DEVELOPMENT IMPACTS & CONSERVATION OUTCOMES

A total of 12 new sites and one existing site will be impacted by the development proposal. Ten sites (S1MC 313,315-321,323-324) are assessed to be of low scientific significance with three sites (S1MC 314, 322 & S1MC 255) assessed to be of medium scientific significance. Without any design changes, 12 Aboriginal sites will be impacted by the current water pipe-line and bore development proposal (*see* Appendix 1: Figure 2).

However, following discussions with Moolarben Coal Operations Pty Ltd to determine likely impacts from the development proposal on existing Aboriginal heritage, site S1MC 322 can be avoided by the proposed water pipe-line route. This can be done using an existing fire trail for a length of at least 300m. As a result of the this route modification, an additional area to the west of the proposed route containing site S1MC 271 will also be avoided. None of the other 11 sites identified in the assessment can be conserved as a result of the development.

11. MANAGEMENT RECOMMENDATIONS

The following recommendations are made based on the existing and proposed legal requirements of the *NSW National Parks and Wildlife Act 1974* and Part 3A of the *Environment Planning & Assessment Act 1979* and the type of archaeological evidence found within the study area:

- The study area is considered to have low-medium potential for Aboriginal heritage.
- The above conclusion is reached based on previous archaeological assessment, Aboriginal consultation advice, background archaeological / historical research, field assessment and land-use history.
- All newly recorded Aboriginal sites and objects are registered under Section 85A of *the National Parks & Wildlife Act 1974* (amended).
- Sites S1MC 271 & S1MC 322 can be avoided by realigning the proposed water pipe-line using an existing fire trail as an alternative route.
- Sites S1MC 313,315-321,323-324 be subject to surface collection in keeping with the methodology being currently applied under MCP Stage 1 Aboriginal Heritage Plan (*see* Section 2.5.3 of the AHP) approved by the NSW Department of Planning on 29 August 2008.
- Sites S1MC 314 and S1MC 255 cannot be avoided by the development proposal, and therefore they will be subject to minor subsurface investigation to determine if they are likely to contain insitu sub-surface deposits. This proposed testing would be done according to the methodology being currently applied under MCP Stage 1 Aboriginal Heritage Plan (*see* Section 2.5.3 of the AHP) approved by the NSW Department of Planning on 29 August 2008.
- The water pipe-line route within the Moolarben mine lease needs to be fenced off and kept within a strict narrow construction easement to avoid any disturbance to existing Aboriginal Sites and Objects.
- The cultural heritage salvage work is to be undertaken by a qualified archaeologist and members of the three Aboriginal Stakeholder community groups: Mudgee Local Aboriginal Land Council based in Mudgee; Murong Gialinga Aboriginal & Torres Strait Islander Corporation based in Mudgee and Warrabinga Native Title Claimants Aboriginal Corporation based in Kandos.
- If additional Aboriginal Sites or Objects are identified as result of the cultural heritage salvage and testing and cannot be permanently avoided by the development proposal, further archaeological assessment may be warranted.

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Appendix 1 FIGURES

Figure 1 General Location Map showing existing Aboriginal sites & objects & Northern Borefield study area

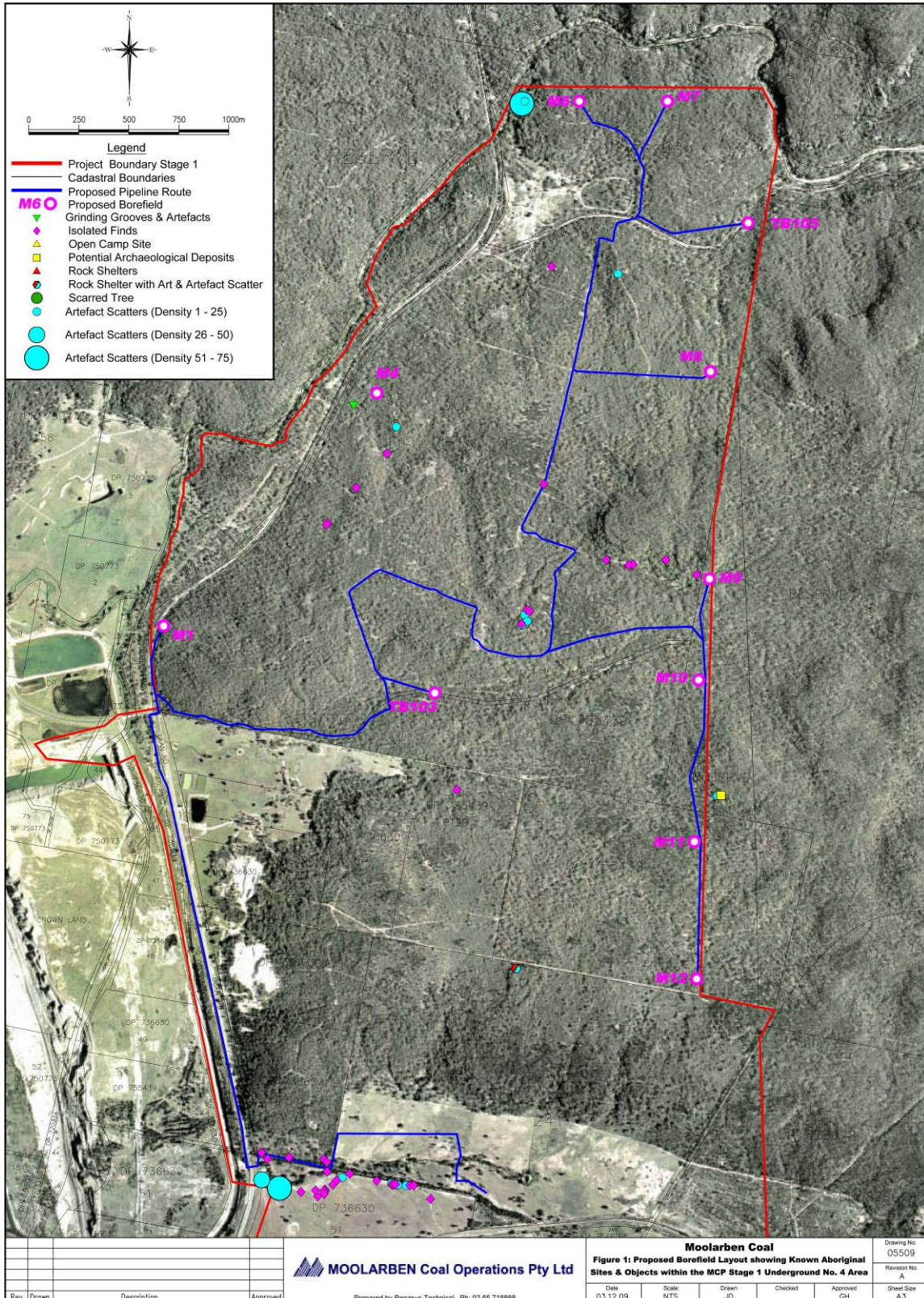


Figure 2 Conceptual drawings showing proposed water pipe-line and water bore sites and likely impact zones

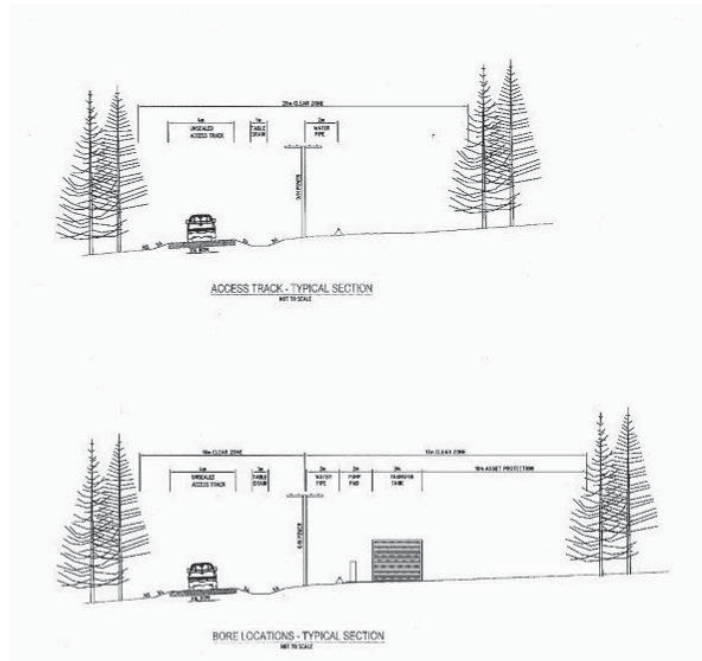


Figure 3 Survey Transects & newly recorded Aboriginal sites & objects located within the study area

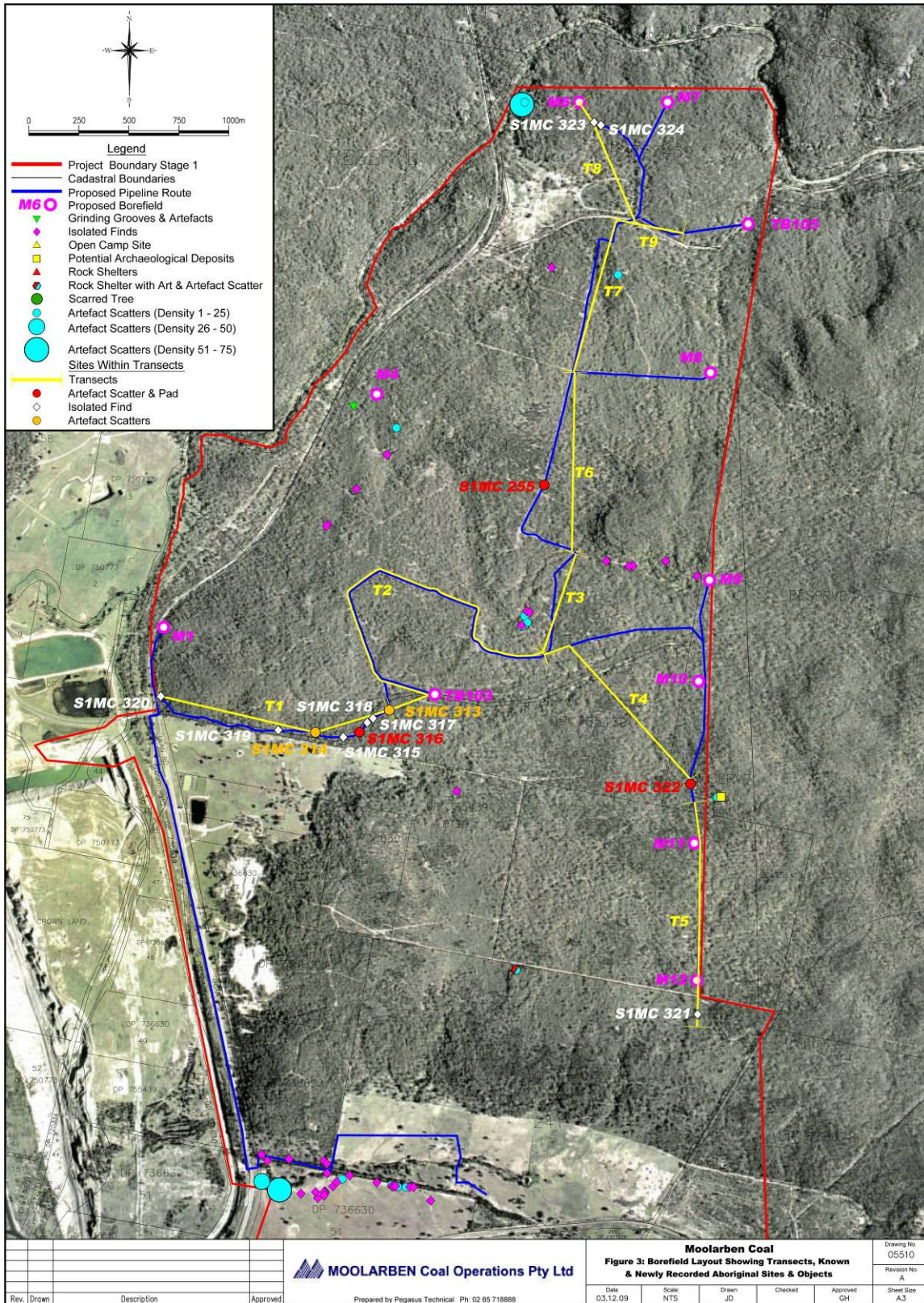


Figure 4 S1MC 314 Artefact Scatter & PAD

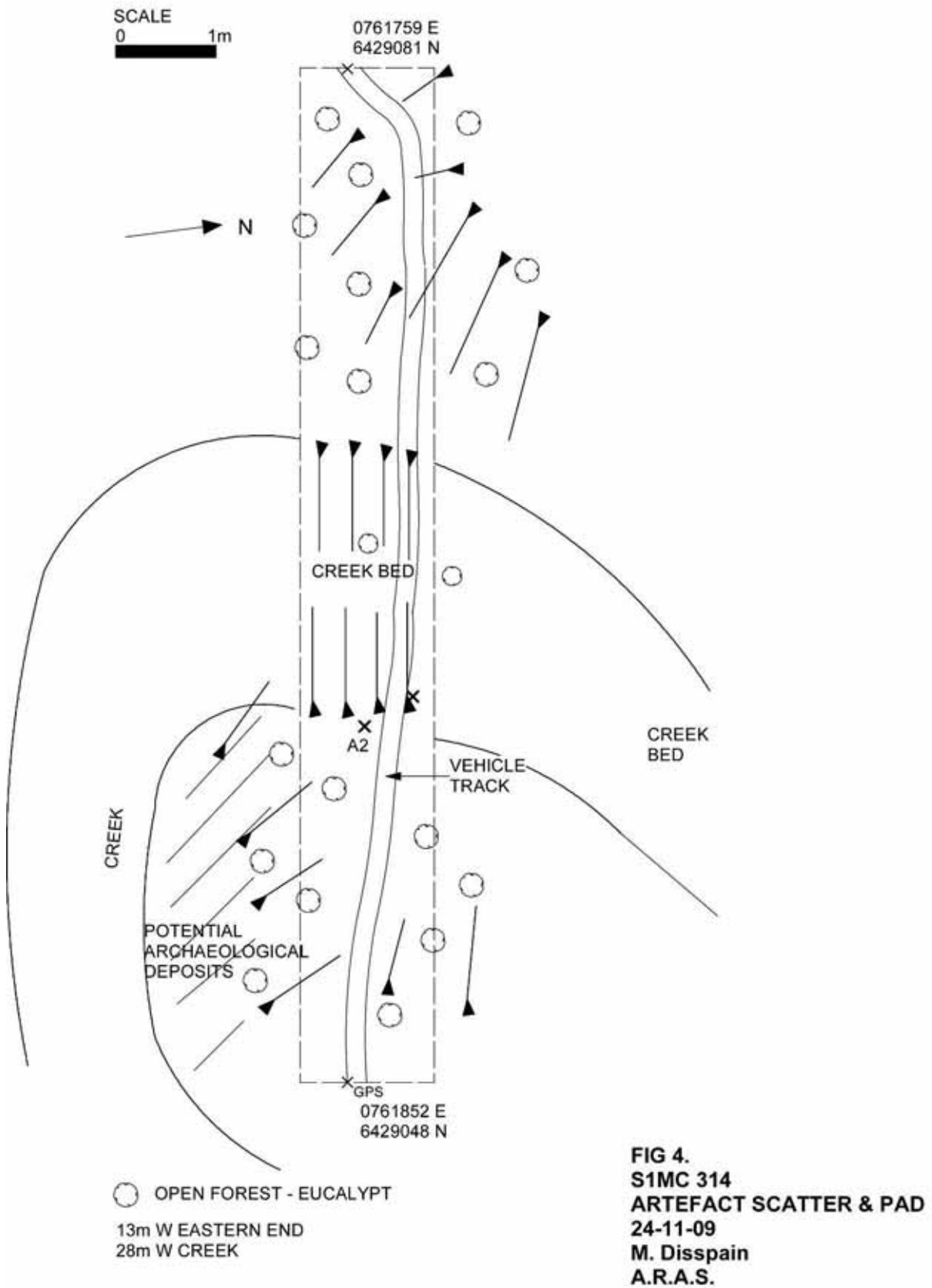


Figure 5 S1MC 255: 36-3-1071 Artefact Scatter

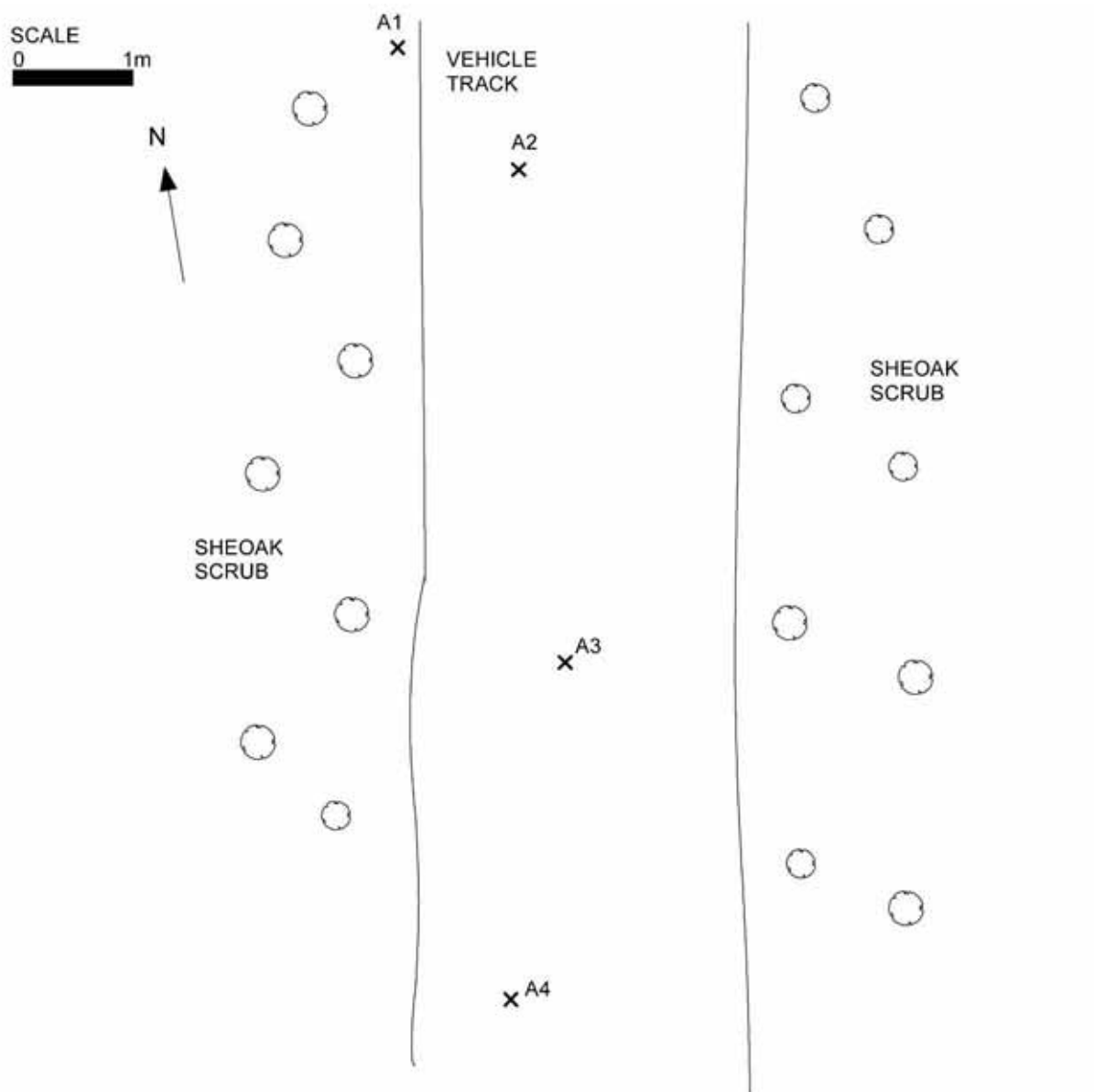
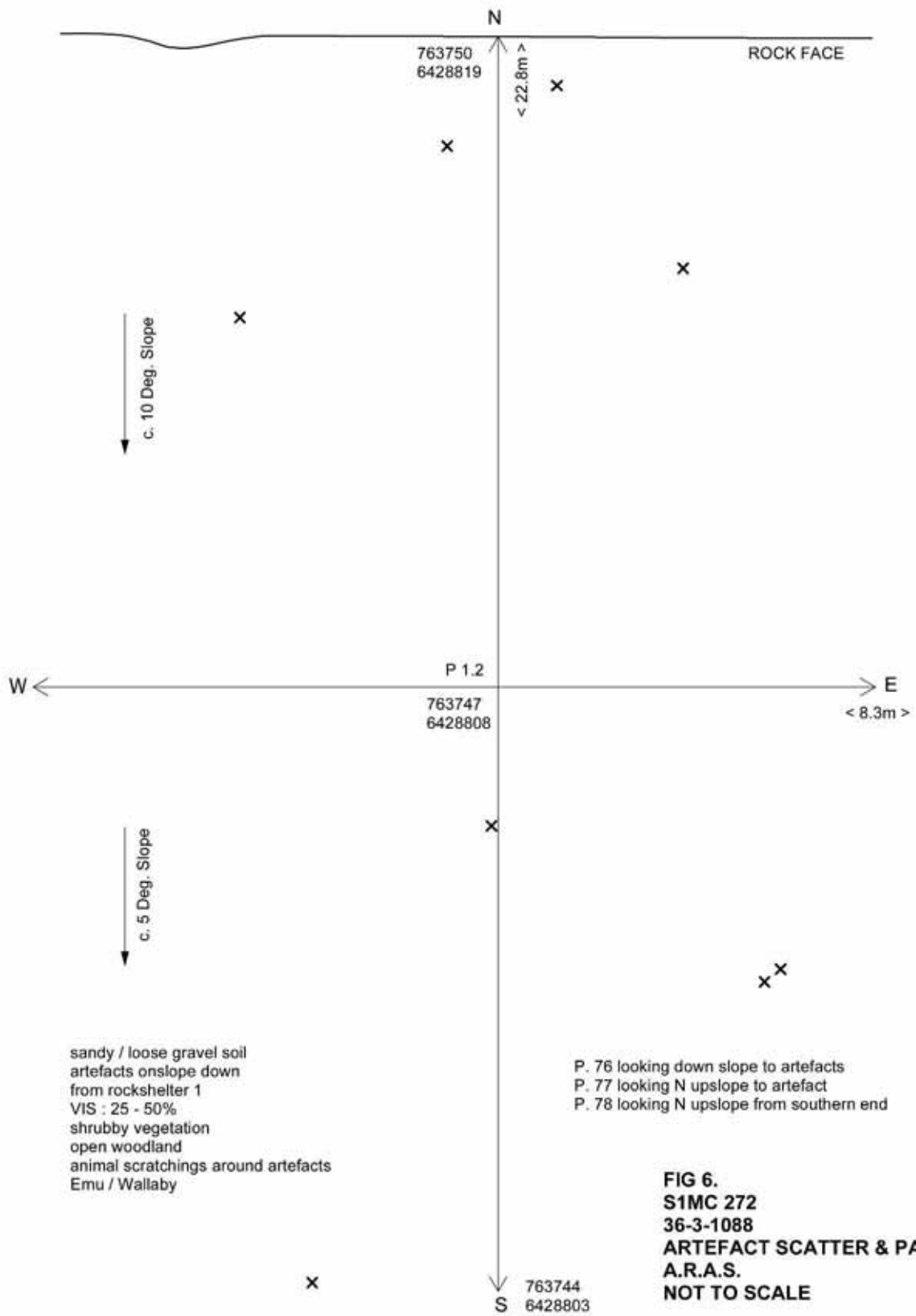


FIG 5.
S1MC 255: 36-3-1071
ARTEFACT SCATTER
27-11-09
M. Disspain
A.R.A.S.

Figure 6 S1MC 272: 36-3-1088 Artefact Scatter & PAD



Appendix 2 PLATES

Plate 1 Looking west along Survey Transect 1 & Artefact Scatter - S1MC 313



Plate 2 Looking east along Survey Transect 1 & Isolated Find - S1MC316



Plate 3 Looking east along Survey Transect 1 & S1MC 314 Artefact Scatter & PAD



Plate 4 Looking North along Survey Transect 3



Plate 5 Survey Transect 4 showing typical ground surface visibility



Plate 6 Survey Transect 5 along existing fire-trail



Plate 7 Site S1MC 321 Isolated Find. Orange flag = artefact location



Plate 8 Site S1MC 321 Isolated Find - Grey Silcrete Flake



Plate 9 Existing Site S1MC 255 looking north along fire-trail. Orange flags = artefacts



Plate 10 Site S1MC 255 artefacts



Appendix 3 DECC AHIMS REGISTER SEARCH RESULTS

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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 5411, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions	Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location		
✓	36-3-0454 WCP 177	GDA	55	770132	6417479	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0455 WCP 178	GDA	55	769042	6418083	None	Artifact	Potential Archaeological Deposit (PAC)	Permit(s)	
		Status	Valid							
✓	36-3-0456 WCP 179	GDA	55	767683	6421370	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0457 WCP 180	GDA	55	768077	6417927	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0458 WCP 181	GDA	55	767820	6416860	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0459 WCP 182	GDA	55	767560	6418332	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0460 WCP 183	GDA	55	768758	6419269	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0461 WCP 184	GDA	55	768914	6419951	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0462 WCP 185	GDA	55	771497	6417049	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0463 WCP 186	GDA	55	773708	6417456	None	Artifact		Permit(s)	
		Status	Valid							
✓	36-3-0464 WCP 187	GDA	55	771101	6416600	None	Artifact		Permit(s)	
		Status	Valid							

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3rd Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features
 List of Sites (Partial)

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General Location				
16-3-0553	WCP117	GDA	55	767046	6417866	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
16-3-0554	WCP118	GDA	55	767012	6417868	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid					Artifact			
16-3-0555	WCP119	GDA	55	767012	6417958	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid					Artifact			
16-3-0556	WCP120	GDA	55	767018	6417824	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid					Artifact			
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		Status	Valid					Artifact			
16-3-0558	WCP122	GDA	55	767483	6418950	None	<input type="checkbox"/>	Modified Tree (Carved or Scanned)		Permit(s)	
		Status	Valid								
16-3-0559	WCP123	GDA	55	767528	6418870	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
16-3-0560	WCP124	GDA	55	767322	6418870	None	<input type="checkbox"/>	Modified Tree (Carved or Scanned)		Permit(s)	
		Status	Valid								
16-3-0561	WCP125	GDA	55	767551	6418662	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
16-3-0562	WCP126	GDA	55	767359	6418476	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
16-3-0563	WCP127	GDA	55	772442	6418074	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								

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Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

List of Sites (Partial)

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
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✓ 36-3-0531	WCP95	GDA	55	773968	6417817	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0532	WCP98	AGD	55	773970	6418008	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0533	WCP97	GDA	55	774018	6418005	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0534	WCP98	GDA	55	773966	6418077	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0535	WCP99	GDA	55	773802	6418148	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0536	WCP100	GDA	55	773853	6418099	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0537	WCP101	GDA	55	773848	6418091	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0538	WCP102	GDA	55	769724	6420426	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0539	WCP103	GDA	55	768862	6420231	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0540	WCP104	GDA	55	768609	6420249	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0541	WCP105	GDA	55	768901	6418830	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				

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Site ID	Site Name	Return	Zone	Easting	Northing	Access Restrictions		Site Features		Site Types (Inscribed prior to June 2001)	Further Info. Contact	Report ID
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✓ 36-3-0641	WCP67	GDA	55	772720	6419067	None		<input type="checkbox"/>	Aniact		Permit(s)	
✓ 36-3-0642	WCP68	Status	Valid	55	773006	6418706	None	<input type="checkbox"/>	Modified Tree (Carved or Scamed)		Permit(s)	
✓ 36-3-0643	WCP69	GDA	55	772359	6418897	None		<input type="checkbox"/>	Modified Tree (Carved or Scamed)		Permit(s)	
✓ 36-3-0644	WCP70	Status	Valid	55	771843	6417719	None	<input type="checkbox"/>	Aniact		Permit(s)	
✓ 36-3-0645	WCP71	GDA	55	771715	6417414	None		<input type="checkbox"/>	Aniact		Permit(s)	
✓ 36-3-0646	WCP72	Status	Valid	55	771826	6417830	None	<input type="checkbox"/>	Art (Pigment or Engraved) Aniact		Permit(s)	
✓ 36-3-0647	WCP73	GDA	55	771578	6417385	None		<input type="checkbox"/>	Potential Archaeological Deposit (PAL) Aniact		Permit(s)	
✓ 36-3-0648	WCP74	Status	Valid	55	771040	6417320	None	<input type="checkbox"/>	Aniact		Permit(s)	
✓ 36-3-0649	WCP75	GDA	55	770872	6417182	None		<input type="checkbox"/>	Modified Tree (Carved or Scamed)		Permit(s)	
✓ 36-3-0650	WCP76	Status	Valid	55	770887	6416900	None	<input type="checkbox"/>	Aniact		Permit(s)	
✗ 36-3-0651	WCP77	GDA	55	770012	6417330	None		<input type="checkbox"/>	Modified Tree (Carved or Scamed)		Permit(s)	

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 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541K, Feature Search Type = AHMS Features

Site ID	Site Name	Datum	Zone	Eastings	Northings	Access Restrictions	Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
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36-3-0608	WCP34	GDA	55	768414	6418593	None	Artifact		Permit(s)	
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36-3-0609	WCP35	GDA	55	768253	6418543	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0610	WCP36	GDA	55	768405	6418489	None	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid				Artifact			
36-3-0611	WCP37	GDA	55	768465	6418489	None	Art (Pigment or Engraved)		Permit(s)	
		Status	Valid				Potential Archaeological Deposit (PAC)			
36-3-0612	WCP38	GDA	55	768665	6418489	None	Artifact		Permit(s)	
		Status	Valid				Potential Archaeological Deposit (PAC)			
36-3-0613	WCP39	GDA	55	768532	6418680	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0614	WCP40	GDA	55	768145	6417921	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0615	WCP41	GDA	55	768093	6417772	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0616	WCP42	GDA	55	768013	6418339	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0617	WCP43	GDA	55	767922	6417816	None	Artifact		Permit(s)	
		Status	Valid							
36-3-0618	WCP44	GDA	55	767641	6416465	None	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid							

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 Grid Reference Type = AMG Map Sheet = HARRIS Feature Search Type = AHIMS Features

Site ID	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (Present prior to June 2001)	Further Info. Contact	Report ID
						General	Localities				
35-3-0162	Cockleburris (Site 4)	AMG	55	749250	6441050	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		1323
		Status	Valid								
35-3-0164	Ulan 103	AMG	55	757560	6433680	None	<input type="checkbox"/>	Artifact Grinding Groove	Art Grinding Groove Shelter with Deposit		2423
		Status	Valid								
35-3-0165	Ulan 104	AMG	55	757600	6433580	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0167	Ulan 106	AMG	55	759440	6434600	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0168	Ulan 107	AMG	55	707250	6434770	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0169	Ulan 108	AMG	55	757000	6435000	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0170	Ulan 108	AMG	55	733770	6435400	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0171	Ulan 110	AMG	55	756700	6435400	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0172	Ulan 111	AMG	55	752810	6435410	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0173	Ulan 112	AMG	55	755770	6434000	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								
35-3-0174	Ulan 118	AMG	55	755730	6434000	None	<input type="checkbox"/>	Artifact	Shelter with Deposit		2423
		Status	Valid								

Number of Sites : 54

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List of Sites (Partial)
 Grid Reference Type = AMG Map Sheet = M48PMS Feature Search Type = AHIMS Features

Site ID	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions	Gender	General	Location	Site Features	Site Types	Further Info. Contact	Report ID
35-3-0176	Ulan 116	AMG	55	765730	6434050	None				Artifact	Shelter with Deposit		2423
		Status	Valid										
35-3-0176	Ulan 116	AMG	65	765660	6434060	None				Artifact	Shelter with Deposit		2423
		Status	Valid										
35-3-0177	Ulan 116	AMG	55	758860	6432530	None				Artifact	Shelter with Deposit		2423
		Status	Valid										
35-3-0178	Ulan 116	AMG	55	757950	6433680	None				Artifact	Shelter with Deposit		2423
		Status	Valid										
35-3-0187	Identifier 110-Site 32	AMG	55	762790	6435400	None				Artifact	Shelter with Deposit		
		Status	Valid										
35-3-0188	Identifier 111-Site 33	AMG	55	765810	6435410	None				Artifact	Shelter with Deposit		
		Status	Valid										
35-3-0205	Ulan 9025	AMG	55	763000	6434700	None				Stone Quarry Artifact	Quarry		
		Status	Valid										
35-3-0205	Ulan 9025	AMG	55	763030	6434640	None				Artifact	Shelter with Deposit		
		Status	Valid										
35-3-0207	Ulan 9028	AMG	55	763800	6435630	None				Artifact	Shelter with Deposit		
		Status	Valid										
35-3-0208	Ulan 9022	AMG	55	759700	6434587	None				Artifact Water Hole	Shelter with Deposit Water Hole/Well		
		Status	Valid										
35-3-0225	L.I. (Loushville 1)	AMG	55	767400	6429400	None				Artifact	Open Camp Site		
		Status	Valid										

Number of Sites : 54

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Grid Reference Type = AMO Map Sheet = HARRAS Feature Search Type = AHIMS Features
 List of Sites (Partial)

Site ID	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions		Site Features	Site Type (resurveyed prior to June 2001)	Further Info. Contact	Report ID
						General	Location				
38-3-0204	MOI	AMG	55	754090	6440410	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0208	BOZ	AMG	55	768990	6435740	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0209	BOZ	AMG	55	758850	6430890	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0250	BOZ	AMG	55	769040	6435610	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0251	BOZ	AMG	55	759390	6430960	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0253	BOZ	AMG	55	758170	6434910	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0264	BOZ	AMG	55	766510	6431740	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0265	BOZ	AMG	55	759210	6435070	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0269	BOZ	AMG	55	759250	6435070	None	<input type="checkbox"/>				
		Status	Valid								
38-3-0282	BOZ (Barash, Quarry 2)	AMG	55	758310	6435550	None	<input type="checkbox"/>				
		Status	Valid								

Number of Sites : 54

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List of Sites (Partial)
 Grid Reference Type = AMG Wap Sheet = GULGOON Feijure Search Type = AllMS Features

Site Id	Site Name	Grid Ref. Type	Zone	Easting	Northing	Assess. Identifications	Site Features	Site Types	Recorded prior to June 2001	Further Info. Collected	Relevant
						General	Locational				
28-3-004	Miam-Dandak Mountain	AMG	Valid	65 756787	6420200	None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Art		
28-3-0041	Miam Creek Site 3	AMG	Valid	65 757104	6420300	None	<input type="checkbox"/>	Artifact	Open Camp Site		381
28-3-0042	Blubb Creek 3	AMG	Valid	65 730276	6420042	None	<input type="checkbox"/>	Artifact	Open Camp Site		
28-3-0048	Miam-Dandak Creek 1	AMG	Valid	65 737542	6421727	None	<input type="checkbox"/>	Artifact	Open Camp Site		
28-3-0115	LOS DAVIS BRIDGE	AMG	Valid	65 741590	6419720	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Scarred Tree		1333
28-3-0188	X 2B	AMG	Valid	65 758410	6426540	None	<input type="checkbox"/>	Artifact	Open Camp Site		381
28-3-0203	Miam 102	AMG	Valid	65 758300	6426600	None	<input type="checkbox"/>	Artifact	Open Camp Site		2423
28-3-0228	ECL 1810	AMG	Valid	65 757180	6428300	None	<input type="checkbox"/>	Artifact	Isolated Find		
28-3-0238	EC1 COOVAL CREEK	AMG	Valid	65 742860	6418800	None	<input type="checkbox"/>	Artifact			
28-3-0238	MCG	AMG	Valid	65 758400	6426500	None	<input type="checkbox"/>	Artifact			

Number of Sites : 10

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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 6411, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	Localisation				
✓ 36-3-0487	WCP211	GDA	55	769953	6418347	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0488	WCP212	GDA	55	767340	6418935	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0489	WCP213	GDA	55	767250	6419766	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0490	WCP214	GDA	55	767380	6418668	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0491	WCP215	GDA	55	766857	6418302	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0492	WCP216	GDA	55	767084	6418194	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0493	WCP217	GDA	55	772380	6416550	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0494	WCP218	GDA	55	772393	6416642	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0495	WCP219	GDA	55	772467	6416920	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0496	WCP220	GDA	55	772530	6417256	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				
✓ 36-3-0497	WCP221	GDA	55	772612	6417691	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid				<input type="checkbox"/>				



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Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions	Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						General	Location			
3-0443	WCP 166	GDA	55	774210	6417972	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0444	WCP 167	GDA	55	774175	6417960	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0445	WCP 168	GDA	55	774376	6417608	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAE)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0446	WCP 169	GDA	55	774143	6417777	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0447	WCP 170	GDA	55	774274	6417965	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0448	WCP 171	GDA	55	774247	6417965	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0449	WCP 172	GDA	55	771678	6420157	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAE)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0450	WCP 173	GDA	55	771907	6420224	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>	Potential Archaeological Deposit (PAE)		
3-0451	WCP 174	GDA	55	771399	6419731	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0452	WCP 175	GDA	55	771542	6418199	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
3-0453	WCP 176	GDA	55	770194	6417686	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			

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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	Location				
35-3-0652	WCP78	GOA	55	770824	6416689	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
35-3-0653	WC.OS.16 with PAD	AGD	55	767267	6422761	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Colley, Sarah (1106)	
35-3-0657	WC.OS.18	AGD	55	765565	6423952	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0658	WC.OS.17 with PAD	AGD	55	766479	6423495	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0659	WC.IF.5	AGD	55	767264	6422874	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0660	WC.OS.15 with PAD	AGD	55	769001	6421142	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0661	WC.IF.4	AGD	55	768272	6420809	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0662	WC.OS.14	AGD	55	769876	6420402	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0663	WC.OS.13 with PAD	AGD	55	769987	6420251	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0664	WC.PAD.1	AGD	55	771196	6419721	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	
35-3-0665	WC.IF.3	AGD	55	771371	6419748	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid							Warrabinga Native	



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Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info, Contact	Report ID
						Gender	Location				
6-3-0509	WCP233	GDA	55	774209	6416644	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
6-3-0510	WCP234	GDA	55	774422	6416360	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
6-3-0511	WCP235	GDA	55	773914	6416734	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
6-3-0512	WCP236	GDA	55	774178	6416894	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
6-3-0513	WCP237	GDA	55	772878	6416301	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
6-3-0514	WCP238	GDA	55	770576	6416748	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
6-3-0515	WCP279	GDA	55	770788	6416510	None	<input type="checkbox"/>	Water Hole		Permit(s)	
		Status	Valid								
6-3-0516	WCP80	GDA	55	770756	6416595	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
6-3-0517	WCP81	GDA	55	770562	6416565	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
6-3-0518	WCP82	GDA	55	720722	6416428	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
6-3-0519	WCP83	GDA	55	770508	6416343	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								

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Original of Sites (Partial)
 List of Sites (Partial)
 and Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 5411, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features		Site Types (Inscribed prior to June 2011)	Further Info. Contact	Report ID
						General	Location	General	Location			
✓ 6-3-0498	WCP222	GDA	55	772556	6417780	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0499	WCP223	GDA	55	771435	6419138	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0500	WCP224	GDA	55	770066	6417096	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0501	WCP225	GDA	55	759110	6416961	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0502	WCP226	GDA	55	766690	6419155	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0503	WCP227	GDA	55	770356	6420383	None	<input type="checkbox"/>	<input type="checkbox"/>	Artefact		Permit(s)	
		Status	Valid									
✓ 6-3-0504	WCP228	GDA	55	770503	6420968	None	<input type="checkbox"/>	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid									
✓ 6-3-0505	WCP229	GDA	55	770565	6416004	None	<input type="checkbox"/>	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid									
✓ 6-3-0506	WCP230	GDA	55	770584	6416001	None	<input type="checkbox"/>	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid									
✓ 6-3-0507	WCP231	GDA	55	770555	6416059	None	<input type="checkbox"/>	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid									
✓ 6-3-0508	WCP232	GDA	55	774002	6418634	None	<input type="checkbox"/>	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid									

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Number of Sites (Partial) : 302
 Id Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions	Site Features		Site Types (Inscribed prior to June 2001)	Further Info, Contact	Report ID
							General	Location			
✓ -3-0476	WCP200	GDA	55	768811	6419235	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	
✓ -3-0477	WCP201	Status	Valid	55	768100	6419743	None	Artifact	Artifact(s)	Permit(s)	
✓ -3-0478	WCP202	GDA	55	769048	6419655	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	
✓ -3-0479	WCP203	Status	Valid	55	768423	6419307	None	Artifact	Artifact(s)	Permit(s)	
✓ -3-0480	WCP204	GDA	55	768512	6419768	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	
✓ -3-0481	WCP205	Status	Valid	55	768556	6419375	None	Artifact	Artifact(s)	Permit(s)	
✓ -3-0482	WCP206	GDA	55	768129	6418868	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	
✓ -3-0483	WCP207	Status	Valid	55	768547	6418903	None	Modified Tree (Carved or Scarred)	Permit(s)	Permit(s)	
✓ -3-0484	WCP208	GDA	55	768747	6418814	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	
✓ -3-0485	WCP209	Status	Valid	55	768850	6418150	None	Artifact	Artifact(s)	Permit(s)	
✓ -3-0486	WCP210	GDA	55	768789	6417930	None	<input type="checkbox"/>	Artifact	Artifact(s)	Permit(s)	

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Set of Sites (Partial)
 List Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 54136, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Eastings	Northings	Access Restrictions		Site Features	Site Types (rescribed prior to June 2001)	Further Info. Contact	Report ID
						General	Location				
✓ 5-3-0455	WCP188	GDA	55	770194	6416729	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0456	WCP189	GDA	55	770387	6416289	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0457	WCP190	GDA	55	770091	6420022	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0458	WCP191	GDA	55	770067	6420513	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0459	WCP192	GDA	55	771158	6420301	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid					Potential Archaeological Deposit (PAC)			
✓ 5-3-0470	WCP193	GDA	55	772009	6419656	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0471	WCP195	GDA	55	774306	6416524	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0472	WCP196	GDA	55	773980	6418129	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
✓ 5-3-0473	WCP197	GDA	55	773982	6418144	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
✓ 5-3-0474	WCP198	GDA	55	766604	6420447	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓ 5-3-0475	WCP199	GDA	55	768760	6420674	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								

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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 5411, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions	Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						General	Localities			
✓	36-3-0432 WCP 155	GDA	55	772228	6417010	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0433 WCP 156	GDA	55	772164	6417380	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0434 WCP 157	GDA	55	772217	6417143	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0435 WCP 158	GDA	55	771958	6416988	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0436 WCP 159	GDA	55	771982	6416730	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0437 WCP 160	GDA	55	771446	6416123	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0438 WCP 161	GDA	55	771855	6416725	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0439 WCP 162	GDA	55	771710	6416719	None	<input type="checkbox"/>	Artifact	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0440 WCP 163	GDA	55	774066	6418110	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0441 WCP 164	GDA	55	774187	6418180	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			
✓	36-3-0442 WCP 165	GDA	55	774281	6418028	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)	Permit(s)	
		Status	Valid				<input type="checkbox"/>			

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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 5411, Feature Search Type = AHIMS Features


Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions	General Location	Site Features	Site Types (ascribed prior to June 2001)	Further Info, Contact	Report ID
✓	IS-3-0421 WCP 144	GDA	55	770589	6420596	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓	IS-3-0422 WCP 145	GDA	55	770532	6420664	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
✓	IS-3-0423 WCP 146	GDA	55	770366	6420979	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
✓	IS-3-0424 WCP 147	GDA	55	770612	6415635	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
✓	IS-3-0425 WCP 148	GDA	55	770366	6415635	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
✓	IS-3-0426 WCP 149	GDA	55	770708	6416157	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
✓	IS-3-0427 WCP 150	GDA	55	773285	6416741	None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)		Permit(s)	
		Status	Valid								
✓	IS-3-0428 WCP 151	GDA	55	772204	6419986	None	<input type="checkbox"/>	Artifact		Permit(s)	
		Status	Valid								
✓	IS-3-0429 WCP 152	GDA	55	768375	6416723	None	<input type="checkbox"/>	Artifact Potential Archaeological Deposit (PAC) Art (Pigment or Engraved)		Permit(s)	
		Status	Valid								
✓	IS-3-0430 WCP 153	GDA	55	768456	6417253	None	<input type="checkbox"/>	Art (Pigment or Engraved) Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								
✓	IS-3-0431 WCP 154	GDA	55	768503	6417372	None	<input type="checkbox"/>	Potential Archaeological Deposit (PAC)		Permit(s)	
		Status	Valid								



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List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLL2N Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Eastings	Northings	Access Restrictions		Site Features		Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	Location	General	Location			
36-3-0074	Wollar-Gulberrig	AGD	55	781478	6414552	None	<input type="checkbox"/>	Artifact	<input type="checkbox"/>	Open Camp Site		
✓ 36-3-0098	Wattle Creek No.2:	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
36-3-0101	Yawanna No.2:	AGD	55	769890	6422760	None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
36-3-0103	Willingbong:	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
36-3-0106	Yawanna No.1:	AGD	55	774740	6421270	None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
36-3-0115	Yawanna No.3:	Status	Valid			None	<input type="checkbox"/>	Modified Tree (Carved or Scarred)	<input type="checkbox"/>	Scarred Tree		
36-3-0116	Yawanna No.4:	AGD	55	774780	6421260	None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
36-3-0124	Devidance No.3:	Status	Valid			None	<input type="checkbox"/>	Grinding Groove	<input type="checkbox"/>	Axe Grinding Groove		1333
36-3-0133	Wattle Creek No.1:	AGD	55	775200	6420600	None	<input type="checkbox"/>	Artifact	<input type="checkbox"/>	Open Camp Site		
36-3-0134	Murrumbidgee No.1:	Status	Valid			None	<input type="checkbox"/>	Grinding Groove	<input type="checkbox"/>	Axe Grinding Groove		
36-3-0222	Moolabren Creek MC1	AGD	55	777480	6427460	None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
		Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
		AGD	55	761300	6421170	None	<input type="checkbox"/>	Art (Pigment or Engraved)	<input type="checkbox"/>	Shelter with Art		
		Status	Valid			None	<input type="checkbox"/>	Artifact	<input type="checkbox"/>	Open Camp Site		



**Department of
Environment
& Conservation**

Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLLON Feature Search Type = AHIMS Features
 List of Sites (Partial)

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions		Site Features	Site Types <small>(recorded prior to June 2001)</small>	Further Info. Contact	Report ID
						Gender	Location				
36-3-0223	MC2 ✓	AGD	55	790420	6420880	None	<input type="checkbox"/>	Artifact	Open Camp Site		
		Status	Valid				<input type="checkbox"/>				
36-3-0237	MC11 ✓	AGD	55	763384	6421070	None	<input type="checkbox"/>	Artifact			
		Status	Valid				<input type="checkbox"/>				
36-3-0238	MC19 ✓	AGD	55	763226	6422800	None	<input type="checkbox"/>	Artifact			
		Status	Valid				<input type="checkbox"/>				
36-3-0239	MC8 ✓	AGD	55	763183	6422680	None	<input type="checkbox"/>	Artifact			
		Status	Valid				<input type="checkbox"/>				
36-3-0240	MC6 ✓	AGD	55	763113	6421840	None	<input type="checkbox"/>	Artifact			
		Status	Valid				<input type="checkbox"/>				
36-3-0241	MC4 ✓	AGD	55	763161	6421650	None	<input type="checkbox"/>	Artifact			
		Status	Valid				<input type="checkbox"/>				
36-3-0287	WC21 ✓	AGD	55	766680	6425480	None	<input type="checkbox"/>	Art (Pigment or Engraved)			
		Status	Valid				<input type="checkbox"/>				

Number of Sites : 29

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Page 3 of 3

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Department of
**Environment
 & Conservation**

List of Sites (Partial)
 Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLL2N Feature Search Type = AHIMS Features


Site ID	Site Name	Datum	Zone	Eastings	Northings	Access Restrictions		Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						General	Location				
36-3-0015	Cook Gully	AGD	55	760387	6415931	None	<input type="checkbox"/>	Grinding Groove	Axe Grinding Groove		
36-3-0016	Ulan: Murrumbidgee	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Art		
36-3-0020	Wollar: X	AGD	55	760796	6421967	None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Art		
36-3-0027	Cook's Gap	Status	Valid			None	<input type="checkbox"/>	Grinding Groove	Axe Grinding Groove		
36-3-0039	Ulan:	AGD	55	760387	6415931	None	<input type="checkbox"/>	Modified Tree (Carved or Scamed)	Scamed Tree		361
36-3-0042	Ulan Creek: Site 2:	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Art		361
36-3-0044	Ulan: Wilbinlong Creek:	AGD	55	762344	6428010	None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Deposit		
36-3-0060	Ulan Creek: Site 18:	Status	Valid			None	<input type="checkbox"/>	Ceremonial Ring (Stone or Earth)	Born/Ceremonial		
36-3-0061	Ulan Creek: Site 19:	AGD	55	771442	6420278	None	<input type="checkbox"/>	Modified Tree (Carved or Scamed)	Carved Tree		
36-3-0063	Ulan Creek: Site 21:	Status	Valid			None	<input type="checkbox"/>	Open Camp Site	Open Camp Site		1299
36-3-0068	Bobadent:	AGD	55	760215	6429006	None	<input type="checkbox"/>	Art (Pigment or Engraved)	Open Camp Site		1299
36-3-0068	Bobadent:	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	Open Camp Site		1299
36-3-0068	Bobadent:	AGD	55	761207	6428074	None	<input type="checkbox"/>	Art (Pigment or Engraved)	Open Camp Site		1299
36-3-0068	Bobadent:	Status	Valid			None	<input type="checkbox"/>	Art (Pigment or Engraved)	Shelter with Art		1299

Number of Sites : 29
 Page 1 of 3
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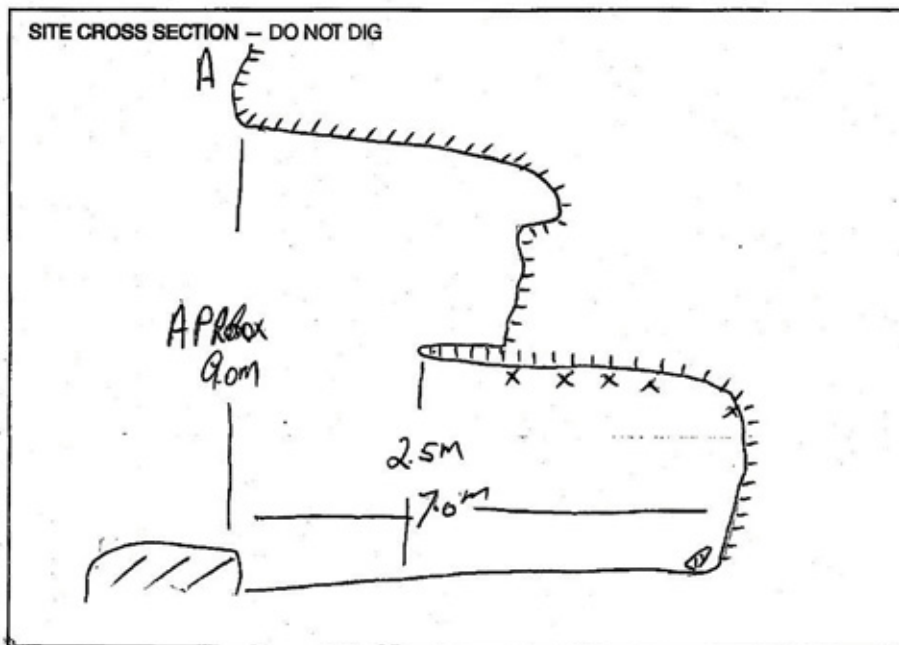
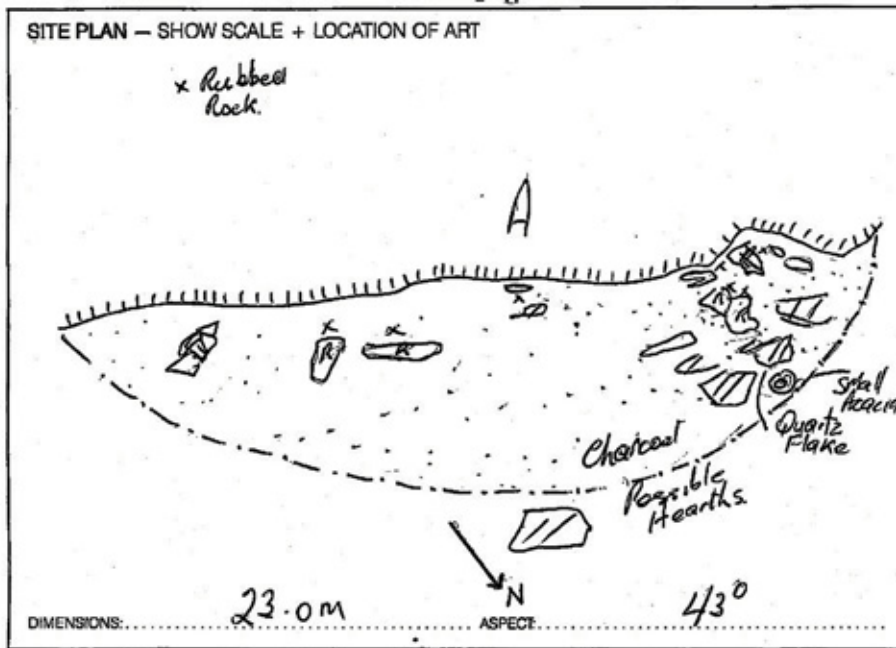
Fax 6372 3186

Cont N^o2 Address: in for station



National Parks and Wildlife Service
 BOX N189, GROSVENOR STREET POST OFFICE, SYDNEY, NSW 2000. TEL (02) 237 6500
Site Recording Form – Art Sites APPENDIX 1

MAP NAME	EDITION	SCALE	REFERENCE	HEAD OFFICE USE ONLY
Dubbo	metric	250K	7634211	NWPS Site No: 36-3-134
Gulgong	1st	1:50000	1 Wx 6/30E 2117N	Site types: SHELTER & ART File No: 28-1-88 Filed by: SW
Site name: <u>Murrumbidgee NP</u>		Locality/Property Name:		
Owner/Manager: <u>Mr M.J. Carlisle</u>		Address: <u>Ulan (phone 063-734693)</u>		
Local Post Office: <u>Ulan</u>		NPWS District: <u>Muswellbrook</u> Region: <u>Central</u>		
Reason for Investigation (Give R.O. Instruction No. where applicable):				
<u>private</u>				
 36-3-0134				
Portion No.: <u>97</u>	Other Land Category:		Plan/Sketch/Section of Site attached? YES/NO	
Parish: <u>Wilpenong</u>	County: <u>Phillip</u>		How many? <u>2</u>	
Air Photo Refs. (For stereo pair)			Photos Taken? YES/NO	
			How many attached? <u>21</u>	
How to get to the site. (Refer to permanent features, give best approach to site eg. from above, below, along cliff. Draw diagram on separate sheet.)				
<p><i>Must have permission to enter</i></p> <p><i>See Mr Carlisle for directions</i></p> <p><i>to site</i></p> <p><i>phone number Mr Kevin Carlisle</i></p> <p><i>brother to Max</i></p>				
Site Recorded by: <u>I. T. Bluff</u>			Date: <u>7/87</u>	
Address/institution: <u>Mortdale</u>				



36-3-

CONDITION OF SITE:

Causes of Art Damage: Vandalism Graffiti Foot Traffic Camping
 Pastoral Urban Mining Plant/Moss/Lichen
 Smoke None
 Other (Specify):

Erosion Damage: Exfoliation Water Fracturing Wind
 Rock Fall Salt None
 Other

Animal Damage: Dust Rubbed Surfaces Disturbed Deposit Bird/Insect Nest
 None Other

Description of Site Condition: *large shelter with pencil charcoal & paint over but names also scratched in rock lying on floor.*

ACCOMPANYING DOCUMENTATION:

<input checked="" type="checkbox"/> Photos	Location	<input type="checkbox"/> Slides	Location
<input type="checkbox"/> Tracings	<input type="checkbox"/> Published Ref.
<input type="checkbox"/> Drawings	<input type="checkbox"/> Notes
<input type="checkbox"/> Aerial Photo	<input type="checkbox"/> Artifacts
<input type="checkbox"/> Charcoal Sample	<input type="checkbox"/> Aboriginal Report
<input type="checkbox"/> Other (Specify)		

Published References:

IMPORTANCE OF SITE TO ABORIGINES: Traditional Contact Contemporary Unknown

Informant/Land Council:

Address:

Details:

PURPOSE OF RECORDING: Research EIS Interest
 Other:

RECOMMENDATIONS FOR MANAGEMENT/PRESERVATION: *clean & fence.*

SITE LOCATION AND ENVIRONMENT:

LOCAL GEOLOGY: Sandstone Granite Limestone Shale
 Other Detail: *conglomerate*

TOPOGRAPHY: River Valley Creek Gully Estuary Beach
 Hill Slopes Cliffline Ridge
 Lake Edge Water Hole Swamp

SOILS: Rocky Clay Sandy Silt
 Gravel Humic

VEGETATION: Woodland Grassland Forrest Heath
 Swampy Desert Mallee

Local Specific Vegetation: *Ironbark, Stringybark, Black Pine, Geebung, Grace, Casuarina, Leptospermum, Burretia, Wang, Murray, Sifter Bush*

DESCRIPTION OF NATURAL ENVIRONMENT: *Marsopods, Reptiles, Nonbats*

NEAREST DRINKING WATER: River Creek Lake Spring
 Well Rockhole Distance from Site: *600m*
 Other: *Silt rheinaganba ch* Temporary Unknown
 Detail: *Silt rheinaganba ch*

PRESENT LAND USE: *Grazing*

DESCRIPTION OF EUROPEAN IMPACT: *clearing, fencing*

NATURE OF SITE: Boulder Outcrop Cliffline Open Surface

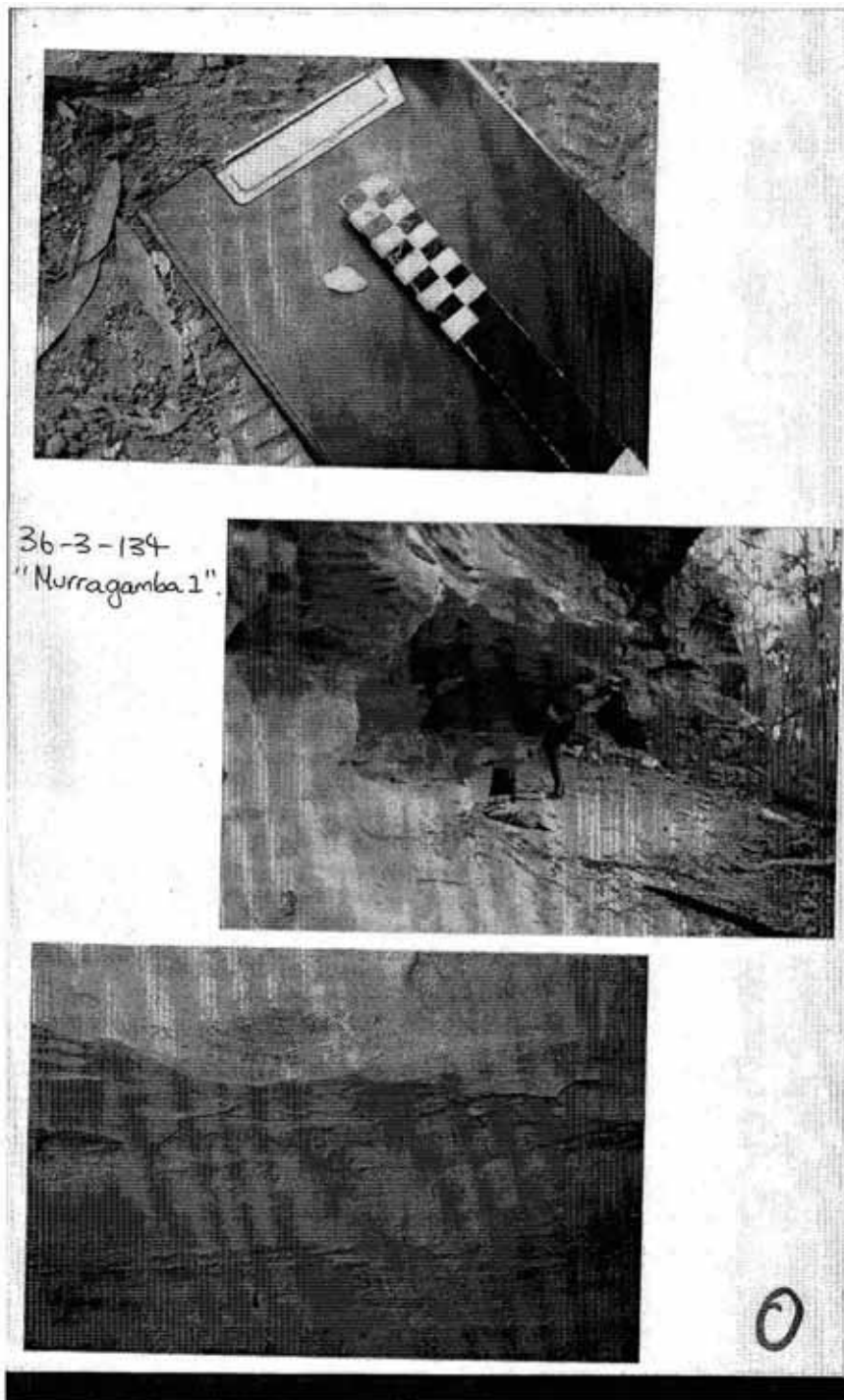
Form of Erosion: Cavernous Honeycomb Exfoliation

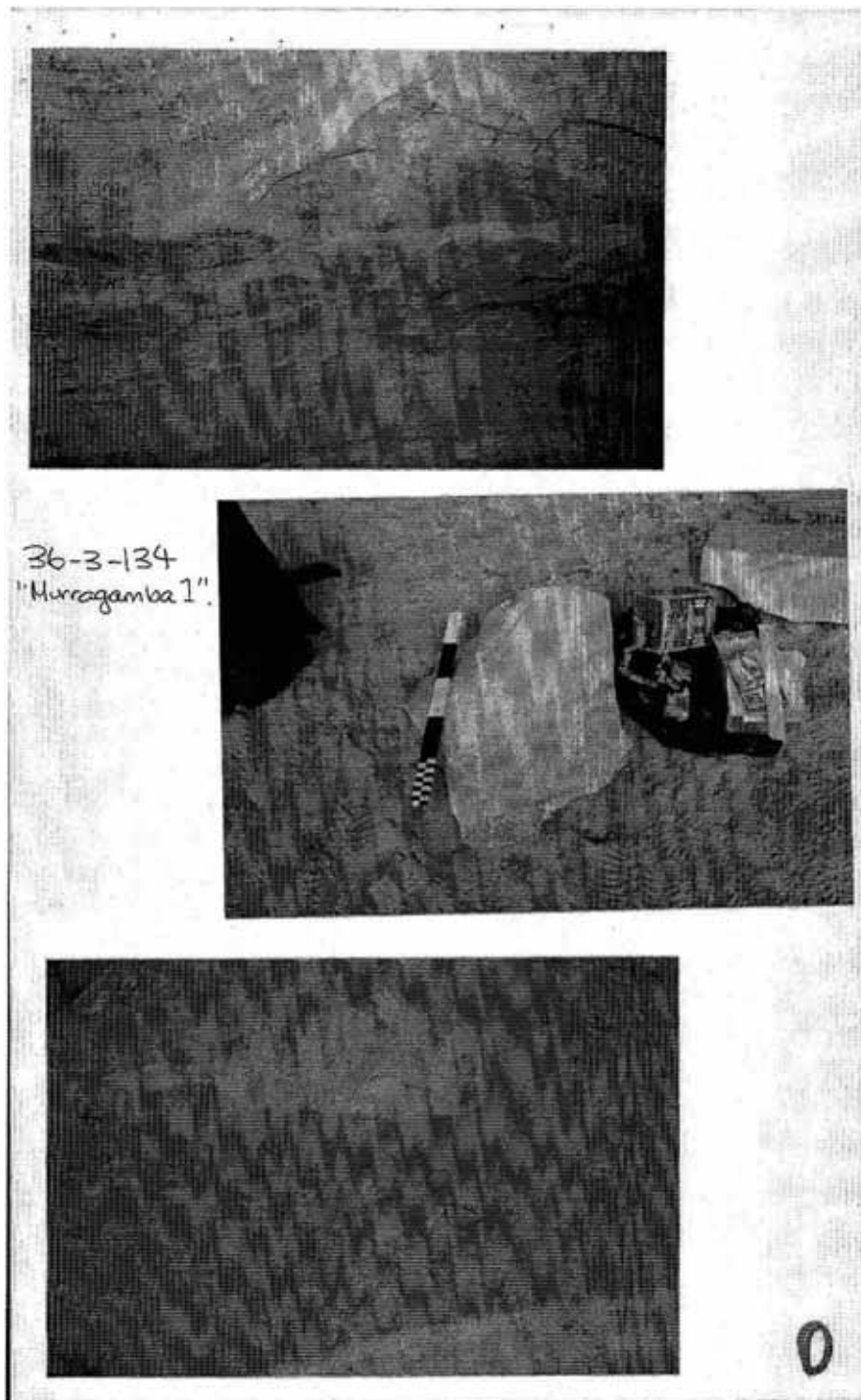
Surface Condition: Stable Exfoliating Exposed/Weathered
 Has Accretion (Mineral/Insect)
 Detail: *paper wasps*

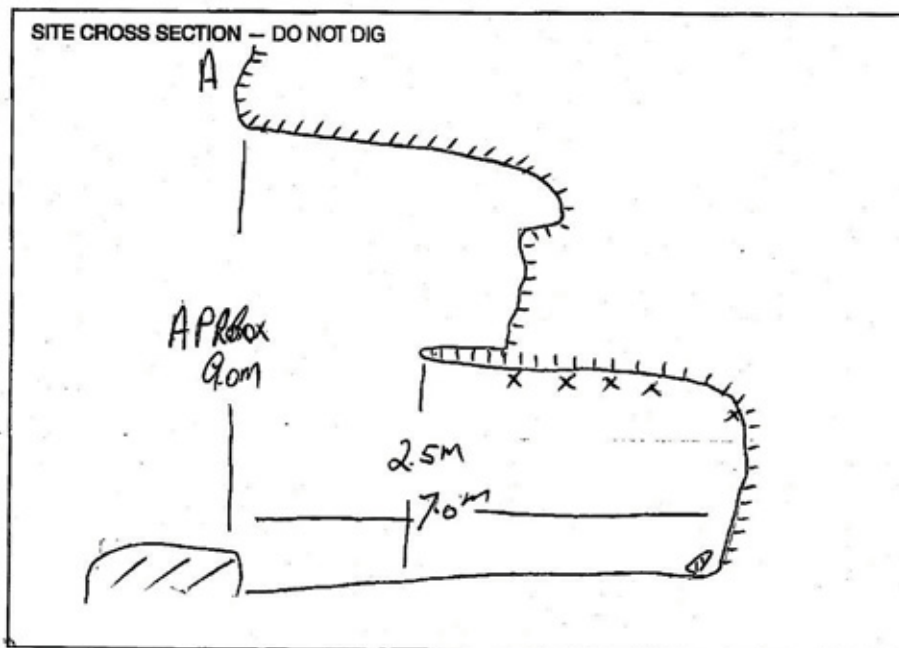
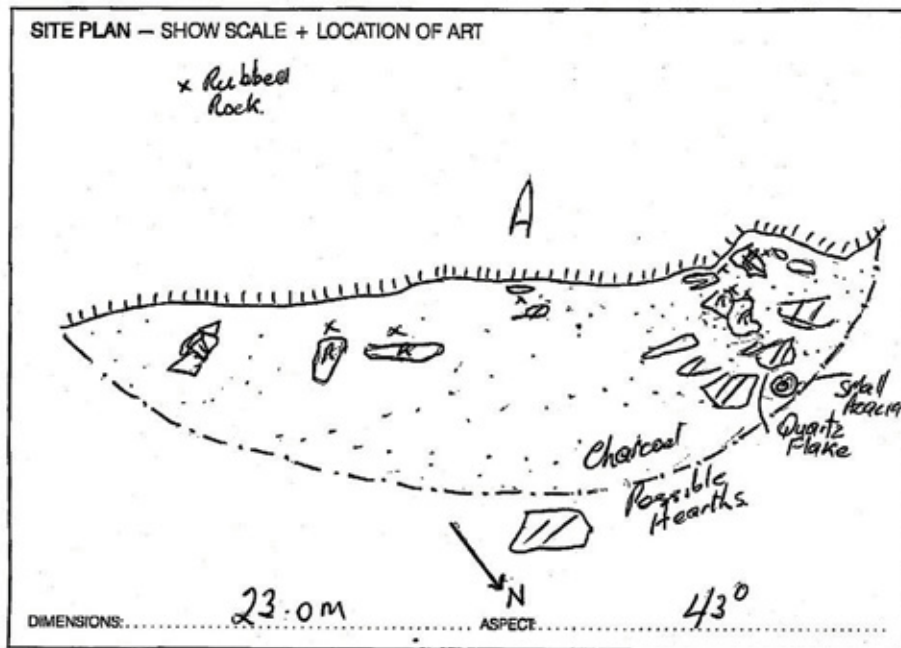
PHYSICAL DESCRIPTION OF SITE: *large shelter in cliffline with good deposit on North end*

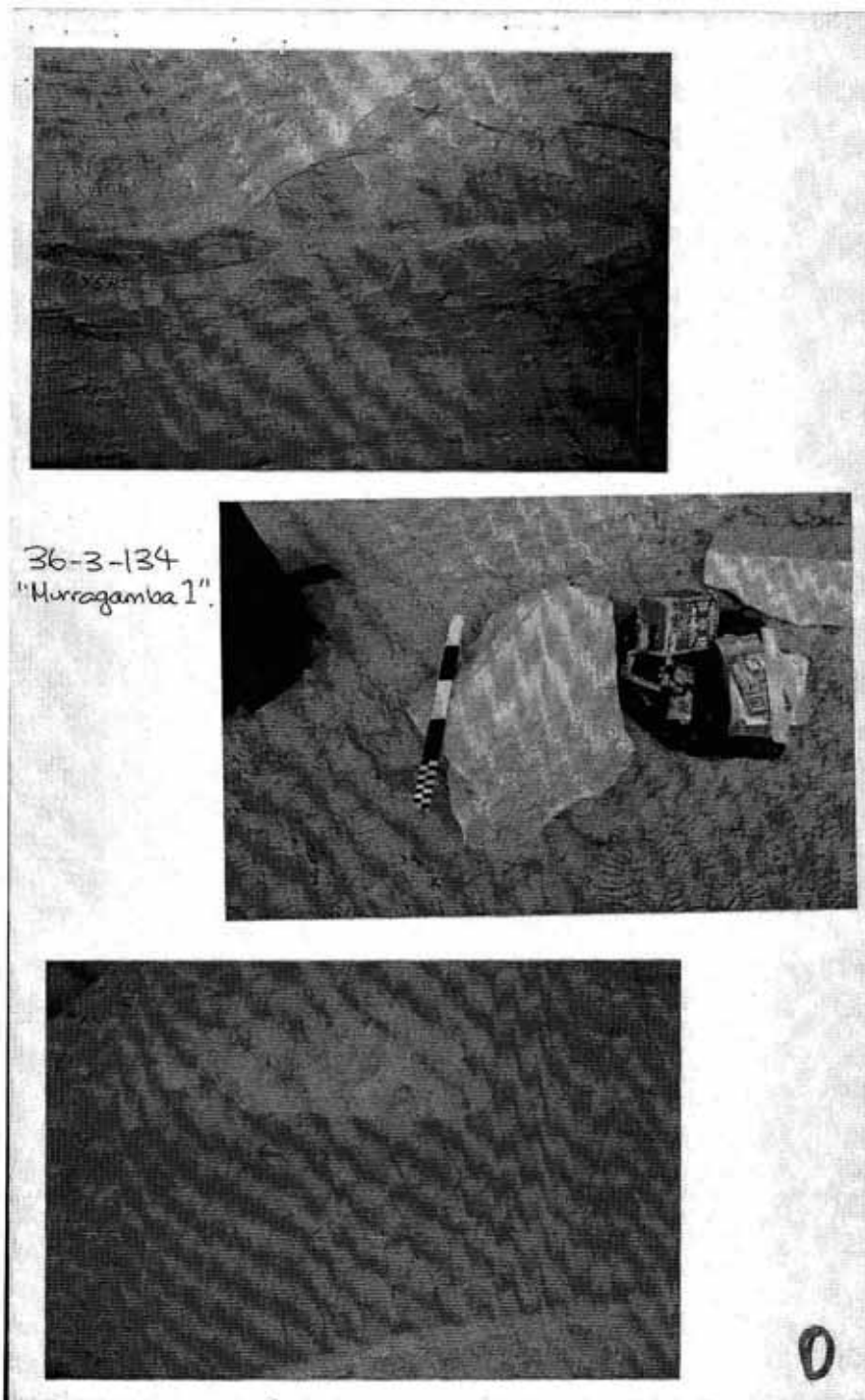
OTHER SITES/SITE TYPES IN VICINITY: *ant shelter*

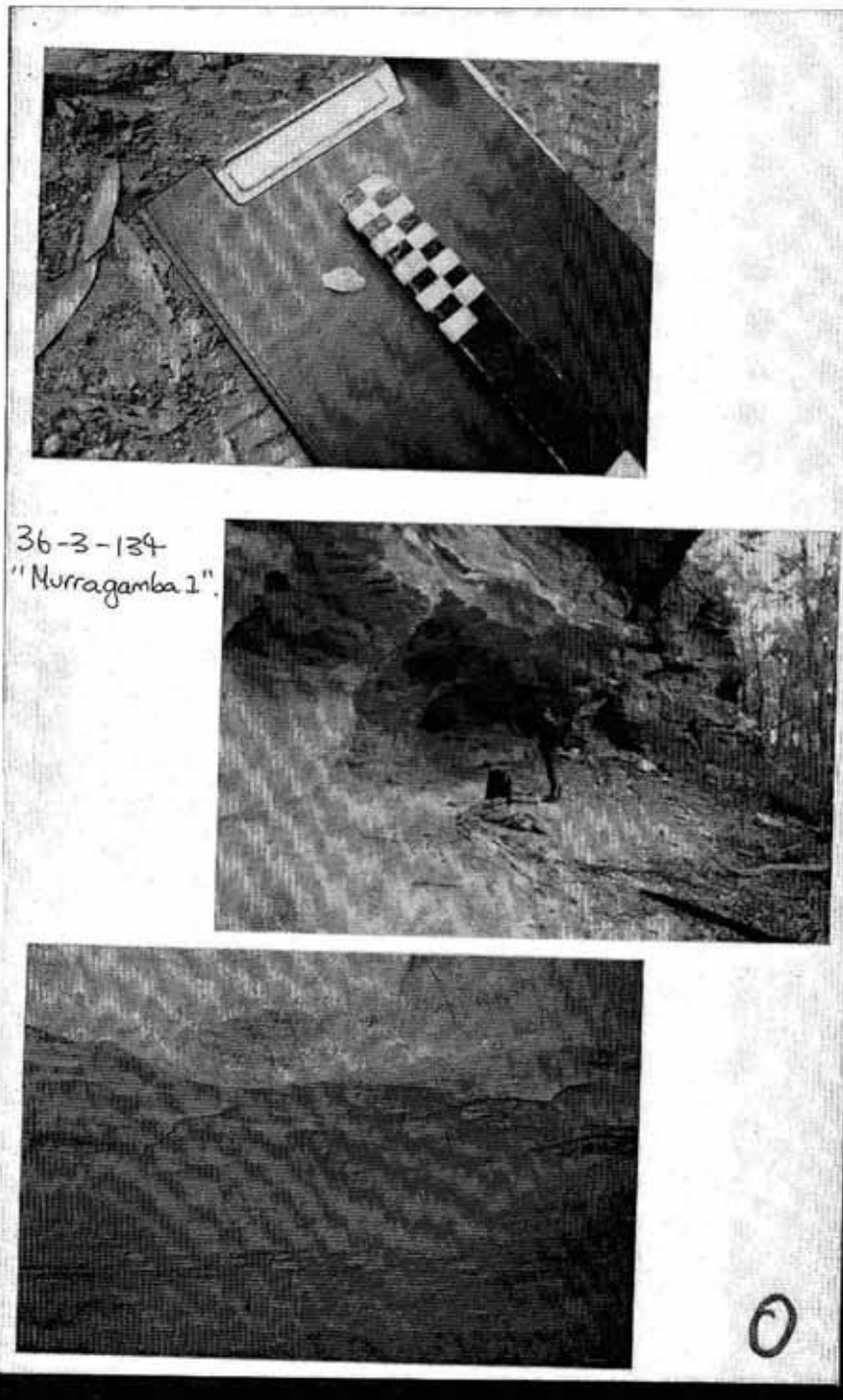
SITE ASSOCIATIONS: *9 possible grind stones on floor, much charcoal on North end, 1 piece of glass quartz seen in cliffline*











SITE LOCATION AND ENVIRONMENT:

LOCAL GEOLOGY: Sandstone Granite Limestone Shale
 Other Detail: *conglomerate*

TOPOGRAPHY: River Valley Creek Gully Estuary Beach
 Hill Slopes Cliffline Ridge
 Lake Edge Water Hole Swamp

SOILS: Rocky Clay Sandy Silt
 Gravel Humic

VEGETATION: Woodland Grassland Forrest Heath
 Swampy Desert Mallee

Local Specific Vegetation: *Monbark Stringybark Black Pine, Geebung
 Grass, Casuarina, Leptospermum, Persicaria
 Kunzea, Sulfur Bush*

DESCRIPTION OF NATURAL ENVIRONMENT: *Mammals, Reptile
 Monbats*

NEAREST DRINKING WATER: River Creek Lake Spring
 Well Rockhole Distance from Site: *600m*
 Other: Permanent Temporary Unknown
 Detail: *bit mura-gamba ch*

PRESENT LAND USE: *Grazing*

DESCRIPTION OF EUROPEAN IMPACT: *clearing, fencing*

NATURE OF SITE: Boulder Outcrop Cliffline Open Surface

Form of Erosion: Cavernous Honeycomb Exfoliation

Surface Condition: Stable Exfoliating Exposed/Weathered
 Has Accretion (Mineral/Insect)
 Detail: *paper wasps*

PHYSICAL DESCRIPTION OF SITE: *large shelter in cliffline with
 good deposit on North end*

OTHER SITES/SITE TYPES IN VICINITY: *art shelter*

SITE ASSOCIATIONS: *9 possible grind stones on floor, much
 charcoal on North end, 1 piece of glass quartz
 seen in cliffline*

36-3-

CONDITION OF SITE:

Causes of Art Damage:

<input type="checkbox"/> Vandalism	<input checked="" type="checkbox"/> Graffiti	<input type="checkbox"/> Foot Traffic	<input type="checkbox"/> Camping
<input type="checkbox"/> Pastoral	<input type="checkbox"/> Urban	<input type="checkbox"/> Mining	<input type="checkbox"/> Plant/Moss/Lichen
<input type="checkbox"/> Smoke	<input type="checkbox"/> None		
<input type="checkbox"/> Other (Specify):			

Erosion Damage:

<input type="checkbox"/> Exfoliation	<input type="checkbox"/> Water	<input checked="" type="checkbox"/> Fracturing	<input type="checkbox"/> Wind
<input type="checkbox"/> Rock Fall	<input type="checkbox"/> Salt	<input type="checkbox"/> None	
<input type="checkbox"/> Other:			

Animal Damage:

<input type="checkbox"/> Dust	<input type="checkbox"/> Rubbed Surfaces	<input checked="" type="checkbox"/> Disturbed Deposit	<input type="checkbox"/> Bird/Insect Nest
<input type="checkbox"/> None	<input type="checkbox"/> Other:		

Description of Site Condition: *large shelter with pencil charcoal paint over but names also scratched in rock lying on floor.*

ACCOMPANYING DOCUMENTATION:

<input checked="" type="checkbox"/> Photos	Location	<input type="checkbox"/> Slides	Location
<input type="checkbox"/> Tappings	<input type="checkbox"/> Published Ref.
<input type="checkbox"/> Drawings	<input type="checkbox"/> Notes
<input type="checkbox"/> Aerial Photo	<input type="checkbox"/> Artifacts
<input type="checkbox"/> Charcoal Sample	<input type="checkbox"/> Aboriginal Report
<input type="checkbox"/> Other (Specify)			

Published References:

IMPORTANCE OF SITE TO ABORIGINES:

<input type="checkbox"/> Traditional	<input type="checkbox"/> Contact	<input type="checkbox"/> Contemporary	<input checked="" type="checkbox"/> Unknown
--------------------------------------	----------------------------------	---------------------------------------	---------------------------------------------

Informant/Land Council:

Address:

Details:

PURPOSE OF RECORDING:

<input type="checkbox"/> Research	<input type="checkbox"/> EIS	<input checked="" type="checkbox"/> Interest
<input type="checkbox"/> Other:		

RECOMMENDATIONS FOR MANAGEMENT/PRESERVATION: *clean & fence.*

Appendix 4 ABORIGINAL CONSULTATION ADVICE

Awaiting Aboriginal Community responses



21 October 2009

Mr Tony Lonsdale
Acting CEO
Mudgee Local Aboriginal Land Council
PO Box 1097
MUDGEES NSW 2850

Dear Tony

I am writing to your organisation to seek your involvement in an Aboriginal cultural heritage survey of a proposed Northern Borefield project as a part of Moolarben Coal Project Stage 1.

The work is scheduled to be undertaken during the week commencing 9th November and is likely to last a couple of days. Moolarben Coal Operations Pty Ltd has agreed to pay a rate of \$55/hour for all Aboriginal Stakeholders and \$45/hour for junior trainees. An assistant and I will be conducting the archaeological assessment.

If you would like to be involved, could you please respond to me in writing? We are engaging one representative from each group. If we have not heard from your organisation in writing by 6th November, we will assume that you are not interested in being involved with this work.

As the *NSW Department of Environment, Climate Change & Water* have requested more proof that Aboriginal consultation has taken place, we are now seeking all communication on project issues in writing. You can send your response by fax to (02) 9958 5347 or e-mail to A.R.A.S@bigpond.com.

I have enclosed a copy of the proposed Borefield plan for your information. If you have any queries about this letter or its contents please don't hesitate to contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Giles Hamm', with a long horizontal flourish extending to the right.

Giles Hamm
Director

cc: Mr Steve Peart, Environment & Community Relations Manager, Moolarben Coal Operations Pty Ltd



6 November 2009

Mrs Wendy Lewis
Secretary
Warrabinga Native Title Claimants Aboriginal Corporation
525 Pheasants Nest Road
PHEASANTS NEST NSW 2574

[by fax: 02 4684 1341]

Dear Wendy

This letter is regarding your involvement in the Aboriginal cultural heritage survey of the proposed Northern Borefield project as part of Moolarben Coal Project Stage 1.

The scheduled work on the Northern Borefield project has been delayed for two weeks. Moolarben Coal Operations are still planning the pipeline route. As soon as I have a confirmed date, I will let you know when the fieldwork will commence.

If you have any queries about this letter or its contents please don't hesitate to contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Giles Hamm', with a long horizontal flourish extending to the right.

Giles Hamm
Director

cc: Mr Steve Peart, Environment & Community Relations Manager, Moolarben Coal Operations Pty Ltd



13 November 2009

Mr Larry Foley
Chairperson
Murong Gialinga Aboriginal and Torres Strait Islander Corporation
C/- PO Box 1097
MUDGEES NSW 2850

Dear Larry

We propose to undertake the ROM Hopper and North Borefield monitoring work from Monday, 23rd to Friday, 27th November. We will commence at 8.00am for the induction process at the Moolarben Mine Site office on the Monday.

Any enquiries you may have concerning this project should be directed to me at the address below or by telephone on (02) 4782 2733 or by email (A.R.A.S@bigpond.com).

Thank you for your attention and assistance.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Giles Hamm', with a long horizontal flourish extending to the right.

Giles Hamm
Director

cc: Mr Steve Peart, Environment & Community Relations Manager, Moolarben Coal Operations Pty Ltd



13 November 2009

Mr Tony Lonsdale
Acting CEO
Mudgee Local Aboriginal Land Council
PO Box 1097
MUDGEES NSW 2850

Dear Tony

We propose to undertake the ROM Hopper and North Borefield monitoring work from Monday, 23rd to Friday, 27th November. We will commence at 8.00am for the induction process at the Moolarben Mine Site office on the Monday.

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Thank you for your attention and assistance.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Giles Hamm', with a long horizontal flourish extending to the right.

Giles Hamm
Director

cc: Mr Steve Peart, Environment & Community Relations Manager, Moolarben Coal Operations Pty Ltd



13 November 2009

Mrs Wendy Lewis
Secretary
Warrabinga Native Title Claimants Aboriginal Corporation
525 Pheasants Nest Road
PHEASANTS NEST NSW 2574

Dear Wendy

We propose to undertake the ROM Hopper and North Borefield monitoring work from Monday, 23rd to Friday, 27th November. We will commence at 8.00am for the induction process at the Moolarben Mine Site office on the Monday.

Any enquiries you may have concerning this project should be directed to me at the address below or by telephone on (02) 4782 2733 or by email (A.R.A.S@bigpond.com).

Thank you for your attention and assistance.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Giles Hamm', with a long horizontal flourish extending to the right.

Giles Hamm
Director

cc: Mr Steve Peart, Environment & Community Relations Manager, Moolarben Coal Operations Pty Ltd

09/09/1999 22:34 02

PAGE 01

WAARRABINGA

Native Title Claimants Aboriginal Corporation

525 Pheasants Nest Road,
PHEASANTS NEST NSW 2574
Ph: (02) 46841 341 Fax: (02) 46831 375 Mobile: 040 99 66 705
Email: wendy.lewis@bigpond.com

052 add
705



27th October 2009

Mr Giles Hamon,
P.R.S.

Dear Giles
Waarrabinga wishes to be involved in the archaeological
heritage survey of the proposed Northern borefields at Moolarben
mine.

We will have a representative available week commencing
9th November 2009.

I would also agree with the involvement of NEWCO.
In fact, I would suggest that their not being involved
would be detrimental of the Native Title Agreement with
Moolarbens.

I have sent a copy of the letter to Lyn Syne.
I will send a copy of this letter to Mr. Steve Peart.

Yours in Indigenous Unity
Wendy Lewis



**Moolarben Coal Project Stage 1
 Northern Borefield Project
 Timesheet**

Date	Name	Organisation	Time In	Time Out	Signature
24-11-09	Morgan Disspain	ARAS	9:00am	5:00pm	[Signature]
24-11-09	GILES HAMM	ARAS	9:00am	5:00pm	[Signature]
24-11-09	STEVEN FOLEY	M.L.A.L.C	9:00am	5:00pm	[Signature]
24-11-09	Debbie Foley	MURONGIALINGA	9am	5:00pm	D. Foley
" " "	WENDY ANN LEWIS	WARRABINGA	9am	5:00pm	Wendy Ann Lewis
25-11-09	Morgan Disspain	ARAS	7:40am	4:00	[Signature]
25-11-09	Giles Hamm	ARAS	7:40am	4:00	[Signature]
25-11-09	SHAWN FOLEY	MURONGIALINGA	7:55am	4:00	[Signature]
25-11-09	LARRY FOLEY	M.L.A.L.C	8:00	4:00	[Signature]
25-11-09	Jasmine Cokerfull	M.L.A.L.C	8:00am	4:00	[Signature]
25-11-09	Wendy Ann Lewis	WARRABINGA	8:00	4:00	Wendy Ann Lewis
26-11-09	Morgan Disspain	ARAS	7:45	4:30	[Signature]
26-11-09	LARRY FOLEY	M.L.A.L.C	7:45	4:00	[Signature]
26-11-09	Debbie Foley	MURONGIALINGA	7:45	4:00	D. Foley
25-11-09	Giles Hamm	ARAS	7:45	4:30	[Signature]
"	WENDY LEWIS	WARRABINGA	7:45	4:00	Wendy Ann Lewis

ARCHAEOLOGICAL RISK ASSESSMENT SERVICES PTY LIMITED
 T +61 2 4782 2733 | F +61 2 4782 2933 | M 0423 046 208 | A.R.A.S@bigpond.com
 ABN: 71 106 520 290 | PO Box 67, Katoomba NSW 2780



**Moolarben Coal Project Stage 1
 Northern Borefield Project
 Timesheet**

Date	Name	Organisation	Time In	Time Out	Signature
27-11-09	Morgan Dissanayake	ARAS	7:00am	1:30	<i>[Signature]</i>
27-11-09	LARRY FOLEY	M.L.A.L.C	7:00	12:00	<i>[Signature]</i>
27-11-09	Brendan Souter	M.L.A.L.C	7:00	12:00	<i>[Signature]</i>
27-11-09	Larry FLICK	Mugaring	7:00	12:00	<i>[Signature]</i>
"	Wendy Ann Lewis	WARRENBERG	7:00	12:00	<i>[Signature]</i>
27-11-09	Giles Hamm	ARAS	7:00	1:30	

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 ABN: 71 106 520 290 | PO Box 67, Katoomba NSW 2780



Moolarben Coal Project Stage 1
ROM Hopper Project
Timesheet

Date	Name	Organisation	Time In	Time Out	Signature
23-11-09	GILLES HAMM	ARAS PTY LTD	8:00am	3:00	<i>[Signature]</i>
"	LARRY FULEY	MLALL	8:00am	3:00	<i>L Fuley</i>
"	Morgan Disquin	ARAS Pty Ltd	8:00am	3:00	<i>[Signature]</i>
"	Nancy Ann Lewis	NARRABINDI	8:00am	3:00	<i>Nancy Ann Lewis</i>
"	Larry Flick	MLALL	8:00am	3:00	<i>[Signature]</i>
"	Lyn Syme	NewCO	8:00	3:00	<i>[Signature]</i>
24-11-09					

ARCHAEOLOGICAL RISK ASSESSMENT SERVICES PTY LIMITED
T +61 2 4782 2733 | F +61 2 4782 2933 | M 0423 046 208 | A.R.A.S@bigpond.com
ABN: 71 106 520 290 | PO Box 67, Katoomba NSW 2780



Appendix 5 GENERAL GLOSSARY OF TERMS

Analytical Recording	A process of site recording which obtains detailed archaeological data useful in archaeological analysis.
Analysis	Evaluation of archaeological data to determine the archaeological significance of sites recorded within an impact area.
Archaeological Deposit	A layer of soil material containing archaeological remains.
Archaeological Investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological Comparability	The evaluation of whether archaeological sites are uniformly different or similar across an impact area.
Archaeological Data	Archaeological information that is recorded as a result of an archaeological investigation.
Artefact	Any object made by human agency (e.g. stone artefacts).
Artefact Scatter	A collection of artefacts usually lying as a lag deposit on an eroding surface.
Assemblage	<ol style="list-style-type: none">1. A group of stone artefacts found in close association with one another.2. Any group of items designated for analysis—without any assumptions of chronological or spatial relatedness (Witter 1995)
Avoidance	A management strategy which protects Aboriginal Sites within an impact area by avoiding them totally in development.
Broken Flake	A flake which is either a distal fragment or proximal fragment.
Campsite	A site which contains a variety of artefactual data not specific to one type of stone tool reduction sequence.
Complete Flake	A flake which is whole and not broken.
Core	A lump or nodule of stone from which flakes have been removed.
Debitage	Unmodified flakes or fragments of stone material removed as a result of stone tool manufacture or modification.
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform

Flaked Piece	A fragment of stone where negative flake scarring is visible but no obvious striking platforms are present.
Hearth	The site of a campfire represented by charcoal, burnt earth, ash and sometimes stones used as heat retainers.
Isolated Find	A single artefact found in an isolated context.
Impact Area	An area that requires archaeological investigation and management assessment
In situ	Latin words meaning 'on the spot, undisturbed'.
Knapping Floor	A location on a site which normally represents a stone artefact reduction episode.
Landform	Any one of the various features that make up the surface of the earth.
Landscape	That part of the land's surface, more or less extensive being viewed or under study, that relates to all aspects of its physical appearance, including various vegetation associations and landforms.
Land System	An area, or group of areas, commonly delineated on a map, throughout which there is a recurring pattern of topography, soils, and vegetation.
Land Unit	An area of common landform, and frequently with common geology, soils, and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system.
Management Plans	Conservation plans which identify short and long term management strategies for all known sites recorded within an impact area.
Methodology	The procedures used to undertake an archaeological investigation.
Minimum Requirements	The minimum standard for which NPWS will accept the reporting of an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
Open 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).

Open Area Excavation	A method of excavation where large areas of an archaeological site are open at any one time. A horizontal representation of Aboriginal occupation of different archaeological features is considered to be more important than vertical stratigraphic relationships.
Research Design	A research strategy for carrying out an intensive archaeological investigation and analysis.
Sampling	The process of selecting part of an area under archaeological investigation as a basis for generalising about the whole.
Sample Unit	An area of investigation which is uniform size or density and which can be quantified for analytical reasons.
Salvage	A method by which an archaeological site or group of sites may be fully investigated before they are totally destroyed by a development.
Site	A place where past human activity is identifiable.
Site Recording	The systematic process of collecting archaeological data for an archaeological investigation
Spatial Significance	A site which may contain potential sub-surface deposits or in situ material useful in the analysis of human use of land and site formation process.
Summary Recording	A process of site recording where archaeological data is collected on a summary level only.
Survey Coverage	A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed.
Technological Significance	Artefactual material which may contain types or items, although not unique, may be included in a sample to demonstrate an aspect of stone artefact variability.
Test excavation	A process of exploratory excavation carried out on a small scale and used to determine site extent, site condition and excavation potential.

GLOSSARY BIBLIOGRAPHY

Soil Conservation Service NSW

1986 *Glossary of Terms used in Soil Conservation*, pp 76-7.

Witter, D.

1995 *A classification of Australian Stone Artefacts and principles of taxonomy*. Unpublished report.

Appendix 6 DECCW SITE CARDS



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number _____ - _____ - _____

Date received __/__/__

Date entered into system __/__/__

Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1M255 (DEC number 36-3-1071)

Easting: 0762962

Northing: 6430307

AMG GDA

Mapsheet: Durrigere 8833/1/S

- Zone** 54 1:25k topographic map Non differential GPS
- 55 1:50k topographic map Differential GPS
- 56 1:100k topographic map Engineering survey plan or map
- Client GIS or CAD system

Primary Recorder

Title Surname First Name

Initials

Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733

Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

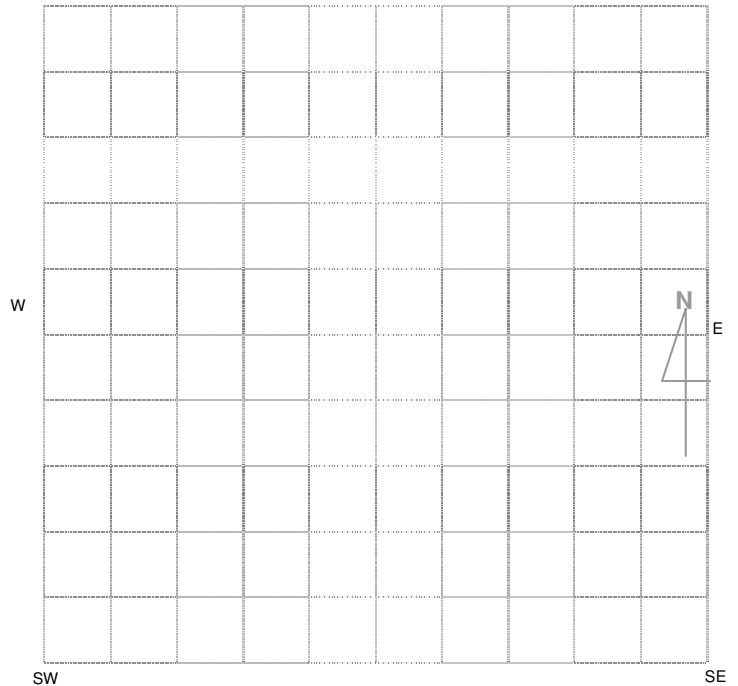
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

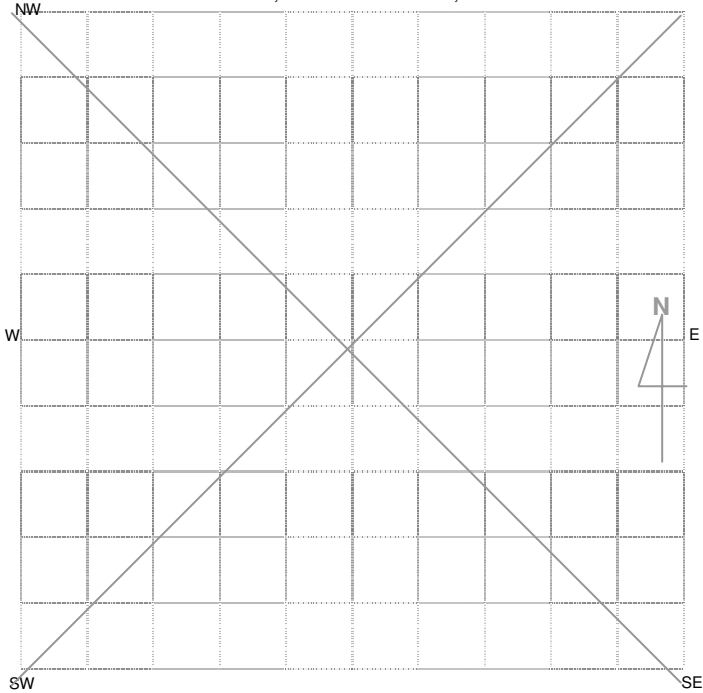
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input checked="" type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 8.5 m Total length of visible site
- 3 m Average width of visible site
- 8.5 m x 3 m Estimated area of visible site
- 8.5 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979. The site is surrounded by potential archaeological deposit and further investigation is recommended.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Artefact scatter located on a vehicle track along a ridge crest (Site previously recorded as an isolated find). Four silcrete flakes recorded in disturbed context. Artefact 1: Silcrete distal flake, no cortex, feather termination. Measurements: L17mm x W9mm x T3mm. Artefact 2: Silcrete distal flake, no cortex, feather termination. Measurements: L23mm x W17mm x T7mm. Artefact 3: Silcrete distal flake, no cortex, feather termination. Measurements: L16mm x W12mm x T3mm. Artefact 4: Silcrete proximal flake, feather termination, broad platform, flake scars on platform. Measurements: L27mm x W24mm x T6mm.

The site is surrounded by potential archaeological deposit and further investigation is recommended. This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: [] Knowledge Holder [] Nominated Trustee [] Native Title Holder [] Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- [] A4 location map
[] B/W photographs
[] Colour photographs
[] Slides
[] Aerial photographs
[] Site plans, drawings
[] Recording tables
[] Other
[] Feature inserts – No. ___

Comments

Large empty rectangular box for entering comments.



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____

Date received __/__/__ Date entered into system __/__/__ Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: S1MC313

Easting: 0762188 Northing: 6429182 AMG GDA

Mapsheets: Durrigere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Office Use Only

Client on system

Client on system

Primary Recorder

Title Surname First Name

Initials

Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

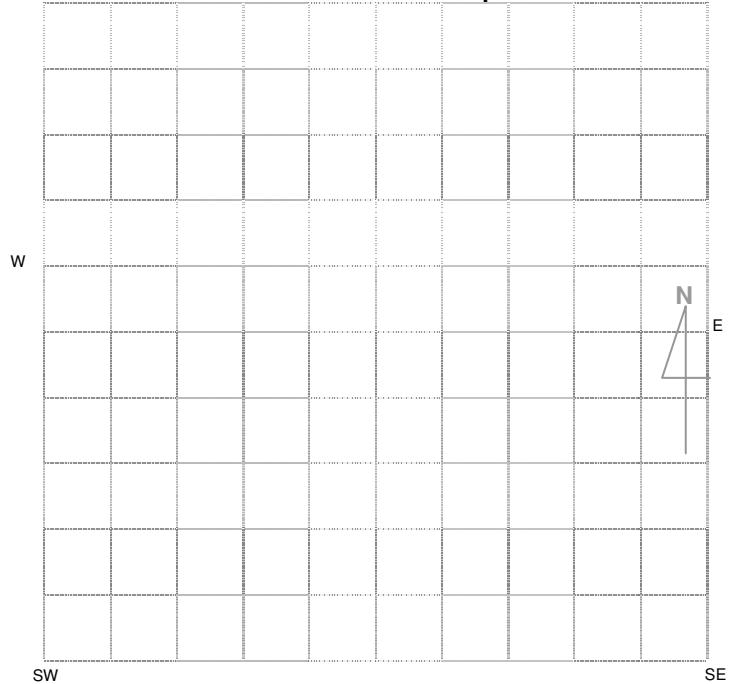
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

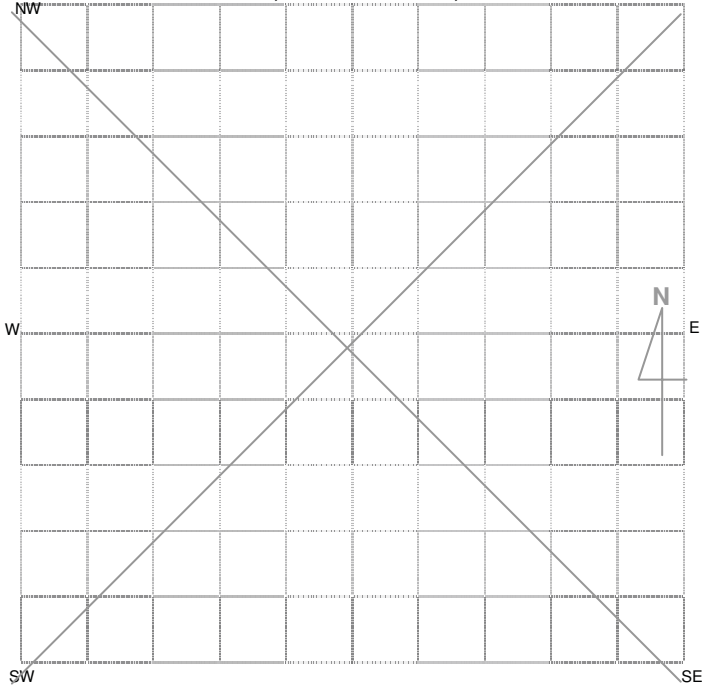
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input checked="" type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Artefact Scatter located on a vehicle track on a lower ridge slope. Two quartz flakes recorded in disturbed context. Artefact 1: Crystalline Quartz flaked piece, possible use wear on margin, no cortex. Measurements: L36mm x W25mm x T16mm. Artefact 2: Crystalline quartz medial flake fragment, no cortex. Measurements: L15mm x W11mm x T 4mm.

This site is of low significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ____

Comments



National Parks and Wildlife Service
Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number _____ - _____ - _____

Date received ____/____/____

Date entered into system ____/____/____

Date catalogued ____/____/____

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC314

Easting: 0761819

Northing: 6429071

AMG GDA

Mapsheet: Durridgere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Client on system

Primary Recorder

Title Surname First Name

Initials

Mr

Hamm

Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733

Fax 4782 2933

Date recorded: 24 November 2009

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

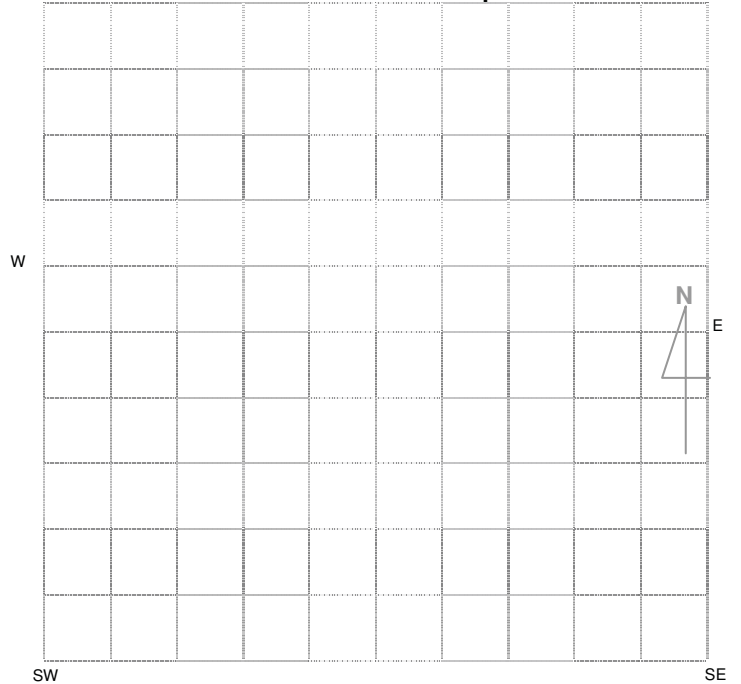
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

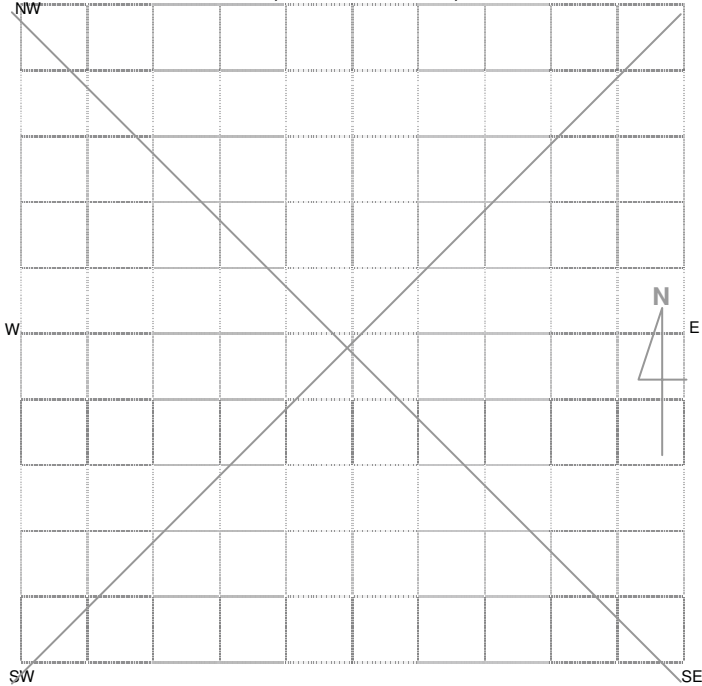
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input checked="" type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 100 m Total length of visible site
- 13 m Average width of visible site
- 100 m x 13 m Estimated area of visible site
- 100 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979. The eastern terrace of the site has potential archaeological deposit and is suitable for further sub-surface investigation

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Artefact Scatter located on a vehicle track on a lower ridge slope on the edge of a dry alluvial gully. Two quartz flakes recorded in disturbed context. Artefact 1: Crystalline quartz medially broken flake, possible use wear on margin, no cortex. Measurements: L21mm x W19mm x T9mm. Artefact 2: Crystalline Quartz distally broken flake no cortex. Measurements: L20mm x W15mm x T5mm.

The eastern terrace of the site has potential archaeological deposit and is suitable for further sub-surface investigation. This site is of low significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments



National Parks and Wildlife Service
Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number _____ - _____ - _____

Date received ___/___/___ Date entered into system ___/___/___ Date catalogued ___/___/___

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: S1MC315

Easting: 0761959 Northing: 6429047 AMG GDA

Mapsheet: Durrigere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials
Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Office Use Only

Client on system

Client on system

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW	NE

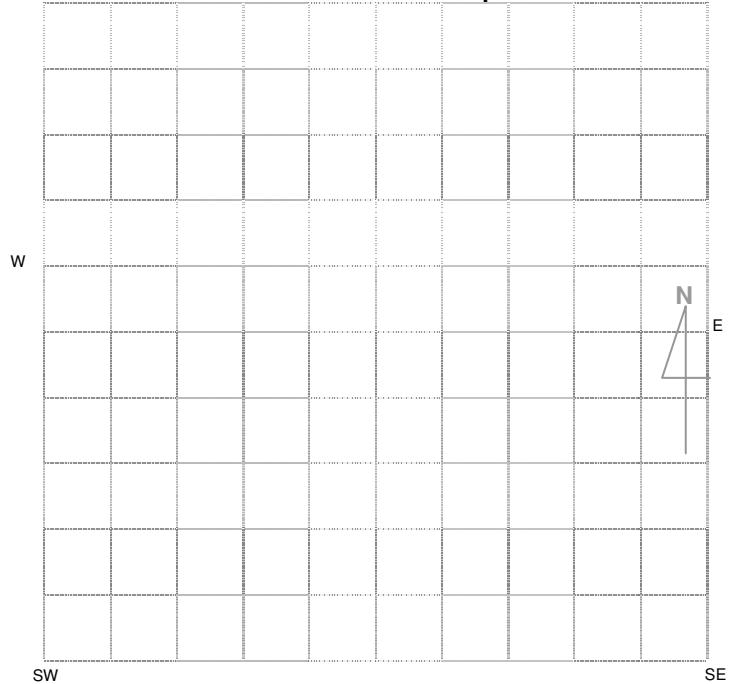
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

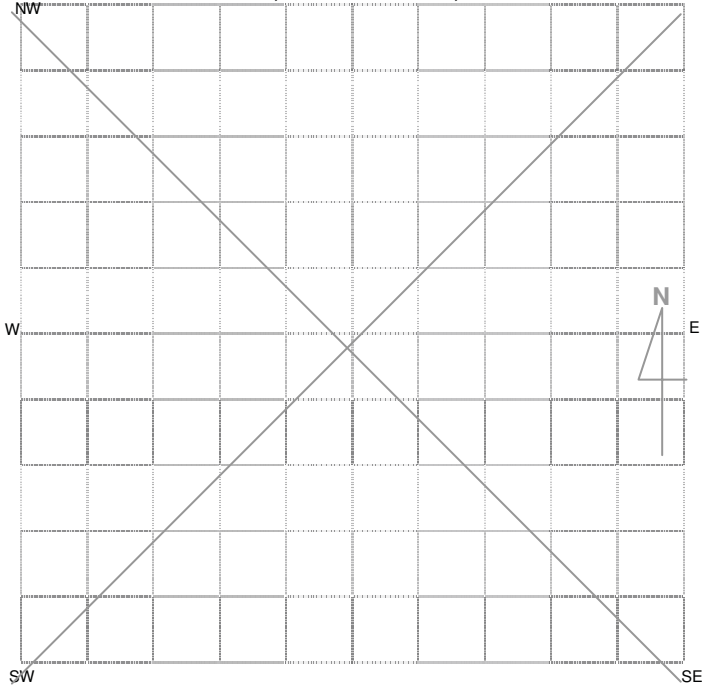
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located 1.5 m north of a vehicle track on a ridge crest. One quartz flake recorded in disturbed context. Artefact 1: Crystalline Quartz medially broken flake, no cortex. Measurements: L17mm x xW11mm x T3mm.

This site is of low significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres

Distance to temporary water source: 500 – 2000 metres

Name of nearest permanent water source: Bora Creek

Name of nearest temporary water:

Directions for Relocation

NW NE

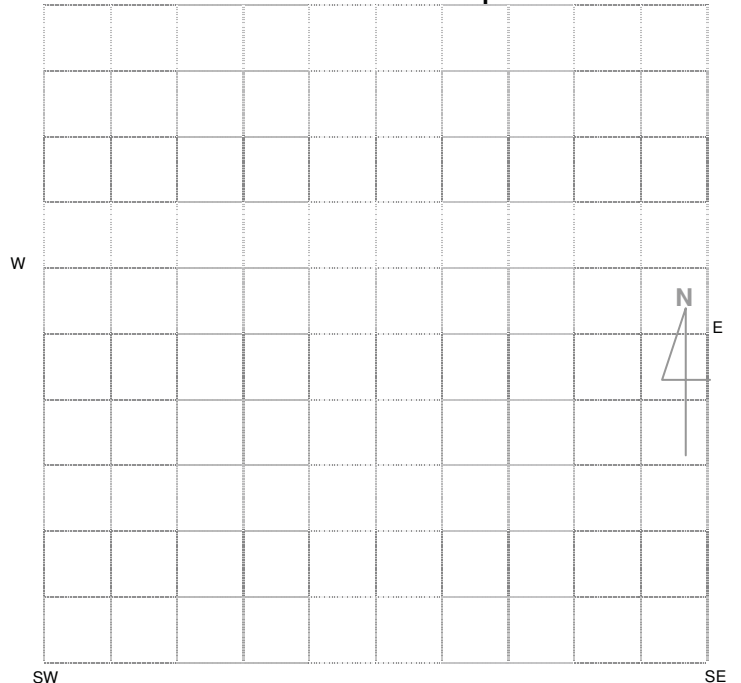
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

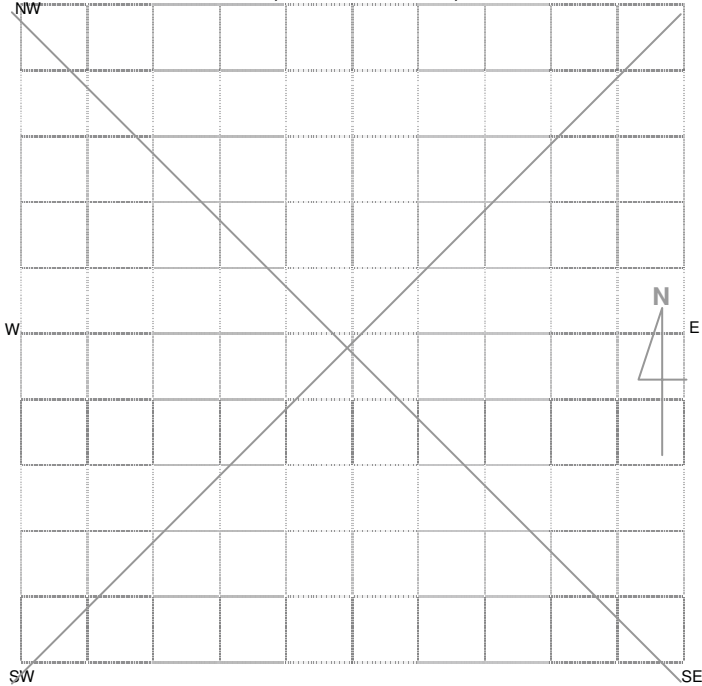
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Artefact Scatter located on a vehicle track on a ridge slope. Two quartz flakes recorded in disturbed context. Artefact 1: Crystalline quartz flake, platform cortex, feather termination. Measurements: L13mm x W22mm x T8mm. Artefact 2: Crystalline quartz flake, no cortex, feather termination, possible use wear on the distal margin. Measurements: L13mm x W12mm x T3mm. Platform: 11mm x 4mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
 Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ___ - ___ - ___

Date received __/__/__ Date entered into system __/__/__ Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC324

Easting: 0763245 Northing: 6432104 AMG GDA

Mapsheet: Durrigere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials Hamm Giles
Mr

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW	NE

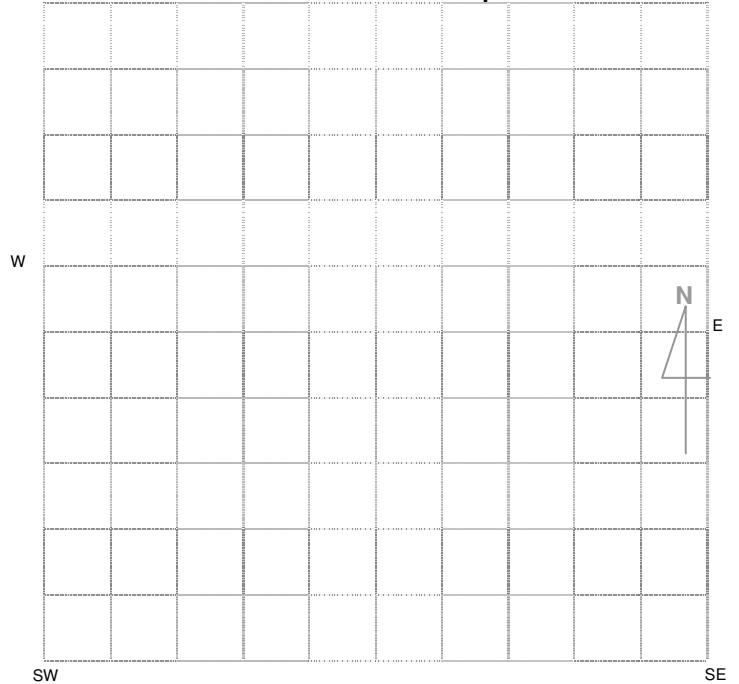
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

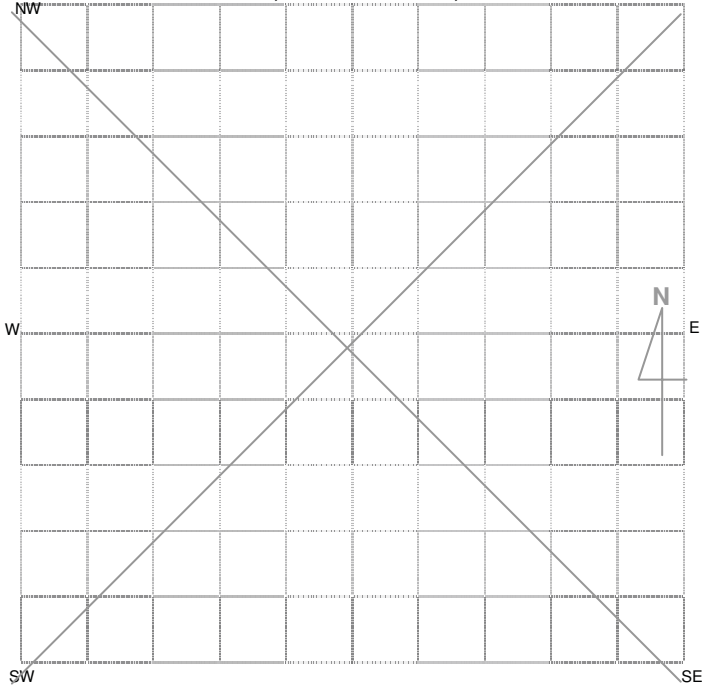
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1 m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located on a vehicle track along a ridge slope. One quartz flake recorded in disturbed context. Artefact 1: Crystalline quartz broken flake, split cone, no cortex, feather termination, no retouch, small amount of edge damage.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ____

Comments



**National Parks and Wildlife Service
Aboriginal Site Recording Form**

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____ - ____

Date received __/__/__

Date entered into system __/__/__

Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male
 Gender/female
 Location restriction
 General restriction
 No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC317

Easting: 0762078 Northing: 6429120
 AMG GDA

Mapsheet: Durridgere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials Hamm Giles
Mr

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

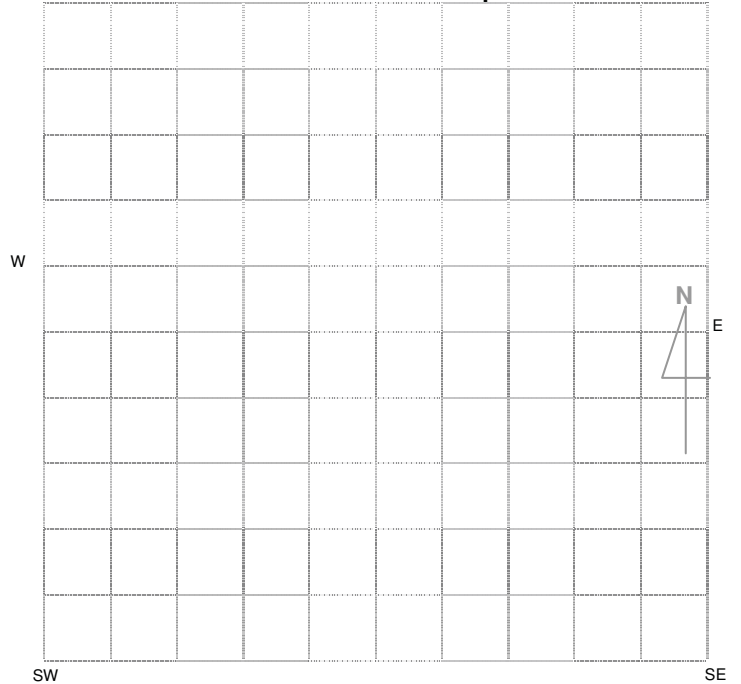
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

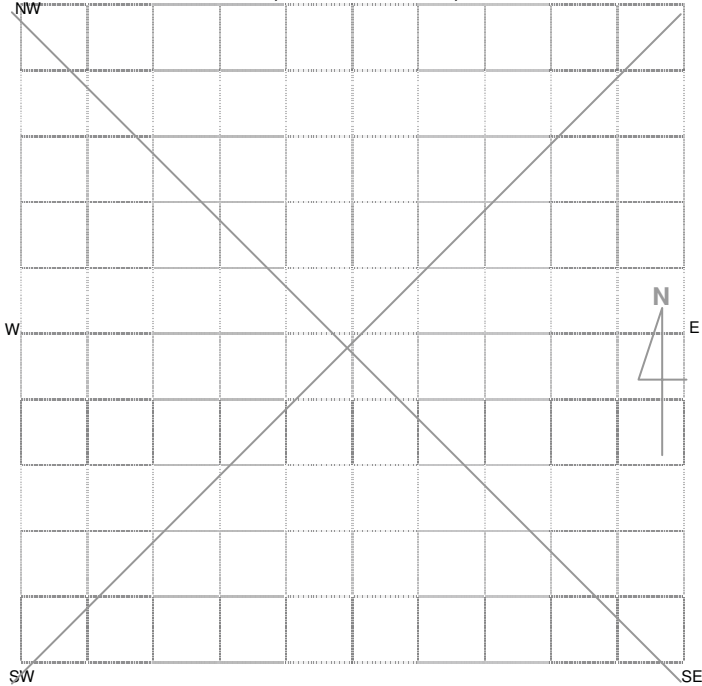
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located on a vehicle track on a ridge slope. One quartz flaked piece recorded in disturbed context. Artefact 1: Crystalline quartz flaked piece, no cortex. Measurements: L29mm x W19mm x T13mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____

Date received __/__/__ Date entered into system __/__/__ Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC318

Easting: 0762107 Northing: 6429141 AMG GDA

Mapsheet: Durridgere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials
Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Current Land Tenure

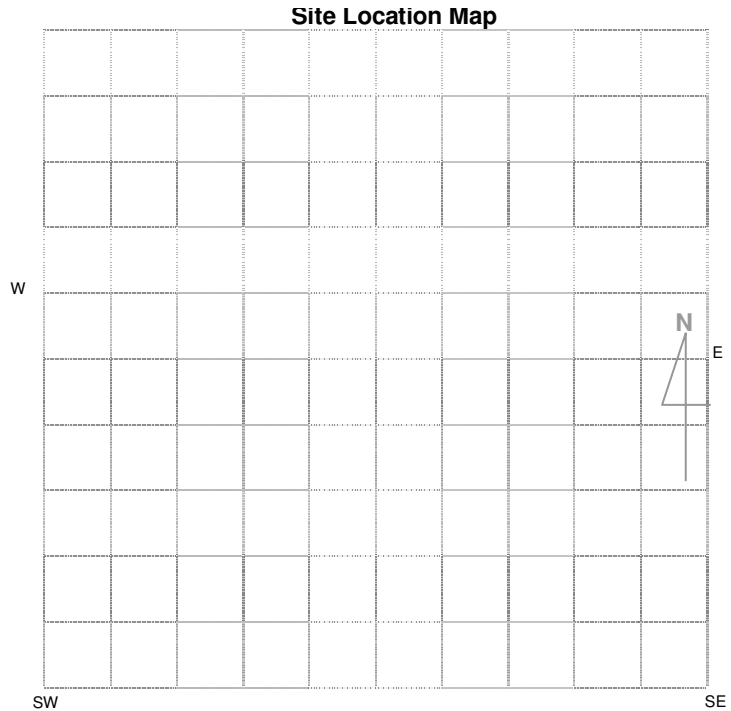
- Public National Park / other Government Dept.
- Private

Private report

I.D. (I.D. Office Use only)

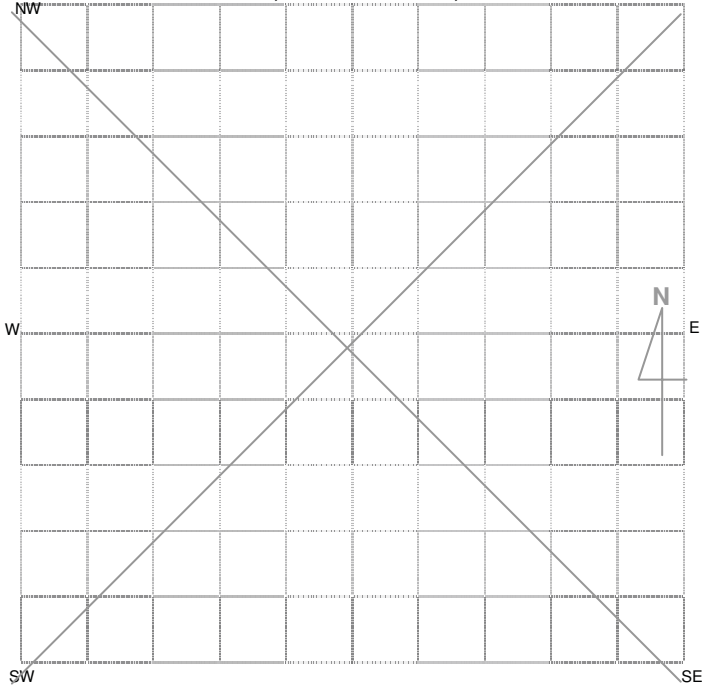
Directions for Relocation

NW	NE



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1 m Average width of visible site
- 1m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated Find located on a vehicle track on a ridge crest. Single quartz flake recorded in disturbed context. Artefact 1: Crystalline quartz complete flake, feather termination, no cortex. Measurements: L31mm x W13mm x T9mm.

This site is of low significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsee

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____ - ____

Date received __/__/__

Date entered into system __/__/__

Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: S1MC319

Easting: 0761634

Northing: 6429082

AMG GDA

Mapsheets: Durridgere 8833/1/S

Zone 54 1:25k topographic map

Non differential GPS

55 1:50k topographic map

Differential GPS

56 1:100k topographic map

Engineering survey plan or map

Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials
Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733

Fax 4782 2933

Date recorded: 24 November 2009

Office Use Only

Client on system

Client on system

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

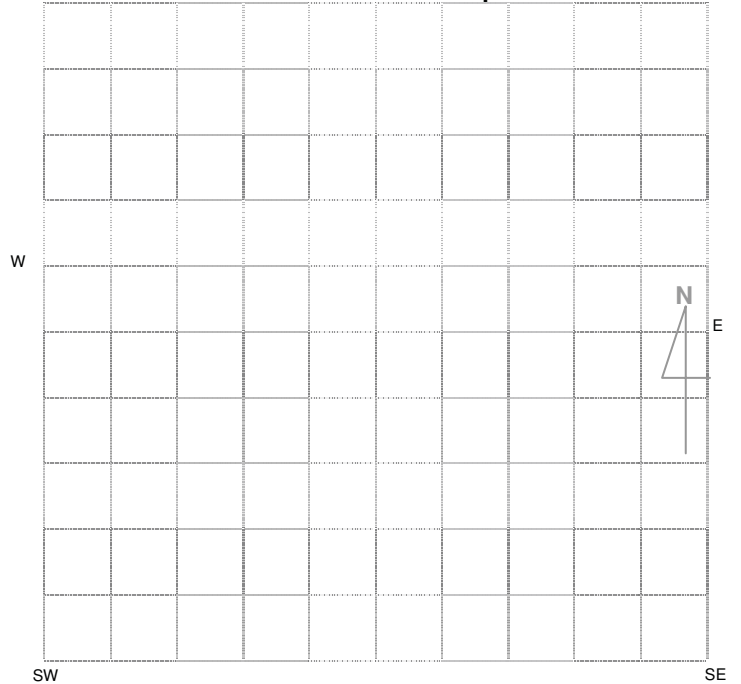
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

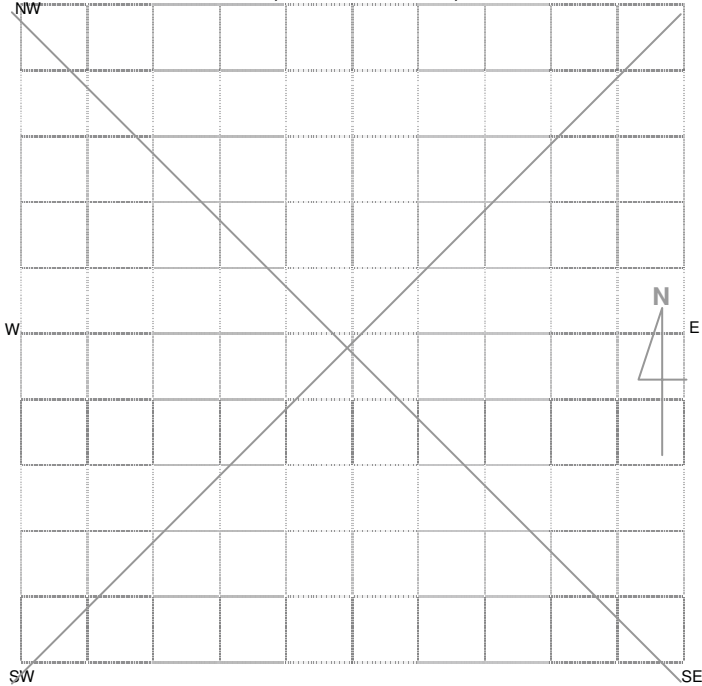
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
Closed Site Shelter/Cave Formation <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse Condition of Ceiling <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	Rock Surface Condition <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform Shelter Aspect <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West	Open Site Site Orientation <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located on a vehicle track along a ridge slope. One quartz flake recorded in disturbed context. Artefact 1: Crystalline quartz distally broken flake, no cortex, broad platform, no use wear. Measurements: L15mm x W18mm x T7mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ____

Comments



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number _____ - _____ - _____

Date received ___/___/___

Date entered into system ___/___/___

Date catalogued ___/___/___

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC320

Easting: 0761047

Northing: 6429251

AMG GDA

Mapsheet: Durridgere 8833/1/S

- Zone** 54 1:25k topographic map Non differential GPS
- 55 1:50k topographic map Differential GPS
- 56 1:100k topographic map Engineering survey plan or map
- Client GIS or CAD system

Client on system

Primary Recorder

Title Surname First Name
Initials Hamm Giles
Mr

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733

Fax 4782 2933

Date recorded: 24 November 2009

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW	NE
<hr/> <hr/> <hr/> <hr/>	

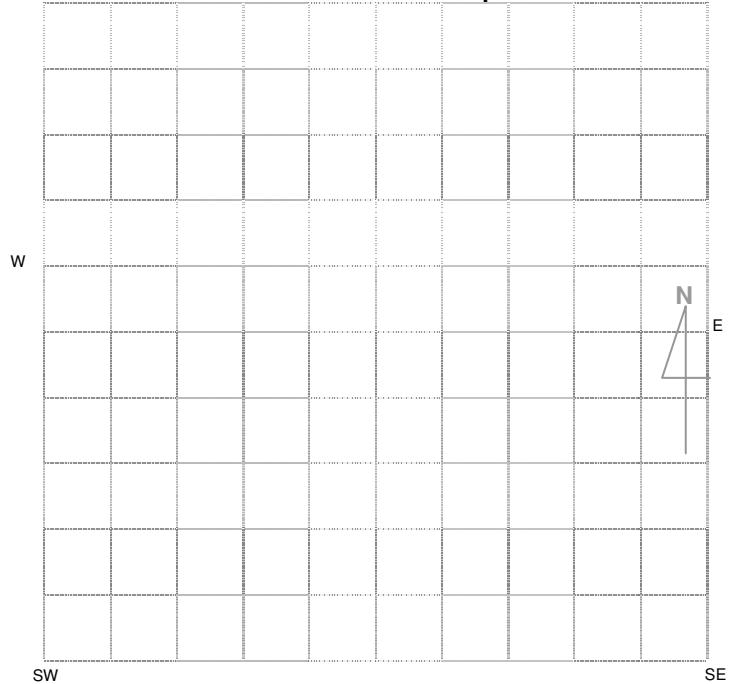
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

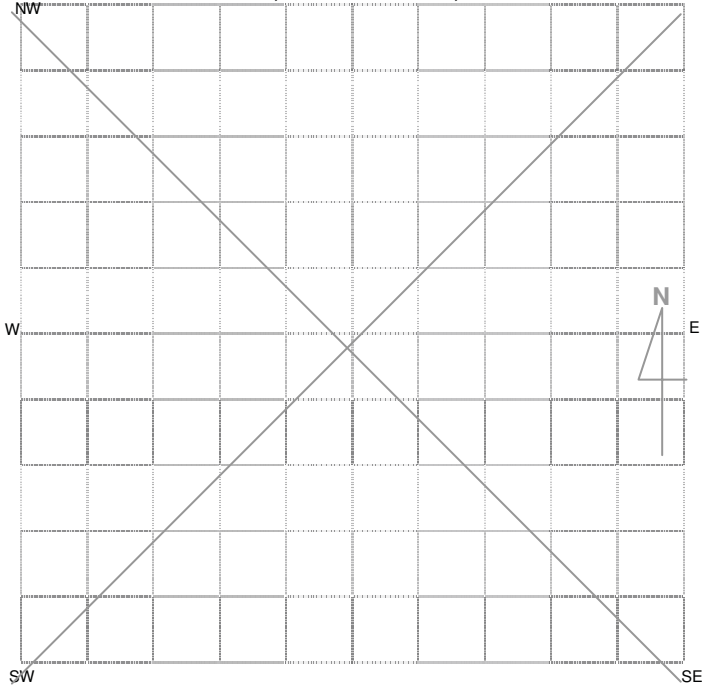
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located on a vehicle track along a lower ridge slope. One quartz flake recorded in disturbed context. Artefact 1: Crystalline Quatz complete flake, no cortex, focal platform, feather termination, possible use wear on margins. Measurements: L13mm x W17mm x T5mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ____

Comments



**National Parks and Wildlife Service
Aboriginal Site Recording Form**

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____ - ____ - ____

Date received __/__/__ Date entered into system __/__/__ Date catalogued __/__/__

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name: S1MC321

Easting: 0763728 Northing: 6427662 AMG GDA

Mapsheet: Wollar 8833/2/N

Zone 54 1:25k topographic map Non differential GPS
 55 1:50k topographic map Differential GPS
 56 1:100k topographic map Engineering survey plan or map
 Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials Hamm Giles
Mr

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Office Use Only

Client on system

Client on system

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

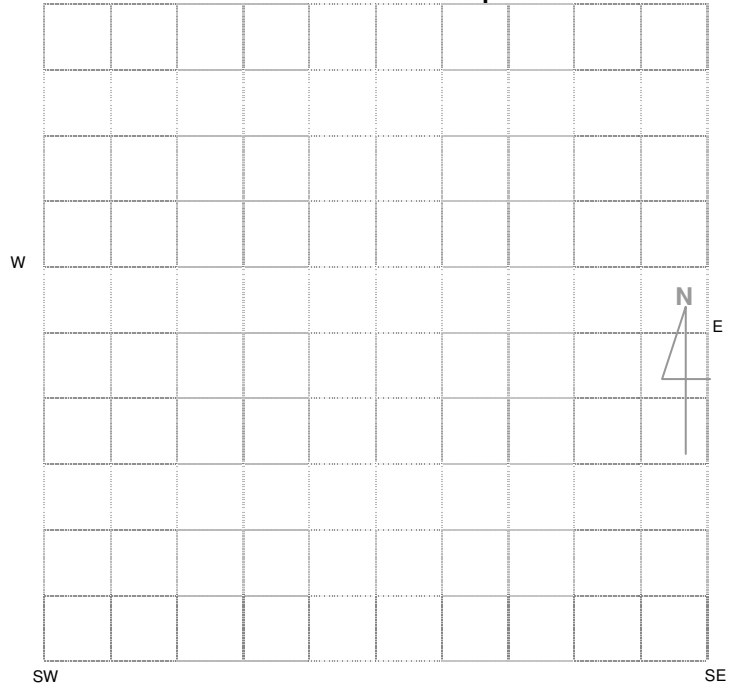
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

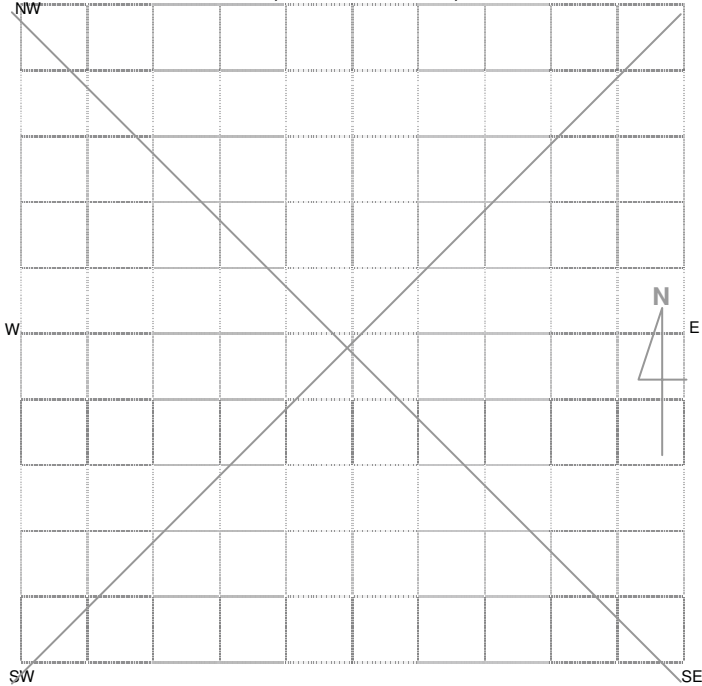
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1m Average width of visible site
- 1 m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by control gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located within a patch of ti-tree scrub within an open forest. One silcrete flake recorded. Artefact 1: Grey silcrete distally broken flake, cortex 5% on dorsal surface, possible use wear on margin. Measurements: L35mm x W29mm x T5mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ____

Comments



National Parks and Wildlife Service
Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number _____

Date received ___/___/___

Date entered into system ___/___/___

Date catalogued ___/___/___

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC322

Easting: 0763693

Northing: 6428813

AMG GDA

Mapsheet: Durridgere 8833/1/S

Zone 54 1:25k topographic map Non differential GPS

55 1:50k topographic map Differential GPS

56 1:100k topographic map Engineering survey plan or map

Client GIS or CAD system

Primary Recorder

Title Surname First Name
Initials
Mr Hamm Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733 Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW NE

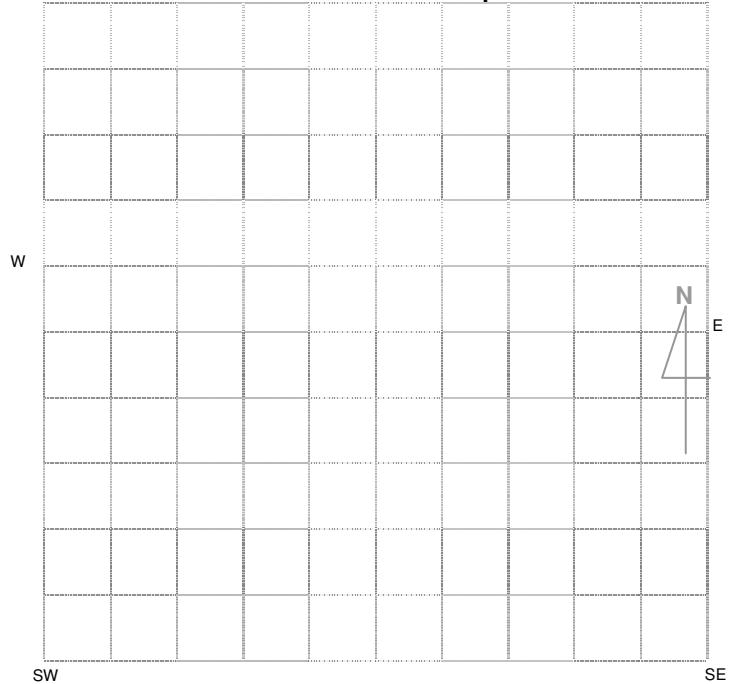
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

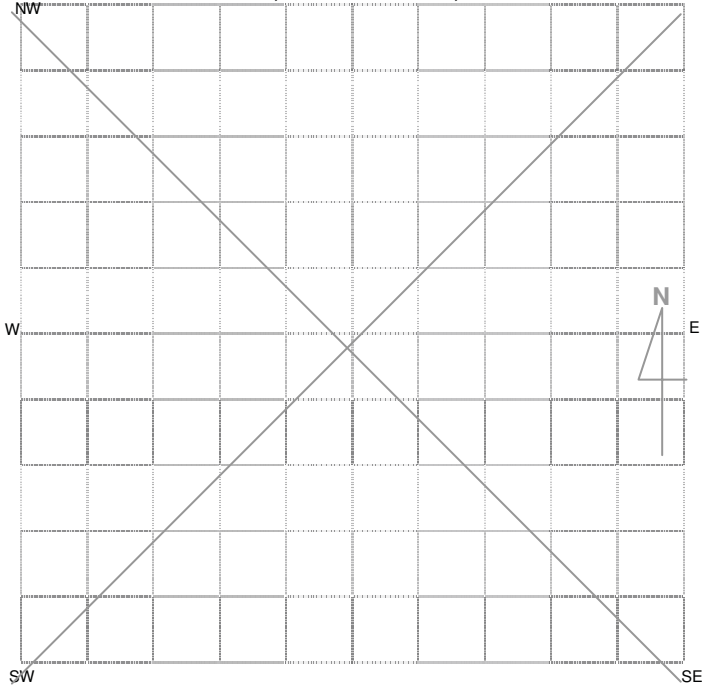
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
<p>Closed Site</p> <p>Shelter/Cave Formation</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Wind erosion <input type="checkbox"/> Water erosion <input type="checkbox"/> Rock collapse	<p>Rock Surface Condition</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Open Site</p> <p>Site Orientation</p> <input type="checkbox"/> N-S <input type="checkbox"/> NE-SW <input type="checkbox"/> E-W <input type="checkbox"/> SE-NW <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> 1. Aboriginal Ceremony & Dreaming <input type="checkbox"/> 2. Aboriginal Resource & Gathering <input type="checkbox"/> 3. Art <input checked="" type="checkbox"/> 4. Artefact <input type="checkbox"/> 5. Burial <input type="checkbox"/> 6. Ceremonial Ring <input type="checkbox"/> 7. Conflict <input type="checkbox"/> 8. Earth Mound <input type="checkbox"/> 9. Fish Trap <input type="checkbox"/> 10. Grinding Groove <input type="checkbox"/> 11. Habitation Structure <input type="checkbox"/> 12. Hearth <input type="checkbox"/> 13. Non Human Bone & Organic Material <input type="checkbox"/> 14. Ochre quarry <input type="checkbox"/> 15. Potential Archaeological Deposit <input type="checkbox"/> 16. Stone Quarry <input type="checkbox"/> 17. Shell <input type="checkbox"/> 18. Stone Arrangement <input type="checkbox"/> 19. Modified Tree <input type="checkbox"/> 20. Water Hole
<p>Condition of Ceiling</p> <input type="checkbox"/> Boulder <input type="checkbox"/> Sandstone platform <input type="checkbox"/> Silica gloss <input type="checkbox"/> Tessellated <input type="checkbox"/> Weathered <input type="checkbox"/> Other platform	<p>Shelter Aspect</p> <input type="checkbox"/> North <input type="checkbox"/> North East <input type="checkbox"/> East <input type="checkbox"/> South East <input type="checkbox"/> South <input type="checkbox"/> South West <input type="checkbox"/> West <input type="checkbox"/> North West		

Site Plan Indicate scale, boundaries of site, features.



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1 m Total length of visible site
- 1 m Average width of visible site
- 1m x 1 m Estimated area of visible site
- 1 m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

This site is of low significance, however, owing to the proximity of S1MC322 to previously recorded sites (S1MC271, S1MC272), and in order to avoid the surrounding area of potential archaeological deposit, it is recommended that the pipeline route is relocated to follow the nearby existing vehicle track.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Artefact Scatter located on lower ridge slope within a colluvial deposit below a sandstone outcrop. Three quartz flakes recorded in disturbed context. Artefact 1: Crystalline quartz flaked piece, no cortex, edge damage on numerous edges. Measurements: L23mm x W13mm x T9mm. Artefact 2: Crystalline quartz distal flake, no cortex. Measurements: L12mm x W8mm x T5mm. Artefact 3: Crystalline quartz distal flake, no cortex. Measurements: L8mm x W5mm x T3mm.

Site is likely to be on the edge of previously recorded site, S1MC271, and is surrounded by an area of potential archaeological deposit measuring approximately 200 m x 100 m. This site is of low significance, however, in order to avoid the PAD, it is recommended that the pipeline route is relocated to follow the nearby existing vehicle track.

This section should only be filled in by the Endorsee

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus
Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts – No. ___

Comments



National Parks and Wildlife Service Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number ____ - ____ - ____

Date received ___/___/___

Date entered into system ___/___/___

Date catalogued ___/___/___

Entered by (I.D.) _____

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Mr Surname Livingston-Blevins First Name Ian Initials

Organisation Moolarben Coal Mines Pty Ltd

Address Locked Bag 2003 Mudgee NSW 2850

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name: S1MC323

Easting: 0763211

Northing: 6432118

AMG GDA

Mapsheet: Durrigere 8833/1/S

Zone 54

1:25k topographic map

Non differential GPS

55

1:50k topographic map

Differential GPS

56

1:100k topographic map

Engineering survey plan or map

Client GIS or CAD system

Primary Recorder

Title Surname First Name

Initials

Mr

Hamm

Giles

Organisation: Archaeological Risk Assessment Services

Address PO Box 67, Katoomba NSW 2780

Phone Number 4782 2733

Fax 4782 2933

Date recorded: 24 November 2009

Client on system

CLOSED SITE OPEN SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling Hills
- Steep Hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope

- Upper slope
- Plain
- Ridge
- Tor
- Valley Flat
- Levy

- Stream Bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

0-5 Degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source: 500 – 2000 metres
 Distance to temporary water source: 500 – 2000 metres
 Name of nearest permanent water source: Bora Creek
 Name of nearest temporary water:

Directions for Relocation

NW	NE
<hr/> <hr/> <hr/> <hr/>	

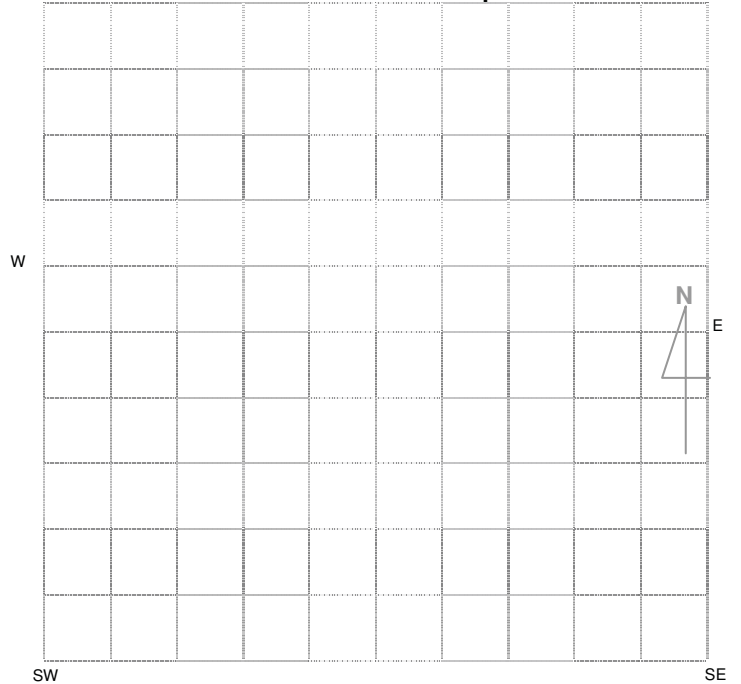
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Private report

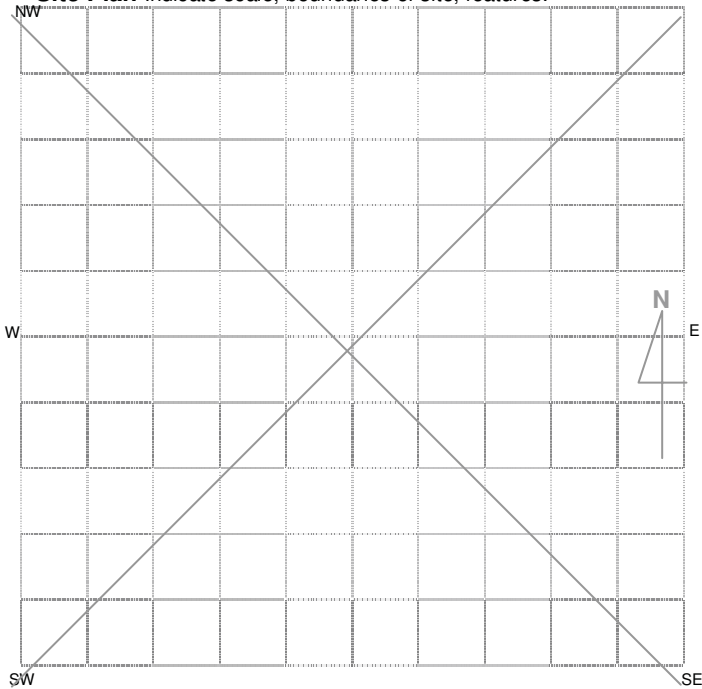
I.D. (I.D. Office Use only)

Site Location Map



General Site Information			Features
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Aboriginal Community Interpretation and Management Recommendations

This site is of low scientific significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Isolated find located on a vehicle track along a ridge slope. One quartz flaked piece recorded in disturbed context. Artefact 1: Crystalline quartz flaked piece/ flaked tool, retouch on longest margin (50%), 10% cortex. Measurements: L45mm x W25mm x T15mm.

This site is of low significance. Surface Collection by controlled gridded method. Bagged and labelled appropriately. Mapped according to scale. All retrieved material bagged and properly labelled for artefact analysis and catalogued for return to Aboriginal community under section 85A Care and Control Permit under NPW Act 1979.

This section should only be filled in by the Endorsees

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Title Surname First Name Initials

Organisation

Address

Phone Number

Fax

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Comments