APPENDIX 11

Aboriginal Archaeology Assessment

Readymix Holdings Pty Limited

Aboriginal Archaeological Assessment Proposed Lynwood Quarry, Marulan

May 2005

Umwelt
Environmental Consultants

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FIGURES

APPENDICES

1.0 INTRODUCTION

This report presents the results of an Aboriginal archaeological survey and assessment undertaken for the proposed Lynwood Quarry (the project). Readymix Holdings Pty Limited (Readymix) proposes to establish the hard rock quarry on its land to the west of Marulan in the Southern Tablelands region of New South Wales (NSW) (refer to **Figure 1.1**). The proposed quarry will be located approximately 160 kilometres southwest of Sydney and approximately 27 kilometres northeast of Goulburn. The Readymix land holding totals approximately 1000 hectares, the majority of which is a grazing property known as 'Lynwood'.

Readymix commissioned Umwelt (Australia) Pty Limited, (Umwelt), to carry out an Aboriginal archaeological survey and assessment of the project area in accordance with the current (July 2004) Department of Environment and Conservation (DEC) *Guidelines for Archaeological Survey Reporting* (1997) and *Standards for Archaeological Practice in Aboriginal Heritage Management* (1997). Prior to completion of this report DEC released their *Interim Community Consultation Requirements for Applicants* (December 2004), which calls for broader Aboriginal consultation than required previously, however, in accordance with advice from DEC (February 2005) the report for this project was completed under the former guidelines for Aboriginal consultation (refer to **Section 1.6**).

1.1 LOCATION OF THE PROJECT AREA

The project area is situated to the south and west of Marulan township in the Goulburn Mulwaree Local Government Area (LGA) (refer to **Figure 1.2**). It is bounded on its southern side by the Hume Highway and bisected in an east-west direction by the Main Southern Railway. It incorporates the headwaters of Joarimin Creek and, on its southern side running approximately parallel to the Hume Highway, Marulan Creek.

The project area is currently used for cattle grazing except for the transport corridors and an area on the eastern boundary of the property which is leased by Readymix to Orica Explosives and is occupied by a bulk storage depot. A substantial portion of the northern area of the project area is occupied by woodland, with the majority of the remainder being cleared grazing land with scattered patches of woodland. The project area is surrounded primarily by grazing land with a developing rural residential area located adjacent to the northeastern boundary and residential areas associated with the township of Marulan further to the east. Marulan's waste management facility is adjacent to the eastern boundary of the project area, with land zoned for industrial development also occurring in this vicinity.

1.2 NATURE OF THE DEVELOPMENT

The project area contains a substantial, high quality hard rock resource with ready access to key transport infrastructure (Main Southern Railway and Hume Highway). Readymix has a sound knowledge of the hard rock resource, due to both an extensive exploration drilling program and experience from operation of the existing Johniefelds Quarry, located on Brayton Road approximately 2 kilometres north of the project area.

The project is intended to provide a long-term supply of high quality construction material into the Sydney, regional and local markets. The proposed supply to the Sydney market will replace Readymix's current production from the Penrith Lakes Scheme which is likely to be exhausted within the next six years. It is proposed that the Lynwood Quarry will produce up to 5 million tonnes per annum (Mtpa) of hard rock aggregate with an expected life of in excess of 90 years. Initial approval is sought for a 30 year quarry period.

The conceptual design for the project has evolved throughout the environmental impact assessment (EIA) process in light of ongoing exploration and geological modelling work, environmental

FIGURE 1.1

Locality Plan

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Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

Project Area

FIGURE 1.2

Aerial View of Project Area

constraints and opportunities and in consideration of stakeholder consultation outcomes. A detailed description of the conceptual features that comprise the Lynwood Quarry Project are included in the following sections.

1.2.1 Construction Phase

As Lynwood Quarry is a greenfields project (that is, there is not currently any quarrying activity at the site), substantial construction works will be required prior to the quarry becoming operational. The construction phase is expected to last approximately two years and will include the following key activities:

- construction of initial site access road and set-up of construction compounds including supply of services (e.g. electricity, water, etc.);
- set-up of mobile concrete and crushing plants;
- construction of the Hume Highway interchange and permanent site access road;
- construction of the rail overpass;
- extraction of material from the primary crusher area. The excavation of this material is likely to require blasting with the excavated material processed through the mobile crushing plant to produce road base/fill to be used in the construction project;
- excavations for the rail loop and reclaim tunnel. Again the excavation process may require blasting and overburden and moderately weathered material will be generated. This material will also be utilised in the construction project;
- construction of the crushing plant, rail facility, truck loading facility and other infrastructure;
- construction of rail lines and connection onto the Main Southern Railway;
- construction of remaining facilities including workshops, site offices, amenities, laboratory, weighbridge, stores, parking areas, site roads, safety bunds, etc.;
- construction of water management structures and installation of pumps, pipelines, etc; and
- installation of security fencing and gates to ensure public safety and security for the quarry operations.

The conceptual locations of the construction compounds and mobile crushing and concrete plants are shown on **Figure 1.3**.

1.2.2 Operational Phase

Over the initial 30 year operation period, Lynwood Quarry will produce approximately 145 Mt of quarry product. Some of the material extracted as part of the quarrying process will not be suitable for sale and consequently emplacement areas will be required. This material consists of both overburden material which will be excavated and taken directly to emplacement areas without passing through the crushing and screening plant and also material generated at various phases of the crushing and screening process. Due to the depth of the resource and the number of years which will be required in order to reach a terminal face, in-pit dumping will not be possible during the initial 30 year quarry period without sterilising future resources and therefore, all emplacement areas are planned to be out-of-pit.

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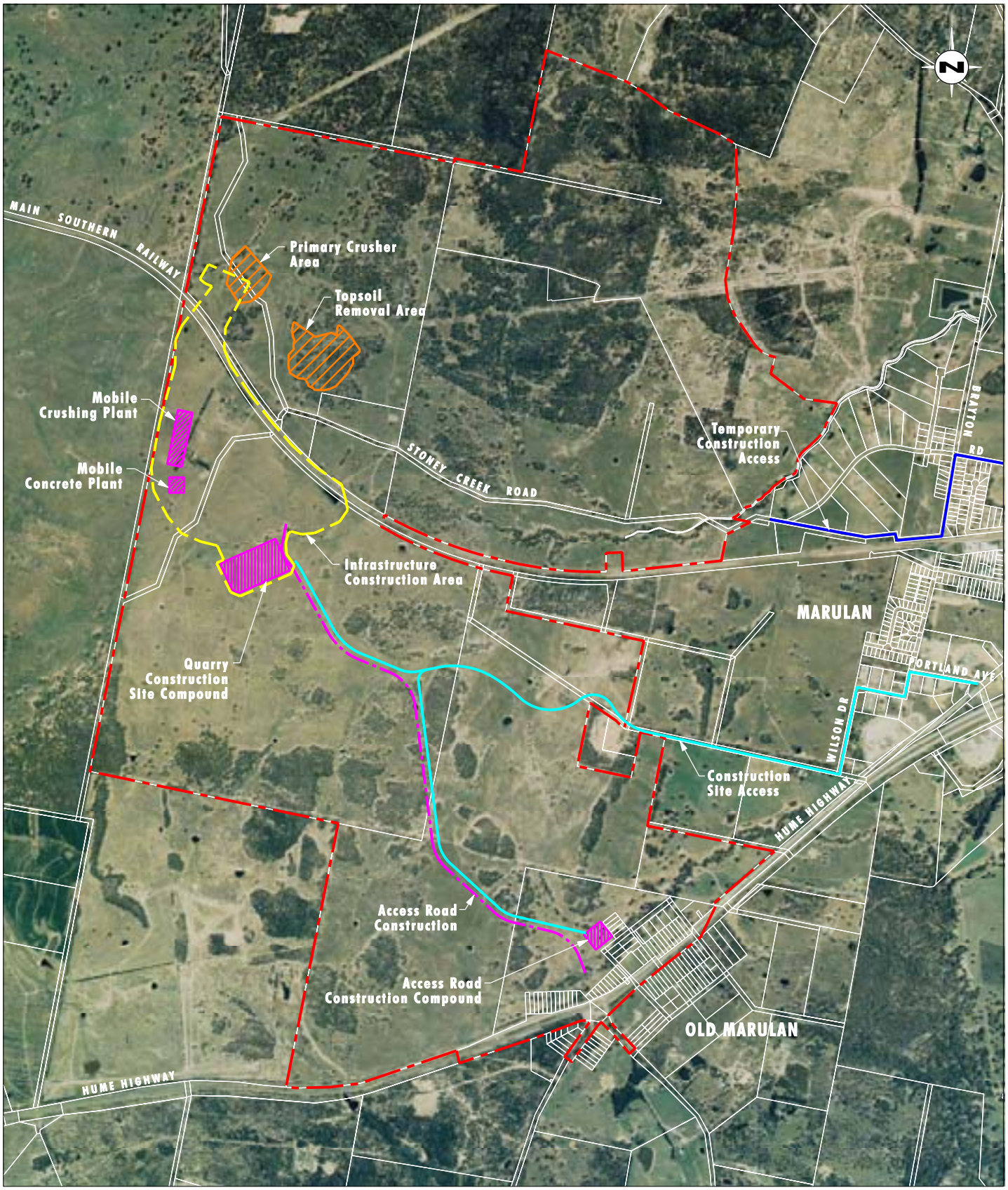

Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

- Project Area
- Access Road Construction
- Construction Site Access
- Temporary Construction Access
- Infrastructure Construction Area
- Construction Compounds and Plant Locations

FIGURE 1.3

Construction Phase Conceptual Layout

The footprint of the conceptual quarry plan and associated infrastructure for Years 2, 10 and 30 are shown on **Figures 1.4**, **1.5** and **1.6**.

The initial quarry will commence in the southeastern portion of the proposed quarry area. In Year 2 (refer to **Figure 1.4**), the quarry pit will continue to expand and deepen, and will extend to the west. By Year 10 (refer to **Figure 1.5**) the quarry pit will have extended further to the north occupying an area approximately two thirds of the 30 year quarry footprint. The quarry footprint continues to expand between Years 10 and 15, with the 15 year footprint almost totally occupying the 30 year footprint (refer to **Figure 1.6**). After this time, the majority of quarry development is through increased depth with only minimal footprint increases between Years 15 and 20, and between Years 20 and 25.

The quarrying process will involve the following broad steps:

- clearing and topsoil stripping – likely equipment will include a dozer, excavator, loaders and dump trucks;
- drill and blast – percussion drill drilling holes to a bench height of approximately 15 metres. Approximately one blast will be required each week in order to meet production requirements; and
- the resultant material from the blast will be loaded by front-end loaders into dump trucks and transported to the crushing and screening plant. Any pieces of rock that are too large to be transported or loaded into the primary crusher will be broken into smaller pieces by a hydraulic rock breaker.

Three overburden emplacement areas have been designed to accommodate the overburden material removed during the initial 30 year quarrying period. These three dumps are shown on the staged conceptual quarry plans included as **Figures 1.4** to **1.6** and are known as the Rail Overburden Emplacement Area, the Eastern Overburden Emplacement Area and the Western Overburden Emplacement Area. The Rail Overburden Emplacement Area will be developed first and will occupy an area of approximately 12 hectares. This emplacement area will be used for the first approximately three years of the operation, following which emplacement will commence in the Eastern Overburden Emplacement Area. This emplacement area has a footprint of 31 hectares and will reach its capacity in approximately Year 12. Following this time, all overburden will be emplaced in the Western Overburden Emplacement Area which will have a footprint of approximately 11 hectares.

The overburden emplacement areas will require vegetation clearance and topsoil stripping prior to development.

1.2.3 Proposed Infrastructure

The proposed infrastructure includes:

- a crushing and screening plant;
- rail loading facility and rail transportation infrastructure;
- truck loading facility and roads;
- areas for storage of product, including the excess product stockpiles;
- workshop facilities;

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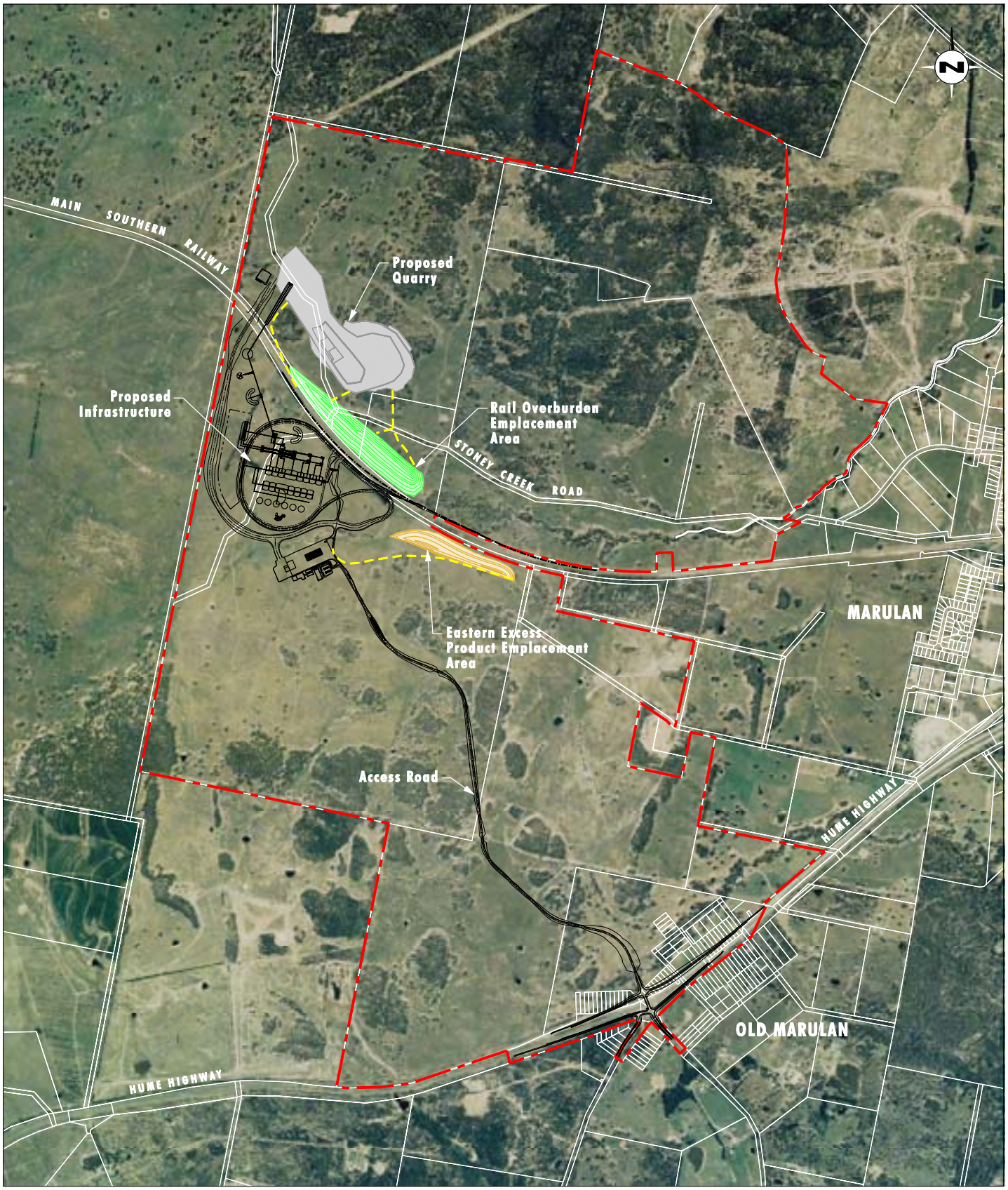

Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

Project Area

Haul Road

FIGURE 1.4

Year 2 Quarry Plan

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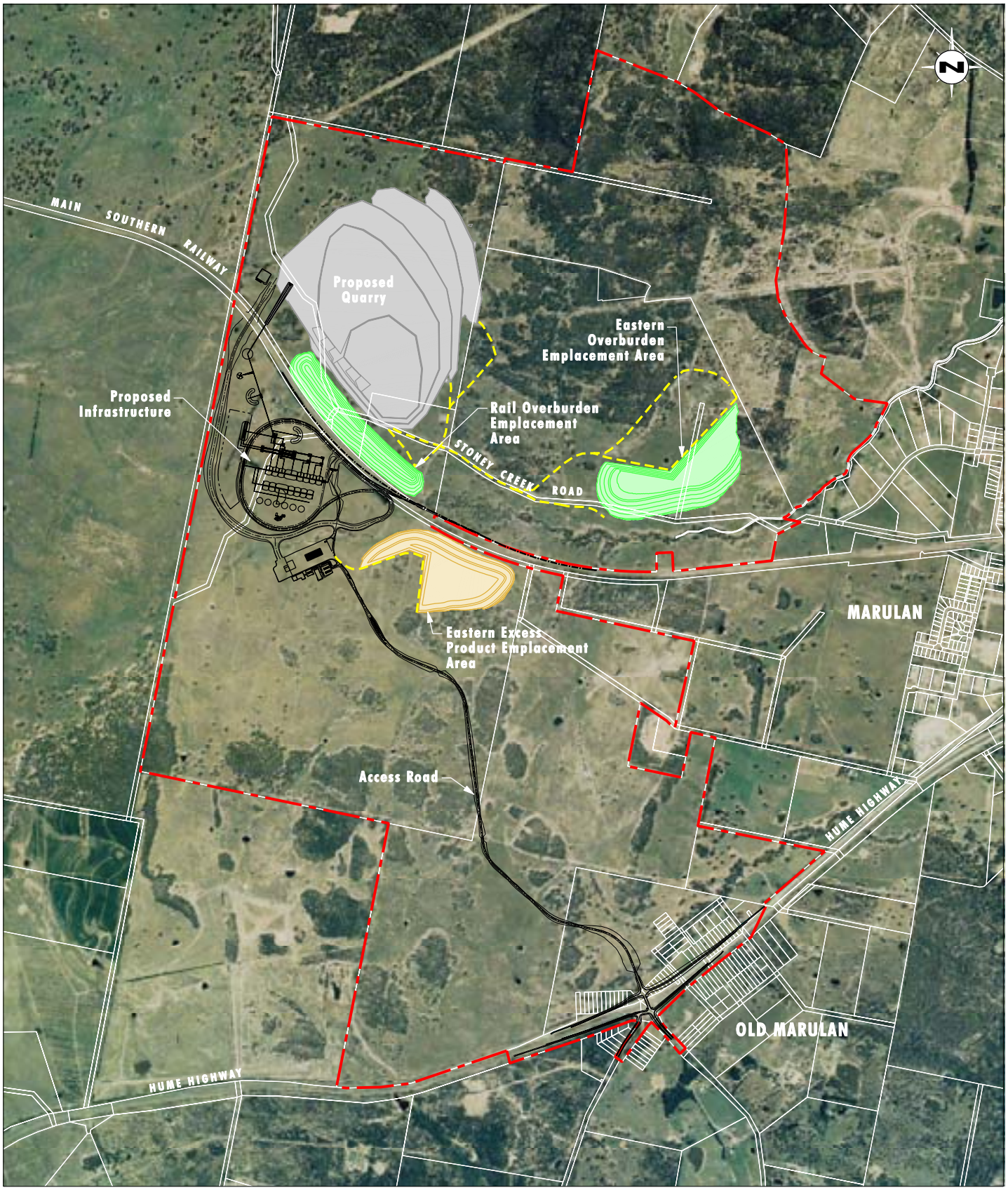

Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

- Project Area
- Haul Road

FIGURE 1.5

Year 10 Quarry Plan

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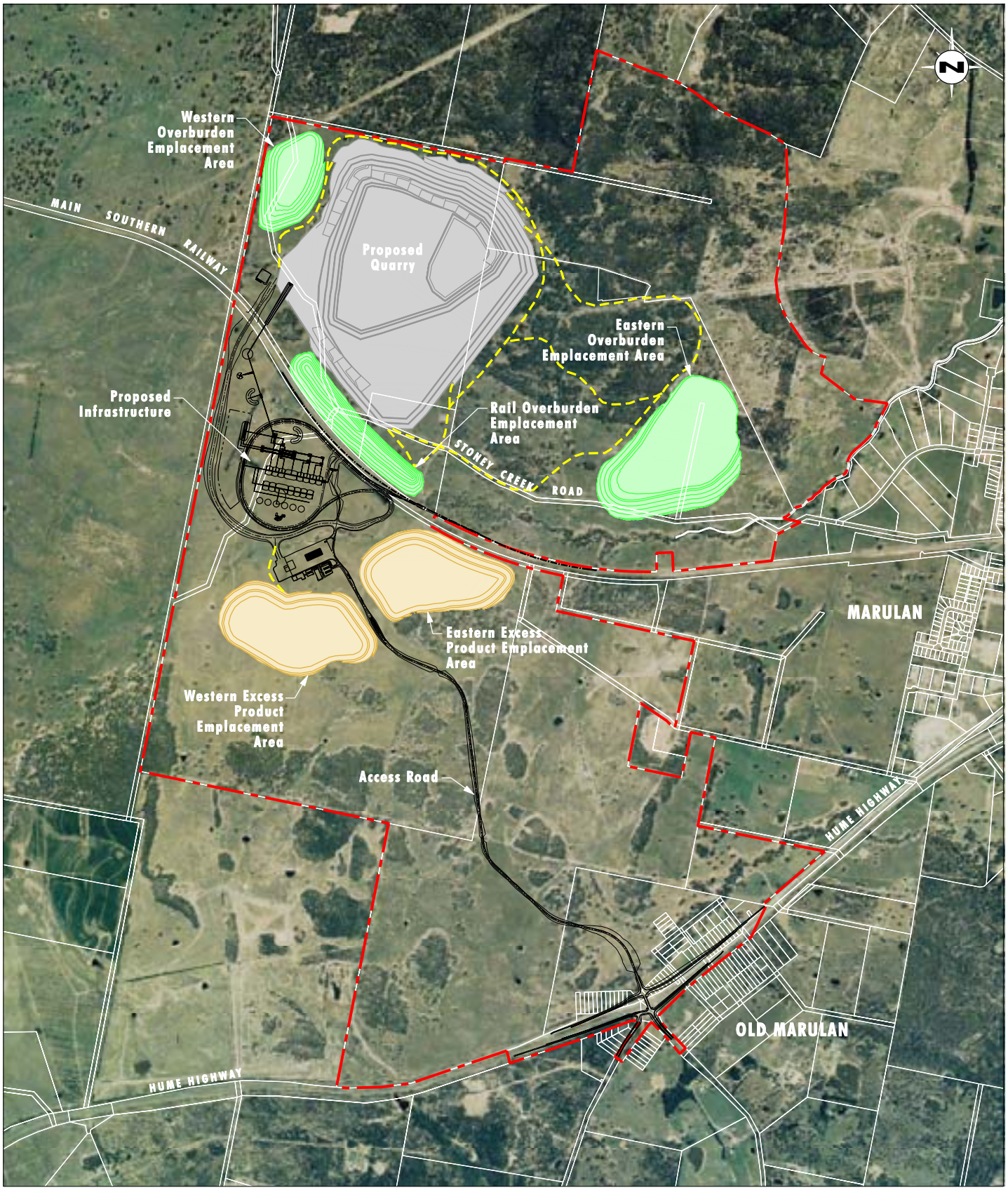

Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

- Project Area
- Haul Road

FIGURE 1.6

Year 30 Quarry Plan

- administration and washroom facilities; and
- electrical and power reticulation facilities.

Figure 1.6 indicates the conceptual locations for these facilities at 30 years.

1.2.4 Catchment Impact

Apart from the general landform changes associated with quarrying and ancillary activities, there will be specific creek and drainage line impacts. These include loss of some sections of the lower order tributaries of Lockyersleigh Creek and Joarimin Creek, damming and/or diversion of some sections of these creeks for the quarry pit, overburden emplacement and excess product emplacement areas, the quarry pit itself and quarry infrastructure. Further impact on the upper catchment of Lockyersleigh Creek and Joarimin Creek will result from the construction of haul roads and internal mine roads.

The main channel of Marulan Creek and some of the upper tributaries of Joarimin Creek will also be impacted by the construction of the access road from the Hume Highway. Marulan Creek will largely be unaffected, although the access road will require a creek crossing which will impact on a small section of the creek (refer to **Figure 1.6**).

1.3 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT ON ABORIGINAL CULTURAL HERITAGE

The total proposed impact area for the development of the Lynwood Quarry and associated infrastructure is shown on **Figure 1.6**. All evidence of past Aboriginal occupation within the quarry area, emplacement areas and areas impacted by associated infrastructure will be destroyed. There is no potential for *in situ* conservation of Aboriginal cultural heritage sites in these areas. There is, however, some potential for *in situ* management of sites outside the boundaries of the quarry, emplacement areas and areas associated with infrastructure.

Readymix will require Section 90 consents for any sites located within the area of impact. As Section 90 consents have a life of two years the initial consent application will be for those areas to be impacted by the construction phase (first two years), initial quarry development and the clearing of vegetation from the Rail Overburden Emplacement Area (first three years). Applications for Section 90 consents can then be staged as the development progresses.

1.4 LEGISLATIVE FRAMEWORK

In NSW, Aboriginal cultural heritage is managed primarily under the NSW *National Parks and Wildlife Act* 1974 (NPW Act). The following information in relation to the Act is drawn from the *DEC Interim Community Consultation Requirements for Applicants* (2004: 2-3).

> The *National Parks and Wildlife Act* 1974 (NPW Act) is the primary legislation regulating the protection of Aboriginal heritage through the administration of Part 6 of the NPW Act. The Department of Environment and Conservation (DEC) administers the NPW Act. Part 6 of the Act provides protection for Aboriginal objects and Aboriginal places (DEC 2004).
>
> - An Aboriginal object is any deposit, object or material evidence (not being handicraft made for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains (as defined within the meaning of the NPW Act).
> - An Aboriginal place is a place which has been declared so by the Minister administering the NPW Act because he or she believes that the place is or was of special significance to

> Aboriginal culture. It may or may not contain Aboriginal objects. Aboriginal places are gazetted in accordance with Section 84 of the NPW Act.
>
> DEC responsibilities under Part 6 of the NPW Act are triggered where an activity is likely to impact on Aboriginal objects (also referred to as sites) and declared Aboriginal places. Such an activity requires the approval of the Director General of DEC under section 87 or section 90 of the NPW Act. Section 91 of the Act requires that DEC be notified by any person who is aware of the location of an Aboriginal object within a reasonable time after discovery of that object.
>
> The decision whether or not to issue a consent under section 90 and/or permit under section 87 of the NPW Act is the responsibility of the Director General of DEC. It is the responsibility of the proponent to supply sufficient information to enable the Director General to make a decision.
>
> A DEC section 87 Permit is required to disturb land for the purpose of discovering an Aboriginal object. A DEC section 90 consent is required to destroy, damage or deface an Aboriginal object or Aboriginal place. In the Act, these are collectively referred to as 'approvals'.

The *Environmental Planning and Assessment Act* 1979 (EP&A Act) also includes legislation in Part 5 of the EP&A Act that pertains to Aboriginal cultural heritage. Under the EP&A Act environmental impacts, including impacts on Aboriginal cultural heritage must be considered prior to development. The EP&A Act also requires that Local Governments prepare Local Environmental Plans (LEPs). The project area is managed under the Mulwaree LEP (now administered by Goulburn Mulwaree Council). Under this LEP Aboriginal cultural heritage is provided protection within the general aims and objectives of the plan which are to "encourage the proper management, development of natural and man-made resources within the Mulwaree area".

1.5 NATIVE TITLE SEARCH

A Native Title search was undertaken on 16 June 2004 for the Goulburn Mulwaree LGA. The Native Title search indicated that there were two Native Title claimant groups for the Goulburn Mulwaree LGA. These were:

- Donald Thomas Bell on behalf of the Ngunawal People (NNTT number: NCOO/1); and
- Gundungurra Tribal Council Aboriginal Corporation #6 (NNT number: NC97/7).

The Gundungurra Tribal Council Aboriginal Corporation's Native Title claimant area was found to include the project area, giving this group the right to speak for this country, and thus this group was invited to participate in the consultation and fieldwork process. The claim by the Ngunawal People was for an area outside the project area. The results of the Native Title Search are included in **Appendix A**.

1.6 ABORIGINAL CONSULTATION

As indicated in **Section 1.5** the project area falls within the boundaries of a Native Title application lodged by Gundungurra Tribal Council Aboriginal Corporation (GTCAC) on 29 April 1997. Mr Bill Hardie of the GTCAC was invited to participate in the fieldwork and was present throughout the survey period to provide feedback on Aboriginal cultural heritage values of the project area and sites/objects located within the project area (refer to **Sections 5** and **6**). Mr Hardie was unable to attend the survey on one day (29 July 2004) and was subsequently taken to see the sites located on that day.

The project area falls within the boundaries of the Pejar Local Aboriginal Land Council (PLALC). The PLALC are based in Goulburn and Mr Pat Little was nominated as their representative for the survey and was present throughout the survey period. Mr Little also provided feedback on the Aboriginal

cultural heritage values of the project area and sites/objects located within the project area (refer to **Sections 5** and **6**).

The DEC was also contacted in an effort to identify all Aboriginal interest groups in the area. At the time of contact (July 2004) DEC was not aware of any further Aboriginal interest groups/individuals in the area.

As the Aboriginal consultation program was commenced and the survey undertaken prior to the release of the *DEC Interim Community Consultation Requirements for Applicants* (December 2004), the project was undertaken in accordance with the pre-existing guidelines, as approved by DEC in correspondence dated 3 February 2005.

The GTCAC and the PLALC were provided with a draft of this report for their comment/endorsement. The GTCAC and PLALC were also asked if they wished to provide further information they thought relevant to the consideration of the Aboriginal significance of the project area and/or the sites/objects it contains.

GTCAC provided a letter of comment on the draft report on 13 May 2005 (refer to **Appendix B**). The letter from GTCAC supported the management recommendations provided in the draft report.

Following receipt of the draft report PLALC accepted an invitation to visit the project area to discuss the management recommendations on site. This meeting was organised for 11 May 2005. Attending on that day were Evelyn Little (Chairperson PLALC), Delice Freeman (Coordinator PLALC), Justin Boney (Sites Officer PLALC), Jan Wilson (Aboriginal Archaeology Manager Umwelt), Sarah Paddington (Archaeologist Umwelt) and Michael Heath (Project Manager Readymix). During the visit the PLALC representatives were taken to visit all areas they highlighted as being of interest. Visits were also made to areas where Michael Heath could explain the layout of the proposed quarry and its infrastructure and areas where no impact would occur.

A letter of comment on the draft report by PLALC will be prepared following their next Land Council meeting on 25 May 2005. This will be after the printing of the EIS and therefore, PLALC's letter of comment could not be incorporated into this report. PLALC's letter will, however, be provided to the Department of Infrastructure, Planning and Natural Resources (DIPNR) and DEC under separate cover.

1.7 THE STRUCTURE OF THE REPORT

Section 2 provides information about the environmental context of the project area including climate, topography and hydrology, geology and soils, and flora and fauna.

Section 3 presents information related to the cultural context of the project area and discusses the previous archaeological research conducted in the vicinity of the project area as well as relevant ethnographic information, registered Aboriginal sites within the project area and prior European land use(s).

Section 4 summarises the relevant information from **Sections 2** and **3** and uses this information to formulate a predictive model for site location within the project area.

Section 5 discusses the survey strategy, methodology and results including descriptions of the sites located during the survey.

Section 6 discusses the Aboriginal cultural heritage and archaeological or scientific significance of the sites located during the survey.

Section 7 presents a discussion of management options for the sites identified and provides justification for the preferred management option for each site from an Aboriginal and archaeological perspective, as well as recommending an overall management strategy for the cultural heritage and archaeological values of the project area.

Section 8 summarises the management recommendations.

Section 9 lists reports and publications referred to in the text.

2.0 ENVIRONMENTAL CONTEXT

This section of the report presents information about the landscape within the project area. Details of the impact of European land-use practices are considered initially to gain an understanding of how these practices may have impacted upon Aboriginal resource distribution and abundance and the likelihood of finding cultural heritage material in a relatively undisturbed context.

2.1 EUROPEAN IMPACT HISTORY

A full historic heritage assessment has been completed by Umwelt as a separate report. The following European impact history summarises key historic land uses to provide context for this Aboriginal archaeology assessment.

The project area and its surrounds have a long history of European impact. The site of Old Marulan (on the southern boundary of the Readymix holdings) was selected by Surveyor-General Mitchell at the junction of the roads to Goulburn to the southwest and Bungonia to the south. Before the design of the village was finally approved, several allotments were marked out so as to allow occupation in 1834. The final layout was approved in March 1835 although it did not follow the regulations laid down by the Government six years earlier. The allotments all fronted the main roads and there were no side streets. Among the earliest buildings were the church and the Woolpack Inn. Ten years later Old Marulan had several stores, a post office and two hotels.

The building of the railway to the north of the village in the late 1860s refocused traffic and thus trade away from the Old Marulan village toward where the road and railway crossed to the northeast. This caused a relocation of the businesses and community to a new site known originally as 'Mooroowoolen', which is the site of the present day village of Marulan. The relocation began in 1868 and the Old Marulan site was almost completely abandoned soon after.

The location of Old Marulan on the southern boundary of the project area suggests that this general area would have been the first to be targeted for the removal of trees for building materials and fuel and to improve pasture. The early years of settlement saw the introduction of hard-hoofed grazing animals such as sheep, cattle and horses which, in addition to tree clearance, would have left the ground surface lacking in vegetative cover to stabilise the soil. This undoubtedly led to the downslope movement of the sandy soil from areas of higher gradient and its deposition in areas of negligible gradient in valley bottoms. In many cases this soil would have been removed by the local watercourses. In other areas it could have resulted in the build up of substantial depths of colluvium. These agricultural land use practices have occurred across the entire project area.

2.1.1 Implications for Aboriginal Site Location/Site Integrity

Prior land-use practices in the general area are likely to have resulted in the following:

- the removal of scarred and/or carved trees during land clearing;
- the removal of plant species that were valued economic resources for Aboriginal people;
- competition for prey species;
- the introduction of non-endemic flora and fauna that out-competed native flora and fauna;
- a change in the hydrology of the creeks and thus in their morphology and endemic flora and fauna;
- an increase in the downslope movement of soil and any artefacts it may contain;

- the mixing and reburial of artefacts from different sites and of different ages in areas where colluvium has aggraded;

- in areas of cultivation both vertical and horizontal movement and mixing of artefacts of different ages within the soil profile; and

- damage/destruction by cultivation or stock trampling of sites such as bora rings and stone arrangements (refer to **Section 3.1** for definitions of site types).

In summary, the previous land-use in the area has the potential to have destroyed or at least damaged the integrity of any Aboriginal sites that may have been located in the area. It has almost certainly had the effect of removing many species of flora and fauna that would have been useful Aboriginal resources.

2.2 CLIMATE

The following information is based on Goulburn which is the closest long-term weather station for which the relevant data was available. The information is based on records kept since 1857 (Bureau of Meteorology 2005).

Average maximum temperature for the area is 28.1 °C for January. Temperatures over 20 °C are only recorded between October and April. Average minimum temperature is 1.3 °C in July. Maximum temperature recorded in the area over the period of record is 37.8 °C in January with a minimum of -7.8 °C in June.

Average annual rainfall is 735 mm with maximum average monthly rainfall (64.8 mm) occurring in January and average monthly minimum rainfall (47.8 mm) in July. The wettest months overall are November through March. Marulan is approximately 80 kilometres from the coast and has an elevation of 650 metres.

July, August and September are the windiest months and the winds generally blow from the west or southwest throughout the year. June to August are recorded as months when most days are overcast.

In sum, the project area is generally dry, with a warm summer, relatively cool spring and autumn and a cold, windy and overcast winter.

2.2.1 Implications for Aboriginal Resource Exploitation/Site Location

The climatic data suggest that since the mid-Holocene the most comfortable times of the year for Aboriginal occupation may have been late spring, summer and early autumn. The cold southwesterly winds can drastically reduce temperatures and require humans to find shelter when camping for the night and it is probable that in spring, autumn and winter, Aboriginal people would have sought shelter from the wind when camping. In summer, they may have chosen to camp in areas where the southwesterly winds brought respite from the heat.

Late spring, summer and early autumn would have provided sufficient warmth and moisture to encourage the growth of the food plants that both the Aboriginal inhabitants and the animals they preyed upon required for nutrition. In winter the cold temperatures and shorter days would have inhibited most plant growth. During this period most of the staple (carbohydrate) food plants would subsist on their own stores, reducing their nutritional value and increasing the amount of work required in their gathering and processing. Prey animals also use up their stores of fat at this time of the year. Without the lipids provided by the fats, protein is not able to be absorbed by the body, inducing what is termed “protein starvation” in individuals forced to subsist on the meat provided by

these animals. Thus the project area could have been undesirable for anything but transient use in the winter from the perspective of optimal nutrition.

This information suggests that though Aboriginal people may have made transient use of the area in the winter they were more likely to have camped in the area for more extended periods of time in the warmer months when resources would have been more plentiful and more nutritious.

In terms of the location of the camp sites, the overall rainfall for the area is not high and only the main channels of the creeks would have retained water for any time after rain. As water is a determining factor in the location of camp sites it can be predicted that the main campsites, and thus the areas where the majority of artefactual material would have been discarded, would be in proximity to the main creek channels.

In light of the cold west and southwesterly winds it is likely that preferred camping locations in spring, autumn and winter would be on the northern to eastern side of higher ground which provided some protection from the elements. In summer, the reverse may have been the case with Aboriginal people seeking respite from heat by camping in areas with a west or southwesterly aspect.

2.3 TOPOGRAPHY AND HYDROLOGY

The topography of the project area consists of ridges with saddles and crests to the north and south, with the Joarimin Creek valley running through the middle from the southwest to the northeast. The southern portion of the project area slopes towards the south and southeast towards Marulan Creek and the Hume Highway. The topography of the project area ranges from approximately 710 mAHD in the north, to around 630 mAHD near Joarimin Creek. There are no areas of very steep gradient, however, some of the spurs have short, steep slopes which can range in gradient up to 5-8 degrees.

The project area is located within the catchments of Joarimin, Lockyersleigh and Marulan Creeks. Joarimin Creek flows in a northeasterly direction into the Wollondilly River. Lockyersleigh Creek drains in a northwesterly direction and also flows into the Wollondilly River, which is part of the Warragamba catchment area. Marulan Creek flows in a southeasterly direction to the Shoalhaven River via Barbers Creek.

Joarimin Creek is a fifth order stream and has a catchment area of approximately 5440 hectares. Marulan Creek is a fourth order stream and has a catchment area of approximately 2055 hectares. Lockyersleigh Creek has a catchment area of approximately 2630 hectares.

None of the creeks were flowing during the survey period, however, Joarimin Creek did have a few isolated pools of stagnant water in its lower reaches. The creeks were observed again in February 2005 following four inches of overnight rain. All of the creeks were running within their banks the next morning, however, overnight they had overflowed their banks and the resultant wash had scoured an area 5 to 10 metres back from the banks of the creek, removing all loose surface soil and small stones (refer to **Plate 1**).

Floodplain development along the creeklines appears to be restricted to small areas where recent infrastructure (mainly culverts under the Main Southern Railway) slows the waters forcing them to drop some of their bedload. In general the creeks flow in bedrock defined channels and creek migration in most areas has been limited by this factor. The stream channels towards the headwaters were usually simple grassy depressions, often difficult to define, however, as the tributary order increases the channels become deeper and wider due to recent entrenchment.

The area north of the Main Southern Railway rises gently from Joarimin Creek then more steeply to low rocky crests (maximum elevation 700 mAHD) with skeletal soils which for the most part support regrowth woodland. To the south of the Main Southern Railway the relief is more gently undulating with broad ridges and slopes, saddles and low spurs. As in the northern area, the steeper country and

crests have rock outcrop and skeletal soils, but again, these areas support the only significant regrowth tree cover in the area

2.3.1 Implications for Aboriginal Resource Exploitation/Site Location

Areas of low gradient associated with Joarimin Creek and Marulan Creek are likely to have supplied attractive camp locations for small numbers of people during times of creek flow. Camp sites of longer duration, or for larger groups of people, are more likely to have been located in the lower reaches of Joarimin Creek where it appears water was available for longer periods in pools.

It is assumed that moderately to steeply sloping areas are unlikely to have been utilised by Aboriginal people for camping and that their use was generally transient in nature and therefore, did not result in the discard of large amounts of cultural material making the use of these areas harder to discern archaeologically. Within the Readymix holdings, footslopes, lower slopes, crests, and saddles generally have gentle gradients and so may have provided suitable camping locations.

The higher country in the north is of an elevation which would have provided an extensive outlook across the landscape. Such a vantage point may have allowed people to become aware of the movements of other people (through the observance of fires or smoke) and/or game, and perhaps plan hunting expeditions.

In sum, the information related to the topography and hydrology suggests that the creeklines within the area would have been attractive camping places and that the low gradient and high elevation of the crests in the north would have made them attractive as an area for camping when an extensive outlook was required. The lack of water in these elevated areas would suggest, however, that camping would only have been short term.

2.4 GEOLOGY AND SOILS

The Bindook Porphyry is the predominant geological feature of the project area and is the resource being targeted by the proposed quarry. The Bindook Porphyry is a Devonian acid volcanic ignimbritic tuff (Bell, Cochrane and Associates 2004) which extends across the project area on both the northern and southern sides of the Main Southern Railway. The eastern side of the project area is composed of the Marulan Granite and the western side of the Lockyersleigh Adamellite. These bands of rock are generally deeply weathered with little or no outcrop except along ridge crests. The large tors (large rounded boulders) so common in granitic country are absent from the project area.

The southeastern edge of the project area also contains an andesite intrusion. Minor accumulations of dune sand over the Bindook Porphyry have also occurred in recent geological times (refer to **Figure 2.1**). Finally a narrow dyke of siliceous material is mapped in the central portion of the area to the south of the Main Southern Railway

The depth of weathering across the site is variable. Weathering is mostly shallow (1 to 10 metres), although weathering is in excess of 30 metres in places. The weathering profile ranges from decomposed porphyry with essentially clay properties (overburden) to a mixture of jointed hard and softer brown rock (weathered porphyry). The porphyry ranges from massive, to strongly fractured with closely spaced near-vertical joints/fracture planes. These fracture/shear zones often appear pale in colour due to secondary alteration. The fresh porphyry is typically dense and dark in colour and exhibits a porphyritic texture of coarse quartz and feldspar grains in a fine tuffaceous to glassy groundmass.

Whilst some limited areas have deep sands derived from the *in situ* weathering of the porphyry (refer to **Figure 2.1** and **Plate 2**) other areas, especially crests and areas of steeper gradient have skeletal soils (refer to **Plate 3**). Massive downslope movement of the sandy soil was evident in February 2005 when heavy rain followed a long dry spell (refer to **Plate 4**). This massive downslope movement of the

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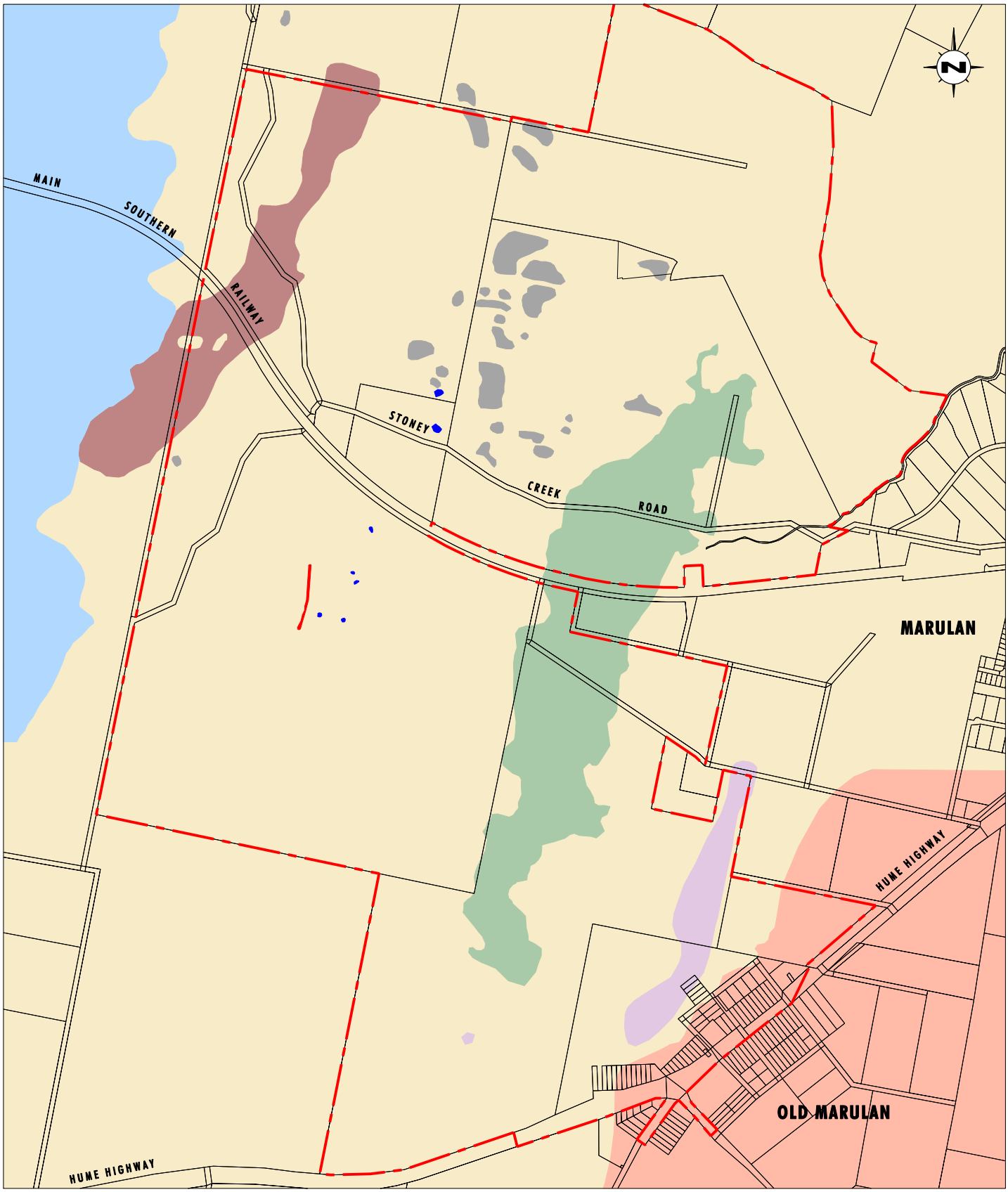

Source: Bell Cochrane & Associates
Base Source: LPI 2004

0 0.25 0.5 1km

Legend

- Project Area
- Sand
- Lockyersleigh Adamellite
- Adamellite Dyke
- Adamellite Dyke/Sills
- Siliceous Dyke
- Porphyritic Adamellite
- Andesite
- Marulan Granite
- Bindook Porphyry

FIGURE 2.1

Geology

File Name (A4): R06_V1/1829_106.dgn

soil must have happened on innumerable occasions in the past when heavy rain followed bushfire or drought.

Colluvial aggradation was also observed at the base of some lower slopes, however, alluvial aggradation and floodplain development were largely absent. Only one area, where creek flow was impeded by the Main Southern Railway, was observed to have recent and limited floodplain development.

2.4.1 Implications for Aboriginal Resource Exploitation/Site Location

Porphyry was not a preferred stone for the manufacture of Aboriginal tools, however, its use has been recorded in the Hunter Valley of NSW, where the local porphyry (occurring as cobbles in the creek) was used to supplement the supply of better flaking materials transported long distances into the area (Umwelt 2004).

Granitic rock types are not preferred raw materials for stone tool manufacture either. However, the use of adamellite for the production of flakes and even for food processing (grinding) has previously been recorded in the Northern Tablelands of NSW (Wilson and Gaynor 1995) in a very similar geological landscape to the current project area. Therefore, there may be some use of the local rock outcrops for tool manufacture and for food processing. Granitic rock types are also often associated with quartz veins and pockets, and quartz generally makes up a high percentage of the stone artefact assemblages from granitic areas with other imported raw materials found in lower numbers (Gaynor and Wilson 1997; Wilson and McAdam 2000).

The use of andesite for the manufacture of stone axes has been recorded in Northern Tablelands assemblages and it is possible that if this stone outcrops in the area, it may have been a source of axe material. The siliceous dyke mapped in **Figure 2.1** may also have been suitable for stone tool manufacture and may have formed a focus for Aboriginal activity.

Overall, as the stone types available within the project area would not have been preferred for tool manufacture, it is highly probable that a large proportion of the stone requirements would be brought in from elsewhere.

As there are no large tors within the project area, rock overhangs with occupation and/or art that are common in both the Northern (Wilson and Gaynor 1995) and Southern Tablelands (Flood 1995) are not possible.

In terms of the soils, the massive downslope movement of the sandy soils following initial land clearing and at other times due to drought and bushfire followed by heavy rains will have resulted in the downslope movement of any artefacts within the soil profile. Therefore, it can be expected that the majority of the artefacts on the slopes will have been subject to both vertical and horizontal displacement and a loss of stratigraphic integrity.

The location of areas of deep sand suggests that these areas may have provided pockets where the vegetation may have been quite distinct from other areas within the project area. These areas may have been targeted by Aboriginal people for the exploitation of resources (both plant and animal) not located elsewhere in the area. The deep sands are exposed on crests and on the valley slopes and in some areas reach down to the local tributaries (refer to **Figure 2.1**).

The lack of floodplain development indicates that there are unlikely to be areas where alluvial deposits have buried Aboriginal sites, however, those areas where colluvial deposits have built up at the lower slope/footslope boundary have the potential to have buried *in situ* sites.

2.5 FLORA AND FAUNA

The project area has been extensively cleared and the make-up of the remnant vegetation has been modified by introduced species. The most extensive regrowth woodlands is on the ridges and crests. Dominant tree species in these areas are stringybark (*Eucalyptus macrorhyncha* and *E. agglomerata),* broad-leaved peppermint (*E. dives)* and western scribbly gum (*E. rossii),* usually with little understorey.

The larger riparian corridors of Joarimin and Marulan Creeks have retained a more diverse, albeit highly disturbed, native vegetation assemblage. Dominant species include Argyle apple (*E. cinerea)*, forest red gum (*E. tereticornis)* and swamp gum (*E. ovata)*. The shrub layer is degraded, lacking in diversity and in many areas absent altogether. It consists largely of those species unpalatable to introduced grazers.

Introduced grasses and herbs dominate the pastoral grasslands of the slopes, and creek banks and drier creek beds, however, native rushes and sedges are present in the moister soils. Some of the more common species include: couch (*Cynodon dactylon*), three-awn wire grass (*Aristida ramosa*), wallaby grasses (*Austrodanthonia laevis* and *A. racemosa* var. *racemosa*), corkscrew grass (*Austrostipa scabra*), sheep burr (*Acaena novae-zeelandiae*), fireweed (*Senecio madagascariensis**), cat's ear (*Hypochaeris radicata**), sorrel (*Acetosella vulgaris*), soft brome (*Bromus molliformis*), squirrel tail fescue (*Vulpia bromoides*), white clover (*Trifolium repens**), sedges (*Cyperus eragrostis** and *Cyperus laevis*,), and rushes (*Juncus planifolius*, *J. sarophorus* and *J. usitatus*).

Some subtle differences were observed in the dominance of plant species in the areas of deep sands formed on the ridges in association with the deep weathering of the porphyry. In these areas there was often an understorey or even a dominance of bracken fern (*Pteridium esculentum*) and tea-tree scrub (*Leptospermum sp.)* with occasional narrow-leafed Geebung (*Persoonia linearis*), grass tree (*Xanthorrhoea australis*) and numerous peach heath (*Lissanthe strigosa*) and urn heath (*Melichrus urceolatus*).

In relation to fauna, prey animals such as kangaroo, wallaby, wombat, reptiles and birds were observed during the survey. In addition the remains of turtles and crayfish were also noted near the watercourses. Wombat burrows were concentrated in those areas of deep weathering and colluvial aggradation where the deep sandy soils provided an ideal medium for the wombat burrows in what was otherwise an area of relatively shallow soils and rocky outcrop.

2.5.1 Implications for Aboriginal Resource Exploitation/Site Location

Evidence for food plants was sparse at the time of survey due to drought conditions, however those that were observed are noted in **Table 2.1**. Aboriginal representatives also recognised plants used for the manufacture of artefacts; these ranged from large scarred trees providing evidence of both shelter and coolamon manufacture, to gummy exudates from species such as black wattle (*Acacia decurrens).*

Table 2.1 - Aboriginal Food and Useful Plants

Common Name and *Scientific Name*	**Use**	**Reference**
appleberry *Billardiera scandens*	Fruit eaten	Low 1989:40 Zola & Gott 1992:26
black wattle *Acacia decurrens*	Gum eaten	Bill Hardie 2004: pers. comm
bracken fern *Pteridium esculentum*	Underground fibrous stem roasted and beaten with a stone to remove starch	Zola & Gott 1992: 37

Table 2.1 - Aboriginal Food and Useful Plants (cont)

Common Name and *Scientific Name*	**Use**	**Reference**
dianella *Dianella revolute var. revoluta*	Berries eaten; roots of some species can be eaten after pounding and roasting; leaves split and used for weaving	Low 1989:8 Stewart & Percival 1997:17
grass tree *Xanthorrhoea australis*	Base of leaves and pith inside eaten, resin used for hafting stone tools, flowering stems used for spear shafts	Low 1989: 130; Zola & Gott 1992: 58-59
grey box *Eucalyptus moluccana*	Bark favoured for manufacture of coolamons and shields	Wilson pers. obs.
kangaroo grass *Themeda australis*	Seeds ground for flour, leaves and stems used for fibre and weaving	Greenway 1910: 16 Zola & Gott 1992: 58
mat-rush *Lomandra* sp.	Long pliable leaves used for weaving baskets, leaf bases and flowers edible	Low 1989: 131, 174; Zola & Gott 1992: 59
narrow-leafed geebung *Persoonia linearis*	Ripe fruit pulp eaten; fine scrapings of wood from young stems mixed with breast milk for use as eye treatment; solution made from bark strengthened fishing lines	Stewart & Percival 1997:42
native cherry *Exocarpus cupressiformis*	Enlarged succulent stalklet (pedicel) eaten	Low 1989: 46
peach heath *Lissanthe strigosa*	Small sweet berries eaten raw	Low 1989: 42
rushes and sedges *Juncus and Cyperus* spp.	Underground stem or tuber can be eaten in some species, leaves used for weaving	Low 1989: 105; Zola & Gott 1992: 60
stringybark *Eucalyptus sp.*	Fibrous bark used to manufacture string, sheets of bark used for shelter and containers	Bill Hardie 2004: pers. comm
urn heath *Melichrus urceolatus*	Small sweet berries eaten raw	Low 1989: 42
water ribbons *Triglochin procerum*	Small bullet shaped tubers roasted	Low 1989: 109

The list of plants shown in **Table 2.1** must be seen to reflect a very limited number of the useful plants available for gathering by Aboriginal people prior to European land clearing and the introduction of hard-hoofed grazing animals. In general, useful plant species were identified in very low numbers across the project area with minor concentrations noted in the area of the deep sands associated with the deeply weathered porphyry.

Wombats have had a major impact on the areas of deeply weathered porphyry and of colluvial aggradation at the lower slope/footslope boundary. These areas have large numbers of active burrows and widespread evidence of former collapsed burrows. It is likely that these areas formed a target for Aboriginal hunters who could have smoked out/dug out the wombats. Thus these areas may have concentrations of Aboriginal artefacts. The wombat burrowing activity, however, will have acted to destroy the likelihood of site integrity.

A summary of overall implications of the information derived from the environmental context is provided in **Section 4.1**.

3.0 PREVIOUS ETHNOGRAPHIC AND ARCHAEOLOGICAL RESEARCH

This section of the report commences with definitions of site types referred to in the text. The known ethnographic and archaeological context of the general Marulan area and the project area is then discussed. The information provided by the ethnography and archaeological context combined with the conclusions drawn from the environmental context (refer to **Section 2.6**) are then used to formulate a predictive model for site location, site type and site contents.

3.1 SITE DEFINITIONS

The most common site types located by archaeologists during survey in NSW are sites that contain scatters of stone artefacts. Stone artefacts are pieces of stone modified for, or by, human use. Stone artefacts are robust and preserve well in the archaeological record when other forms of evidence of Aboriginal exploitation are lost due to preservation biases (wooden and bone implements, food remains), however, their associations are rapidly modified after their initial discard due to natural and cultural impacts on the landscape.

Aboriginal archaeological sites can be divided roughly into secular (concerned with worldly things) and non-secular (concerned with secret, sacred, ceremonial and ritual things) site types. This division is not made by archaeologists, it is drawn from Aboriginal ideologies (manners of thinking, systems of belief). The division is not always clear cut as some site types may be secular in some circumstances and non-secular in others. The secular or non-secular nature of each of the site types is indicated below. Sites that are non-secular in nature generally have much higher Aboriginal cultural heritage significance than sites of a secular nature. Due to the rarity of non-secular sites they generally also have high archaeological significance.

In accordance with the DEC Guidelines for archaeological reporting (1997), this section provides definitions of the various types of Aboriginal sites known from the archaeological record of the broader Southern Tablelands region. It should be noted that many of these site types will not be relevant to the current project area.

Isolated Find/Artefact

The site type described as an 'isolated find' or 'isolated artefact' consists of a single stone artefact. The vast majority of stone artefacts were tools used in day to day activities and therefore, were secular in nature. There are some stone artefacts, however, that were used in special rituals/ceremonies that were non-secular in nature (i.e. ceremonial axes, tjuringa [engraved or decorated stones], stone knives used in cicatrisation). Isolated finds may represent lost or discarded artefacts, but may also be evidence of a larger scatter of artefacts in a sub-surface context.

Artefact Scatter or Open Campsite

An artefact scatter or open campsite refers to areas (in the open landscape, not in a rockshelter or cave), that contain two or more stone artefacts, generally located within 100 metres of each other. In general, artefact scatters are secular in nature. Artefact scatters may result from the activities of a single person or a group of people. They may reflect a single occupation episode, or multiple episodes of occupation of a single place.

Rock Art Site

The term rock art site generally refers to Aboriginal ochre paintings or ochre or charcoal drawings located on a rock slab (generally in a sheltered place like the floor of a cave or rockshelter), boulder, cliff-face, cave or rockshelter wall or roof, or wall of a rock overhang. The majority of rock art sites

are found in positions that are sheltered from the elements. This observation, however, is probably biased to some extent, as rock art would not preserve well in open positions. Rock art sites are generally believed to be non-secular in nature.

Engraving Site

The term engraving site refers to places where Aboriginal people have incised (using techniques such as pecking or abrasion) some form of motif into rock. The engravings may be on a rock outcrop, rock slab, boulder, cliff-face, rock overhang, or in a cave or rockshelter. Engraving sites are not necessarily located in sheltered positions, but are most often located on softer rock types (like sandstone). Engraving sites are generally believed to be non-secular in nature.

Rockshelter Sites

The term rockshelter site refers to rockshelters/rock overhangs that contain evidence such as stone artefacts and/or bones and/or plant remains (from meals eaten at the site) and/or hearths (fireplaces). Most rockshelter sites are secular in nature, however, those that also contain rock art or engravings are often believed to be non-secular in nature.

Precontact Burial Sites

The term precontact burial site refers to Aboriginal skeletal material dating to a time before white settlement. The skeletal material may be buried, interred in a cave/rockshelter/under a ledge, in a tree hollow etc. or exposed on a platform in a tree. Burial sites are generally believed to be non-secular in nature by contemporary Aboriginal people.

Stone Arrangements

Stone arrangements may take the form of single or multiple cairns, upright standing stones, lines or rings of stones or even stones arranged into figurative designs such as snakes or turtles. The location of many of the recorded stone arrangements suggests that they were related to ceremonial grounds and in particular initiation grounds (McBryde 1974:31-42), while others appear to mark tribal boundaries (Leney 1907:72-77). Stone arrangements it would appear can be either secular or non-secular depending on their purpose.

Shell Middens

Middens are accumulations of shells that have been discarded after human (Aboriginal) meals. Midden sites are commonly located along the coast and estuaries and less often located in inland areas in association with waterways and lakes. Middens sometimes contain burials, but are most often simply domestic waste and as such are generally secular in nature.

Grinding Grooves

Grinding grooves are grooves on rock surfaces that have been manufactured by the sharpening of stone axe heads, stone chisels or fire-hardened wooden spear points. Grinding grooves are commonly located on sandstone ledges that outcrop in creek and river beds, as the availability of water enhances the speed with which grinding proceeds. Less commonly, grinding grooves are located on rock surfaces away from water and on stone types other than sandstone. Grinding grooves appear to be secular in nature.

Stone Quarries

Stone quarries are places where Aboriginal people have sourced raw material for the manufacture of tools. Quarries may be cobble beds in rivers or on beaches, or they may be rock outcrops. When outcrops are exploited the quarrying activity may take the form of the flaking of rock from the outcrop

itself, or scree from below the outcrop may be used instead. In some areas the stone may be dug from beneath the earth as Aboriginal stone knappers often preferred rock which had not been dried out by exposure to the elements (Tindale 1965: 140; Jones and White 1988:61-62). Stone quarries can be either secular or non-secular in nature depending on the Dreaming with which they are associated (Jones and White 1988).

Ochre Quarries

Ochre quarries are places where Aboriginal people sourced ochre (hydrated iron oxides and iron hydroxides - Whitten and Brooks 1972:269) which they used for body decoration, implement decoration and rock art. Ochre quarries can be either secular or non-secular in nature depending on local belief systems.

Ceremonial Grounds

Throughout NSW the main type of ceremonial ground recorded was the Bora. Bora grounds generally consisted of two earthen rings or two rings outlined with stones. The Bora ground was used during male initiation ceremonies (Fife 1995). Bora grounds are believed by many contemporary Aboriginal people to be non-secular in nature, however, the literature suggests that generally only the viewing of the smaller of the two rings was restricted to initiated males (for a summary of the data recorded about Bora grounds see Fife 1995).

Scarred and Carved Trees

Aboriginal people often removed the bark from the trunks of trees to make toe holds (to aid in climbing to extract honey or possums from tree hollows), bowls, shields, spearthrowers, coolamons, canoes and/or for roofing material for shelters. The bark removal leaves scars on the tree trunk which indicates the Aboriginal use of an area. Other trees were carved with designs. These carved trees were used to mark ceremonial grounds and burials (Etheridge 1918:84; McBryde 1974:126). Scarred trees are generally secular in nature while carved trees are always non-secular.

Post-contact Burial Sites

This term refers to burials/interments that have taken place since European settlement and that are not located in a recognised cemetery and are not documented. If they are documented then they are considered Aboriginal historic sites and not Aboriginal archaeological sites. They may be secular or non-secular depending on the status/position of the deceased.

Aboriginal Fringe Camps/Missions/Reserves

These terms refer to those places where Aboriginal people lived in post-contact times. To be archaeological sites they will not be documented in the historic literature; if they are documented, they will be called Aboriginal historic sites. These site types are generally secular in nature.

Waterholes/Wells

These are generally natural rock waterholes that contain water used for drinking or for special ritual purposes. Sometimes these holes are made larger by grinding out the sides and base and sometimes they are protected by placing large stones over the hole to keep out animals and to prevent the water from evaporating. These may be either secular or non-secular in nature.

Massacre Sites

This term refers to an area known from the Aboriginal oral history, or from local history, to have been the location of an Aboriginal massacre. Most Aboriginal massacres in NSW occurred during the early

European settlement period. Massacre sites are secular in nature, however, they have great significance to the Aboriginal community.

3.2 ETHNOGRAPHY

Care must be taken with the use of ethnographic observations of Aboriginal people in the early contact period. The European surveyors and explorers who wrote the majority of the earliest recordings carried with them a notion of racial superiority which tainted their perspective. It must also be recognised that by the time of the first ethnographic observations the traditional Aboriginal ways of life had already been altered due to loss of territory and introduced disease. However, some useful information can be gleaned from the ethnographic record to assist with the formulation of a predictive model for site type and location.

Eddie (1985) compiled a short chapter on the Aboriginal people of the Marulan area for inclusion in a book celebrating Marulan's 150th anniversary. Eddie (1985: 5) reports that:

> Their main implements were spears with stone or bone points, woomeras, boomerangs, stone axes and stone skinning knives. Some of these, along with sharpening stones have variously been found in the district.

Drawing on research by Tindale (1974) in relation to tribal boundaries, Eddie (1985: 5) states that the Marulan area was at the junction of four major tribes. These were the:

- Ngunawal who inhabited the area from Canberra to Yass and north to Goulburn;
- Wandandian who inhabited the area from Ulladulla to Nowra and west to the mountains;
- Wodi Wodi who inhabited the area north of the Shoalhaven River to Wollongong; and
- Gandangara (alternatively spelt Gundungurra) who inhabited the area from Camden to just south of Marulan.

Eddie (1985: 5) also suggests that coastal tribes like the Wodi Wodi had much smaller territories than the Gundungurra due to the abundance of resources associated with the coast.

Tindale (1974) drew his information from recordings made by early explorers and settlers. Early exploration of the area was begun in 1798 when an expedition by John Wilson reached Mt Towrang (about 9 kilometres northeast of Goulburn). Participants in the exploration team commented on the scarcity of Aboriginal people in the area; "…and we really believe that there never was a native in this part of the country" (Collins 1798-1802: 87-91).

Navin (1990: 6) provided the following comments in relation to the Marulan area.

> An apparent scarcity of Aboriginal people in the Southern Tablelands was commented upon by early explorers. Not a single Aboriginal person was encountered in the course of early explorations by Meehan (1818), Throsby (1818), Throsby-Smith (1820), Wild (1820) and Kearnes (1822). References to 'several native fires' (Charles Throsby-Smith) and 'the Fires of the Natives who appeared numerous' (Joseph Wild) were the only signs recorded by the explorers of the presence of Aborigines in the region.

The sighting of fires by the early explorers, indicate that rather than there being no Aboriginal people in the area, that the Aboriginal people were purposefully avoiding contact with the explorers.

Linguistic studies record that the Gundungurra and the Ngunawal shared a common language (Eades 1976: 6). This suggests that these two groups interacted on a regular basis and that they probably shared some parts of their ceremonial lives. In the NSW Northern Tablelands where the granitic

uplands provided an area of interaction between the Anaiwan and the Gamilaroi, there have been many ceremonial sites (Bora rings, stone arrangements, carved trees, rock art sites) recorded in areas along the boundary between the two groups (McBryde 1974; Wilson 1995) and it is possible that similar sites (with the exception of art sites) could be expected in the Marulan area.

As white settlement began to take hold in the Marulan area, there were accounts of attacks on the white settlers by the Aborigines and retaliatory attacks on the Aborigines by the settlers. In 1826 Governor Darling sent 30 troopers to the Bungonia area to act as a peace force following reports of bands of angry natives gathering. Governor Darling later wrote in a despatch to England (Governor Darling to Earl Bathurst Despatch No. 34 per Ship Toward Castle Government House, 23 May 1826 quoted in Eddie 1985: 7):

> My Lord,
> 1st I have much satisfaction in stating to your Lordship, in reference to my despatch No. 28 that the Natives, who had assembled in the County of Argyle, have been dispersed without committing any depredation or act of violence. It is supposed that the prompt and unexpected appearance of the Troops in that distant part of the County had some effect in producing this desirable end. If so it may be hoped that it will be attended with still further beneficial consequences by checking any disposition they might feel to re-assemble.
>
> 2nd The steps that have been taken will I trust ensure the native from further aggression, as there can be no doubt of their friendly disposition, when unmolested, and, though it may be politic to prove our superiority, it would be painful to punish an Act of retaliation with the severity necessary to prevent recurrence of such proceedings on their part.

From the dispatch it can be seen that the Aboriginal people of the area were being driven from their land by 1826. Further European settlement of the Marulan area followed and by 1832 there were already 12 properties listed between Marulan and Bungonia (NSW Calendar and General Post Office Directory).

Eddie (1985: 7) concludes:

> The Aboriginal population in Argyle gradually decreased, mainly from diseases introduced by the whites and the influenza epidemic of 1846/47 almost completely wiped them out. In *Settlers and Convicts* Harris states that the Aborigines complained:
>
> > Plenty of water before white man come, plenty pish (fish), plenty kangaroo, plenty possum, plenty everything: now all gone. Poor fellow now, black fellow.

3.2.1 Ethnography/Implications for Aboriginal Site Location/Site Integrity

The ethnography suggests that the Marulan area was the focus of four Aboriginal tribal groups with the Marulan area and the project area at the southern extent of the Gundungurra tribal area and north of the northern extent of the Ngunawal tribe. As these groups shared a common language it is likely that they also shared ceremony and thus that sites associated with ceremonies (stone arrangements, bora grounds and carved trees, large camp sites) may exist near to the tribal boundaries and even within the project area.

In relation to ceremonies, the groups of "angry" natives gathering, remarked upon by Governor Darling (23 May 1826) may well have been Aboriginal people gathering for ceremony rather than gathering for an attack. There have been other recorded incidents where Aboriginal people were gathering and painting up for a ceremony. These people were thought to be painted up for attack and were subsequently massacred (Davidson and Lovell-Jones 1993).

The ethnography also indicates that the number of Aboriginal people in the area was likely to be low; this may have two causes. Firstly the climate and subsequent availability of food resources may have limited the number of people, in addition, if this area was commonly used for ceremony, it may have had areas that were off-limits for many people most of the time.

The use of the area for ceremony begs the question of what people would have eaten during the time that these large gatherings took place. It is possible that at these times the wombats and kangaroos were the target of large scale drives into standing nets which would have provided large amounts of food for a period of time (and subsequently leaves an area with scarce resources until faunal numbers build up again).

Finally it appears that the Aboriginal people that occupied the Marulan area were driven from their traditional lands in the years following initial white settlement, thus there is unlikely to be much Aboriginal artefactual material related to the early contact period.

3.3 PREVIOUS ARCHAEOLOGICAL SURVEY AND ASSESSMENT

3.3.1 Known Aboriginal Sites in proximity to the Project Area

A DEC/AHIMS (Aboriginal Heritage Information Management System) Site Register search was undertaken for an area approximately 20 kilometres square centred on the project area. The full results of the site search are included in **Appendix C** and are summarised in **Table 3.1**. **Figure 3.1** indicates the locations of the previously recorded sites within 5 kilometres of the project area.

Table 3.1 - Sites Listed on the DEC/AHIMS Register

Site ID	Site Name	Easting	Northing	Site Type
51-6-0059	MQ 1	771860	6152890	Open Camp Site
51-6-0060	MQ 2	772450	6153000	Open Camp Site
51-6-0066	G11	765950	6158450	Open Camp Site
51-6-0068	G13	768800	6159650	Open Camp Site
51-6-0074	MAS 1	771450	6157600	Open Camp Site
51-6-0075	MIF 1	771900	6157800	Isolated Find
51-6-0076	MAS 4	771400	6157280	Open Camp Site
51-6-0077	MAS 5	771450	6157320	Open Camp Site
51-6-0079	MAS 3	771300	6157250	Open Camp Site
51-6-0080	MAS 2	771300	6157320	Open Camp Site
51-6-0086	Marulan 1	774500	6153130	Open Camp Site
51-6-0087	Marulan 2	774530	6153100	Open Camp Site
51-6-0088	Marulan 3	774630	6153170	Open Camp Site
51-6-0089	Marulan 4	774510	6153000	Open Camp Site
51-6-0090	Marulan 5	774380	6153800	Open Camp Site
51-6-0091	Marulan 6	774310	6153270	Open Camp Site
51-6-0092	Marulan 7	774220	6153450	Open Camp Site
51-6-0093	MF 1 – Winfarthing Road	765080	6151200	Isolated Find
51-6-0094	MF 3 – Narambulla Creek	765870	6151120	Open Camp Site
51-6-0095	MF 2 – Winfarthing Road	765190	6151120	Isolated Find
51-6-0096	MF 4 – Narambulla Creek	765950	6150620	Open Camp Site
51-6-0097	MF 5 – Narambulla Creek	765700	6150360	Open Camp Site
51-6-0098	MF 6 – Narambulla Creek	765590	6150170	Isolated Find
51-6-0101	Isolated Find 2	774550	6152900	Isolated Find
51-6-0102	Isolated Find 3	777420	6153370	Isolated Find
51-6-0103	Isolated Find 1	774500	6153170	Isolated Find

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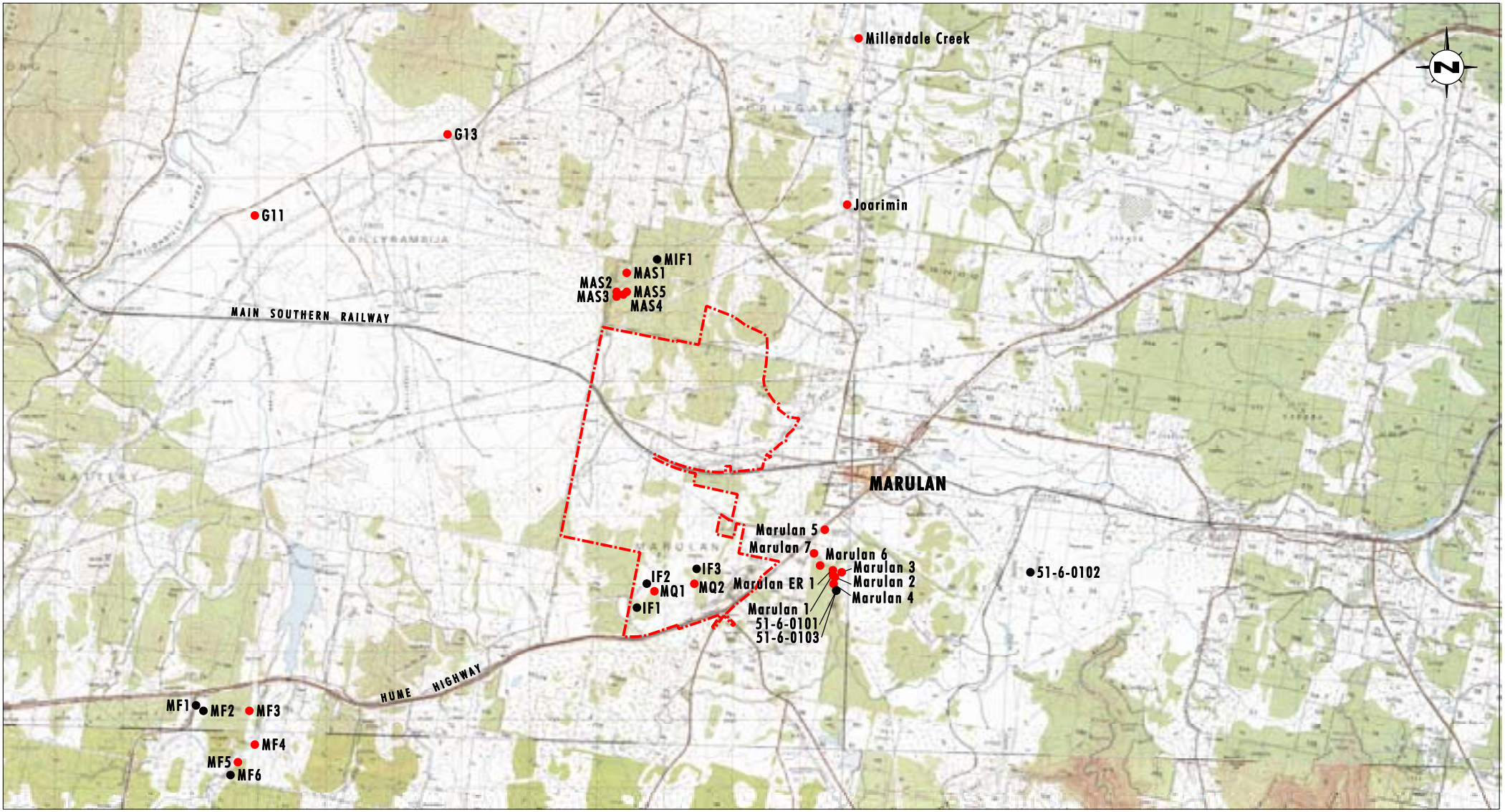


Base Source: LPI 2000 1:25 000 Topographic Maps

Legend

- Project Area
- Artefact Scatter
- Isolated Find

FIGURE 3.1

Location of Previously Recorded Sites in Relation to the Project Area

Table 3.1 - Sites Listed on the DEC/AHIMS Register (cont)

Site ID	Site Name	Easting	Northing	Site Type
51-6-0105	Marulan ER Site 1	774500	6153220	Open Camp Site
51-6-0114	Joarimin Creek 1	774710	6158610	Open Camp Site
57-3-0234	Millendale Creek	774880	6161071	Open Camp Site

In addition to the 29 sites on the DEC/AHIMS register there are three isolated find sites (IF1, 2 and 3) recorded by Navin (1990) and a quarry site G5 that do not appear in the register. Open camp sites (artefact scatters) are the most common site (22) followed by isolated finds (10). Five of these sites (two artefact scatters and three isolated finds) are within the project area (refer to **Figure 3.1**).

According to the DEC/AHIMS Register search none of the sites listed has been granted Section 90 consent, however, the site cards indicate that a Section 90 consent (#570002) was approved on 5 April 1987 for Millendale Creek. Furthermore, a Section 87 Permit (#428) for further investigation was approved by NPWS on 7 October 1992 for G11 and G13. Taking this into account it can be suggested that more of the sites listed may also have been destroyed by development in the period since their recording.

Table 3.2 indicates the geographic location and distance of each of the sites from the nearest watercourse. No distinction has been made in terms of the reliability of the watercourse as this information was not available from the majority of the site cards. For those sites where site cards could not be located the information was derived from mapping the sites.

Table 3.2 - Geographic Location of the Known Sites

Site Name	Site Type	Landform Unit	Distance to Water (m)
MQ 1	Open Camp Site	Lower slopes of spur	200
MQ 2	Open Camp Site	Spur lower slope	220
IF1	Isolated find	Gully erosion	0
IF2	Isolated find	Between two tributaries	10
IF3	Isolated find	Spur slope	10
G11	Open Camp Site	Lower slope	75
G13	Open Camp Site	Lower slope	0
MAS 1	Open Camp Site	Hill slope	500
MIF 1	Isolated Find	Ridge crest	500
MAS 4	Open Camp Site	Gentle slope	250
MAS 5	Open Camp Site	Ridge crest	400
MAS 3	Open Camp Site	Gentle slope	250
MAS 2	Open Camp Site	Gentle slope	400
Marulan 1	Open Camp Site	Elevated bench beside creek	0
Marulan 2	Open Camp Site	Elevated bench beside creek	0
Marulan 3	Open Camp Site	Elevated bench beside creek	0
Marulan 4	Open Camp Site	Elevated bench beside creek	0
Marulan 5	Open Camp Site	Footslope/creek terrace	0
Marulan 6	Open Camp Site	Elevated bench beside creek	0
Marulan 7	Open Camp Site	Elevated bench beside creek	0
MF 1 – Winfarthing Road	Isolated Find	Saddle	>900
MF 3 – Narambulla Creek	Open Camp Site	Midslope of low spur	250

Table 3.2 - Geographic Location of the Known Sites (cont)

Site Name	Site Type	Landform Unit	Distance to Water (m)
MF 2 – Winfarthing Road	Isolated Find	Saddle	900
MF 4 – Narambulla Creek	Open Camp Site	Saddle	>900
MF 5 – Narambulla Creek	Open Camp Site	Footslope/creek terrace	50
MF 6 – Narambulla Creek	Isolated Find	Footslope/creek terrace	<50
Isolated Find 2	Isolated Find	Elevated bench beside creek	6
Isolated Find 3	Isolated Find	Elevated bench beside creek	5
Isolated Find 1	Isolated Find	Elevated bench beside creek	1
Marulan ER Site 1	Open Camp Site	Elevated bench beside creek	0
Joarimin Creek 1	Open Camp Site	Elevated bench beside creek	50
Millendale Creek	Open Camp Site	Hillslope	300

Table 3.2 indicates that the sites were most often located within 50 metres of creeklines (53%) and often directly adjacent to creek lines on elevated terraces. Sites were also relatively common on ridge crests and saddles and on spur slopes. This information will be used to assist with the formulation of the predictive model.

For the remainder of this discussion "open camp sites" will be referred to as "artefact scatters". This is a more accurate description as many scatters of artefacts recorded as "open camp sites" do not necessarily represent camping activity.

3.3.2 Summary of Previous Survey and Assessment

There have been a number of archaeological assessments carried out in the general Marulan area over the last 25 years. Where possible, information from the reports in relation to site location, site type and site contents are summarised below. Where the reports could not be accessed and where the sites cards were available these were referenced instead.

Koettig 1981

In 1981 Koettig undertook a survey for the proposed F5 route alignment between Hoddles Crossing and Alpine to the north of Marulan. Koettig recorded 24 sites, including grinding grooves, scarred trees, artefact scatters and rockshelters with deposit and art. The rockshelter sites and grinding grooves were confined to the Hawkesbury Sandstone areas and the artefact scatter sites were located close to watercourses in the Wianamatta Shales and at the shale/sandstone boundaries.

Brayshaw and Associates 1984

In 1984 Brayshaw and Associates investigated an area proposed for a quarry and its associated infrastructure approximately 15 kilometres west of Marulan. No Aboriginal sites or objects were recorded during this survey and assessment. Brayshaw and Associates explained the lack of evidence as reflecting the lack of a reliable source of water locally.

Dallas 1985

In 1985, Dallas undertook a survey of a deviation for State Highway 2 in the Cullerin Range. Dallas located eight artefact scatters. The most common raw material in the sites was quartz, with indurated mudstone, silcrete and chert also present in low numbers. Sites were located on hillslopes (57%), along creeks (30%) and on ridge tops (13%).

Haglund 1986

In 1986, Haglund reported on a survey carried out in the Bungonia State Recreation Area 10 kilometres south of Marulan in anticipation of the impacts of recreational activities in that facility. Fifteen artefact scatter sites were located. Raw materials used for artefact manufacture were described as "typical" of the Southern Highlands and included quartz, silcrete and chert.

Byrne 1987

In 1987, Byrne surveyed an area 4 kilometres north of Berrima and located one artefact scatter and eight isolated finds. The sites were located on elevated areas beside creeks. Raw materials used for artefact manufacture included quartz, silcrete and chert.

Koettig 1988

East of Marulan, at Tallong, Koettig investigated a proposed rural subdivision and recorded nine sites. Seven of these were artefact scatters and two were rockshelters with potential archaeological deposits (PAD). The artefact scatters and isolated finds were located in association with watercourses.

Patton 1989

In 1989 Patton undertook a salvage excavation of a site on the south bank of the Mulwaree River at Goulburn. The excavation recovered over 15,000 artefacts. The dominant raw materials were quartz (85%) and silcrete (10%); artefact types included geometric microliths, backed blades, bipolar cores and an edge-ground axe.

Navin 1990

Navin carried out a survey of an area within the current project area for a proposed hard rock quarry at that time. Two artefact scatters (MQ 1 and 2) and three isolated finds (IF1, 2 and 3) where located (**Figure 3.1**).

MQ 1 was located on the lower slopes of a spur, 200 metres from a tributary of Marulan Creek. The site is reported to have contained three artefacts, consisting of two broken pebbles and a quartz flaked piece. The artefacts were located in a scour (8 metres by 6 metres) below a tree.

MQ 2 was located on a low spur. Nine artefacts were located in three exposures and consisted of a chalcedony core and flaked piece, a quartz flake, broken flake and flaked piece, a volcanic manuport, two flaked pieces and a chert flaked piece.

The isolated finds were located in association with eroding gullies and consisted of two grey silcrete broken flakes and a broken quartzite flake.

MQ 1 was assessed as having low archaeological significance and MQ 2 was assessed as having moderate archaeological significance.

It was recommended that as MQ 1 would be impacted if development of the quarry proceeded that the artefacts be collected under Section 90 consent. As MQ 2 was outside the area of impact it was recommended that the site be protected by revegetating the area. There were no recommendations made for the isolated finds.

McIntyre 1993

McIntyre reported on three sites located approximately 12 kilometres to the west of the project area. Two of these (G11 and G13), were artefact scatters located adjacent to the route of the 132 kV Marulan to Goulburn transmission line. G11 was located on the banks of Narrambulla Creek and

contained five artefacts. The artefacts were manufactured from silcrete (4) and chert (1) and consisted of four cores and a flaked piece. G13 was described as located at the base of a tree and contained three artefacts manufactured from quartz (2) and silcrete (1). The third (G5) was described as a 'large quarry site and work floor overlooking Towrang Creek'. Its dimensions were given as 'at least 60 by 100 m on the east bank of the creek'. McIntyre reported that at the time of recording (1989), the site was already highly disturbed and on subsequent re-inspection was found to be effectively destroyed through additional clearance work. The "quarry site" was described as containing silcrete, indurated mudstone, chert and quartz. The NPWS site card for the site reports "At least some of these materials (quartz and silcrete) are being quarried at the site".

Sefton 1995, 1996

In 1995, Sefton carried out a survey of the site of a proposed water augmentation project to the north and east of Marulan (from 11 kilometres to 1.5 kilometres distant from the current project area). No sites were located during this survey. A subsequent survey for the Marulan Sewerage Augmentation project in 1996 resulted in the recording of seven artefact scatters and three isolated finds (NPWS site cards #51-6-0086 to #51-6-0104) The artefact scatters contained between six and 13 artefacts and were all located adjacent to Marulan Creek. Artefact types included flakes, cores, broken flakes, flaked pieces, one backed blade and numerous bipolar flakes and cores and one volcanic manuport (pebble). Silcrete was the dominant raw material then quartz and chert. Siltstone and volcanic rock were also present in low numbers. Bipolar flaking was taking place on the silcrete, quartz and chert.

The isolated finds were located beside a tributary of Marulan Creek and contained a quartz bipolar flake, a grey silcrete flake and a yellow silcrete core.

A subsequent review of the archaeological survey by the Department of Public Works recorded a further artefact scatter (Marulan 8). The site was located on the bank of a tributary of Marulan Creek. It contained 3 artefacts including two quartz flakes and a silcrete flaked piece (information from NPWS Site Card (#51-6-0105).

Johnston 1995

In 1995, Johnston (Australian Archaeology Survey Consultants) undertook a survey for a proposed extension to a sand quarry adjacent to the northwestern corner of the current project area (refer to **Figure 3.1**). Johnston recorded five artefact scatter sites (MAS1-5) and one isolated find (MIF1) during his survey. The artefact scatter sites contained between two and six artefacts and were mainly located in highly disturbed contexts due to prior quarry activities. It was thought that the artefacts had come from slopes and benches on the slopes. Raw materials used in artefact manufacture included silcrete, quartz, quartzite, chert and volcanic pebbles. The isolated find was located on a ridge top and was a grey quartzite core.

In addition to the sites listed above, Laws, O'Connell and Pettigrew (1979) identified two "corroboree sites" an "initiation site" and a burial site all within 5 kilometres of Goulburn Railway Station. Unfortunately no details are given of the geographic locations of these sites.

3.3.3 Previous Archaeological Survey and Assessment/Implications for Aboriginal Site Location/Site Integrity

From the results of the previous archaeological survey and assessment it can be ascertained that:

- artefact scatter and isolated find sites have most commonly been located within close proximity to creeks;
- artefact scatter and isolated find sites have also been located on slopes, saddles and on ridge crests;
- rockshelters and grinding grooves have been recorded in areas of sandstone geology;

- sites were found along geological boundaries where it is probable that there was greater species diversity within a small area due to the different soils derived from the different parent materials;
- in areas assessed as having poor surface water availability, there were few/no sites recorded;
- most sites contained <10 artefacts;
- slightly larger numbers of artefacts were located in sites close to watercourses;
- the largest site known was located near a permanent water source (Mulwaree River, 15,000 artefacts);
- quartz and silcrete were the most common raw materials used for artefact manufacture. Chert, quartzite and volcanic (pebble) were also commonly found in sites but generally only made up a minor proportion of the assemblage. Siltstone and chalcedony are recorded but are rare components of the assemblages;
- bipolar reduction is commonly used to reduce quartz and to a lesser extent silcrete and chert;
- backed artefacts and edge-ground axes have been recorded but only in association with the largest assemblage (Mulwaree River);
- one raw material source was located 12 kilometres to the west of the project area which had both silcrete and quartz available; and
- it is highly probable that many of the sites recorded have since been destroyed by development, agricultural practices or natural geomorphological processes.

A summary of the combined implications for site location and site integrity derived from the ethnography and previous archaeological survey and assessment is presented in **Section 4.2**.

4.0 THE PREDICTIVE MODEL

The formulation of a predictive model is undertaken to assess where sites are most likely to be located within the landscape, what types of sites these are likely to be, and what they are likely to contain. It should also contain information in relation to where sites are likely to have survived both natural destructive processes (e.g. slope wash and creek bank erosion) and European land-use practices (land clearing, stock trampling, road construction, power easement clearing and cultivation). Also of importance, the predictive model suggests where sites should not be found and what types of sites should not be found in an area. Such atypical sites/site types will be of increased archaeological significance due to their rarity (refer to **Section 6.3.1** for a definition of rarity).

Predictive models are used to formulate an appropriate methodology for survey as the model pinpoints those areas that are the most archaeologically sensitive and that must be surveyed. This does not mean that the rest of the area can be ignored as an adequate sample of each landscape unit must be surveyed in order for the predictive model to be tested and refined. Otherwise all predictive models will be self-fulfilling with sites only being found in those areas predicted.

In order to formulate the predictive model the information drawn together in **Section 2** and **Section 3** of this report are combined.

4.1 IMPLICATIONS FOR ABORIGINAL SITE LOCATION AND SITE INTEGRITY DERIVED FROM THE ENVIRONMENTAL CONTEXT

The implications for Aboriginal site location and integrity provided by the information related to the environmental context suggested the following:

- prior tree clearance will lessen the number of mature trees in the area and the probability of locating scarred/carved trees;
- downslope movement of soils will have resulted in the vertical and horizontal displacement of artefactual material located on slopes resulting in a lack of site integrity;
- areas of lower gradient subject to cultivation will also have both vertical and horizontal displacement of artefactual material resulting in a lack of site integrity;
- sites such as stone arrangements and Bora grounds are unlikely to have survived intact due to stock trampling;
- from a climatic perspective the preferred time of year for Aboriginal occupation would have been late spring, summer and early autumn;
- areas where there was protection from the cold west and southwesterly winds would have been preferred camping locations in spring, autumn and winter;
- areas open to the west and southwesterly winds may have been preferred camping places for summer;
- in terms of a reliable supply of water the main creek channels are likely to have been preferred longer duration camp sites;
- ridge crests and saddles may have been used for camping when an expansive view was required;
- there may have been some use of locally outcropping stone for tool manufacture, however, there should be a major reliance of stone brought in from elsewhere;

- there will be no rock overhangs with evidence of occupation or art sites;
- there is little likelihood of potential archaeological deposits (PAD) on the crests and slopes with skeletal soils;
- sites in close proximity to the creeks are likely to suffer loss of artefacts due to scouring caused by flooding; and
- the areas where PAD is most likely are in the sands formed by the deeply weathered porphyry and where colluvium has aggraded at the lower slope/footslope boundary. As all these areas are presently impacted by active wombat burrows or have evidence of prior wombat disturbance there is little likelihood of any site integrity.

4.2 IMPLICATIONS FOR ABORIGINAL SITE LOCATION AND SITE INTEGRITY DERIVED FROM THE ETHNOGRAPHY AND PREVIOUS ARCHAEOLOGICAL SURVEY AND ASSESSMENT

The information available from ethnographic sources indicates:

- the number of Aboriginal people using the area on a regular basis may have been small, however,
- the area may have been within a corridor along the Gundungurra/Ngunawal tribal boundary that was used for tribal interaction for ceremony and may contain sites related to these activities (if they have managed to survive natural geomorphic processes and European land-use practices); and
- it is unlikely that there will be sites related to the early contact period.

The information available in relation to previous archaeological research in the general Marulan area indicates that:

- artefact scatter sites and isolated find sites are the most common site types located;
- artefact scatter and isolated find sites have been located most commonly in direct association with watercourses with slightly higher numbers of artefacts in sites beside the main channels;
- sites can also be expected in lower numbers on slopes and ridge crests;
- grinding grooves, rockshelter sites and rockshelter sites with art have been located within areas with sandstone outcrop but not within the granitic country in the general Marulan area;
- scarred trees, burials and ceremonial sites are known in the Goulburn area but are not common site types;
- carved trees have not been recorded;
- the most common artefact types are flakes, broken flakes, flaked pieces and cores. Backed flakes and an edge ground axe have been recorded in association with a site with 15,000 artefacts near the Mulwaree River but are not recorded in sites with small assemblages;
- the most common raw material types used for stone artefact manufacture are quartz, silcrete and chert with minor amounts of quartzite, chalcedony, volcanic and siltstone; and

- bipolar reduction is relatively commonly recorded on quartz and less commonly on chert and silcrete.

4.3 PREDICTIVE MODEL FOR SITE LOCATION

The predictive model summarises all the information provided in **Sections 4.1** and **4.2**.

For the project area it can be predicted that:

- there will not be grinding grooves, rock overhangs, rock overhangs with art or carved trees;
- prior tree clearance will lessen the probability of locating scarred trees;
- burials are unlikely;
- it is highly unlikely that artefact scatter sites or areas of PAD which retain archaeological integrity will be located, due to the downslope movement of soils from most crests and slopes and the impact of wombat burrowing in areas of deep *in situ* or colluvial sand;
- Aboriginal occupation was most likely in late spring, summer and early autumn, with the main camp sites located close to the main creek channels. Due to scouring of the footslopes beside the creeks during flooding, it is likely that most sites on the banks of the creeks will have suffered loss of artefacts and site integrity;
- summer camps may have had a west or southwesterly aspect to take advantage of the cooling west to southwesterly winds, while spring, summer and autumn camps should have a northerly to easterly aspect to provide protection from the prevailing winds;
- artefact scatter and isolated find sites may also occur on slopes and crests;
- there is a possibility that sites of ceremonial nature (stone arrangements/Bora grounds) may be in the area, however, they are likely to have been adversely affected/destroyed by natural geomorphic processes and/or European land-use practices;
- most sites will have <10 artefacts and result from stays of short duration by small numbers of people. Larger sites may be related to targeted resource exploitation or even gatherings for ceremonial purposes;
- there may be some use of locally outcropping granitic stone, porphyry and possibly (reef) quartz for tool manufacture, however, the majority of the stone will be imported into the area and consist of quartz (pebble), silcrete and chert with minor amounts of quartzite, chalcedony, volcanic rock (pebbles) and siltstone;
- sites should commonly contain flakes, broken flakes, flaked pieces, cores and occasional volcanic manuports. Backed flakes and edge ground axes should only occur in large assemblages; and
- bipolar reduction should be relatively common on quartz, chert and silcrete.

5.0 THE SURVEY

5.1 THE SURVEY STRATEGY

The survey strategy was formulated in light of the predictive model and was organised to assess all landforms with a high potential for sites and a representative sample of all other landform units (refer to **Figure 5.1**). The survey included areas to be impacted by the project as well as areas within the project area but that were not designated for impact. Survey was undertaken outside the area of impact in order to determine if these areas contained sites that could be set aside for conservation as an offset for the loss of any cultural heritage sites within the project impact area. The survey included:

- the majority of the two main creek systems:
  - Marulan Creek and its tributaries;
  - Joarimin Creek and its tributaries;
- a section of upper tributary system associated with Lockyersleigh Creek (northwestern corner of the project area); and
- a representative sample of the crests, saddles and slopes associated with each drainage area.

5.2 SURVEY METHODOLOGY

The survey was undertaken during the period 26 July to 6 August 2004. The entire survey was carried out on foot with participants walking at approximately 15-20 metre intervals inspecting all areas of visible ground surface. Details of the methodology are as follows:

Watercourses

The banks and an area 50 metres either side of the watercourse were examined for evidence of Aboriginal occupation/exploitation including stone artefact scatters and PADs indicative of camp sites, or isolated finds indicative of more transient activity. Rock outcrops in and adjacent to the creeklines were also examined for evidence of raw material extraction, or artefact sharpening, e.g. axe or spear grinding grooves. Mature trees were inspected for evidence of scarring/carving and accumulations of loose rock on the ground surface were inspected for evidence of human modification (stone arrangements).

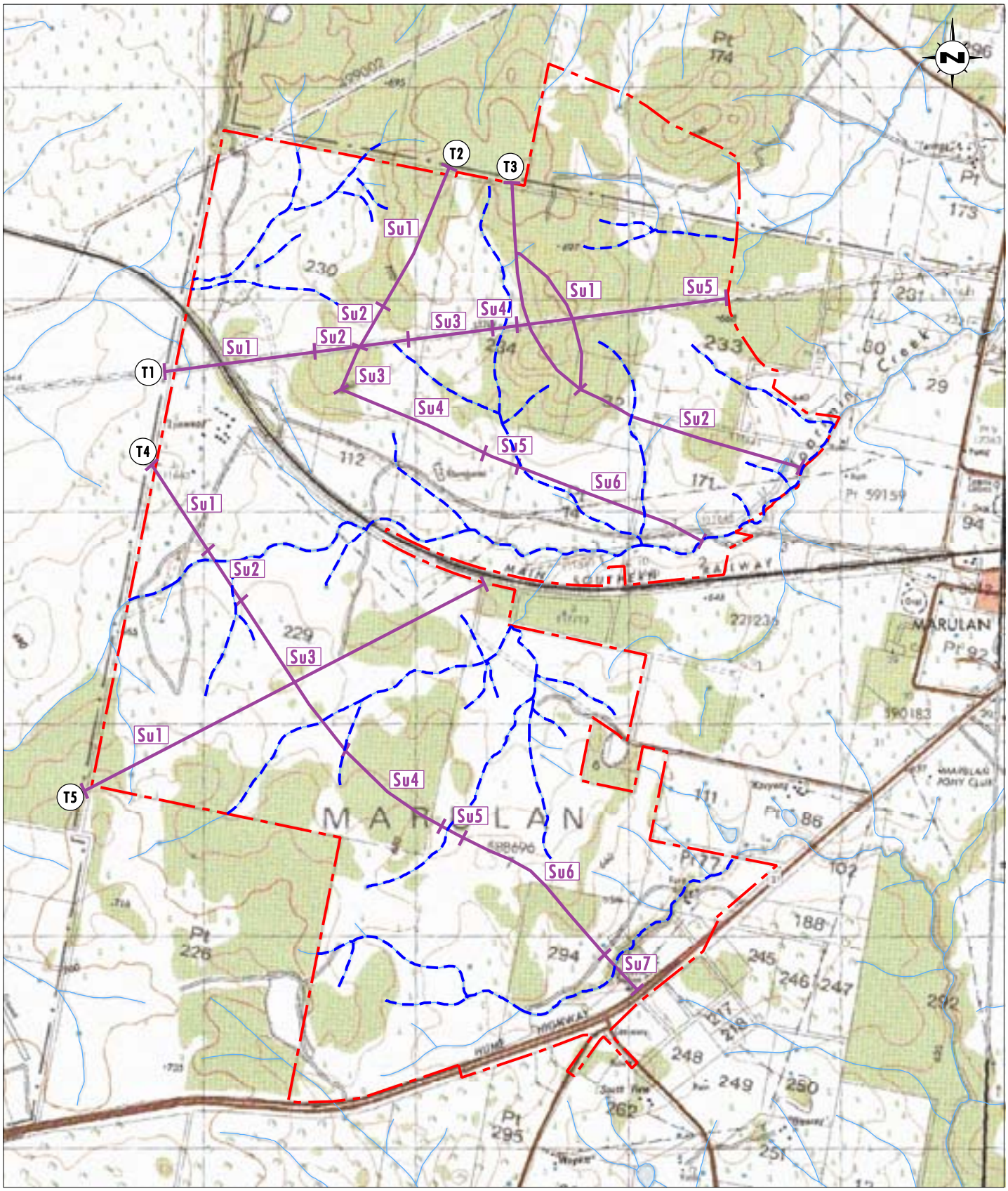
Other landform Units

All ground surface exposures within 50 metres either side of the centreline of the transect were examined for evidence of Aboriginal occupation/exploitation including stone artefact scatters and PADs indicative of camp sites, or isolated finds indicative of more transient activity. Rock outcrops were examined for evidence of raw material extraction, or artefact sharpening. Mature trees were inspected for evidence of scarring/carving and accumulations of loose rock on the ground surface were inspected for evidence of human modification (stone arrangements).

Overall

Throughout all survey transects the occurrence of useful Aboriginal resources within the landscape was recorded.

Umwelt Environmental Consultants



Base Source: LPI 2000 1:25 0000 Topographic Map, Readymix Holdings Pty Ltd

0 0.25 0.5 1km

Legend

- Project Area
- Other Landform Transects
- Creek Survey Transects

FIGURE 5.1

Survey Transects

5.3 SURVEY RESULTS

5.3.1 The Watercourses

Marulan Creek is located essentially along the southern boundary of the project area, adjacent to the Hume Highway. Its headwaters and tributaries were found to be ill-defined linear grassy depressions, however, the main channel became deeply incised (< 5 metres), cutting through earlier colluvial and *in situ* deposits, exposing the underlying bedrock in places. No water was observed in any section of Marulan Creek during the survey.

The total survey length of Marulan Creek and its tributaries is estimated to be approximately 4100 metres. This included an area 50 metres either side of the channel. This results in an area of 41 hectares inspected in association with Marulan Creek and its tributaries.

Joarimin Creek rises in the southwestern quadrant of the project area, runs northeast until it is crossed by the Main Southern Railway after which it veers east and runs roughly parallel to the railway line for approximately 1500 metres. The creekline then turns northeast again and leaves the project area in its northeastern corner. Joarimin Creek has tributaries feeding into it from the north and south. The headwaters of the main channel and the tributaries were found generally to be grass covered depressions, in places easily defined, in others less defined. Downstream the channels become deeply incised in places, particularly along the main channel (<5 metres), cutting through earlier colluvial and *in situ* deposits, exposing the underlying bedrock in places. Joarimin Creek was not flowing during the course of the survey, although several small, isolated, stagnant pools of water were present in its lower reaches.

The width of the survey was 50 metres either side of the watercourse. The surveyed length of the main channel of Joarimin Creek was 4620 metres; the surveyed length of the southern tributaries was 8320 metres and of the northern tributaries 6220 metres, giving a total length of approximately 19,160 metres. This translates into a total area of approximately 192 hectares inspected.

Lockyersleigh Creek rises in the northwestern corner of the project area and drains to the southwest. The tributary channels were not as deeply incised as the other creeks (<2 metres) in the areas inspected. The total length inspected was 4250 metres, giving an area inspected of 43 hectares.

5.3.2 Other Landform Units

The location of each transect discussed is shown on **Figure 5.1**.

T1 followed the power easement, an area cleared and bulldozed and therefore offering (untypically) high ground visibility (~50%), but of little potential archaeological value. However, the transect afforded an opportunity to sample a cross section of landforms with easy access off the sides of the easement onto less disturbed ground (visibility <10%). The transect had a total length of 3726 metres. The transect inadvertently continued 1100 metres past the eastern boundary of the project area (there were no fencelines in this area to indicate the project area boundary).

T2 followed a ridge trending south by west for approximately 1000 metres from the northern boundary of the project area. It then turned 90^{o} east to follow a spurline down onto the lower slope/footslope north of Joarimin Creek. The first section of this transect was relatively heavily wooded making access and visibility difficult. After the turn eastward, the visibility was little improved due to grass cover. Overall visibility for this transect was estimated at about 5% for its 2899 metre length.

T3 followed a similar south/southeast course and encountered similar conditions to those found along **T2**. Again, overall visibility was estimated at about 5% along its 2832 metre length.

T4 followed a roughly southeast course from a point at the centre of the western boundary of the project area. It traversed a variety of landforms, including crossing Joarimin Creek and several of its southern tributaries. Visibility was uniformly low (<5%), as for about 80% of its length this transect crossed grassy paddocks. The ridge tops were rocky outcrops with a covering of leaf litter. Typically, visibility was best where the track crossed watercourses. Total length of this transect was 3370 metres.

T5 ran northeastward from the southwest corner of the project area. It crossed similar country to that of **T4** and visibility was similar, <5%. The total length of this transect was 2095 metres.

Other locations for the transects within the project area were considered, however, moving the transects would not have provided greater ground surface visibility as this was fairly uniform with contiguous grass cover across the pastureland and a fairly uniform covering of leaf litter within the woodlands. The total length of transects away from watercourses was 14,920 metres which gives a surveyed area of 149 hectares.

5.3.3 Effective Coverage

The total area surveyed was 350.91 hectares (refer to **Tables 5.1** to **5.7**). It is estimated that the overall area of ground surface visibility within the transects was 15.37 hectares. This equates to a total of 4.4% of the overall project area. This is a relatively high effective coverage which was possible due to the drought conditions, scouring of the banks of the watercourses and wombat activity within the areas surveyed.

Table 5.1 - Effective Coverage Creeklines

Landform Unit	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for Detection (ha)	% of landform area available for site detection
Marulan Creek	41	10	4.10	5	0.21	0.50
Joarimin Creek	192	33	63.36	15	9.50	4.95
Lockyersleigh Creek	43	10	4.30	5	0.22	0.50
Total	276		71.76		9.92	3.60

Table 5.2 - Effective Coverage Transect 1 (Power Easement)

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Slope <8°	1 0.67 km	3.35	50	1.68	50	0.84	25
On contour	2 0.416 km	2.08	75	1.56	60	0.94	45
Slope <3°	3 0.391 km	1.96	50	0.98	50	0.49	25
Creek margin	4 0.103 km	0.52	50	0.26	40	0.10	20
Slope <5° forested	5 1.665 km	8.30	50	4.15	50	2.08	25
Total		16.21		8.63		4.44	27

Table 5.3 - Effective Coverage Transect 2

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Ridge top	1 0.679 km	3.40	10	0.34	5	0.02	0.50
Creek margin	2 0.24 km	1.20	25	0.30	10	0.03	2.50
Ridge top	3 0.22 km	1.10	10	0.11	5	0.01	0.50
Spur	4 0.95 km	4.70	25	1.18	5	0.06	1.25
Slope < 3°	5 0.21 km	1.04	25	0.26	10	0.03	2.50
Flat	6 0.93 km	4.65	30	1.40	20	0.28	6.00
Total		16.09		3.58		0.42	2.59

Table 5.4 - Effective Coverage Transect 3

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Ridge top	1 0.694 km	8.47	5	0.42	5	0.02	0.25
Slope <5°	2 1.107 km	5.54	10	0.55	20	0.11	2
Total		14.01		0.98		0.13	0.94

Table 5.5 - Effective Coverage Transect 4

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Slope < 2°	1 0.509 km	2.60	20	0.52	10	0.052	2
Creek margin	2 0.269 km	1.35	30	0.40	20	0.081	6
Flat	3 0.876 km	4.38	15	0.66	15	0.10	2.25
Wooded slope < 2°	4 0.565 km	2.82	15	0.42	15	0.06	2.25
Creek margin	5 0.126 km	0.63	30	0.19	20	0.038	6

Table 5.5 - Effective Coverage Transect 4 (cont)

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Slope < 3°	6 1.062 km	5.31	10	0.53	5	0.03	0.5
Creek margin	7 0.21 km	1.05	25	0.26	25	0.07	6.25
Total		18.14		2.99		0.42	2.34

Table 5.6 - Effective Coverage Transect 5

Landform Unit	Survey Unit (Su)	Total Area of Landform Unit (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for detection (ha)	% of landform available for site detection
Slope 2°	1 2.092 km	10.46	7.5	0.78	5	0.04	0.38
Total		10.46		0.78		0.04	0.38

Table 5.7 - Effective Coverage Summary

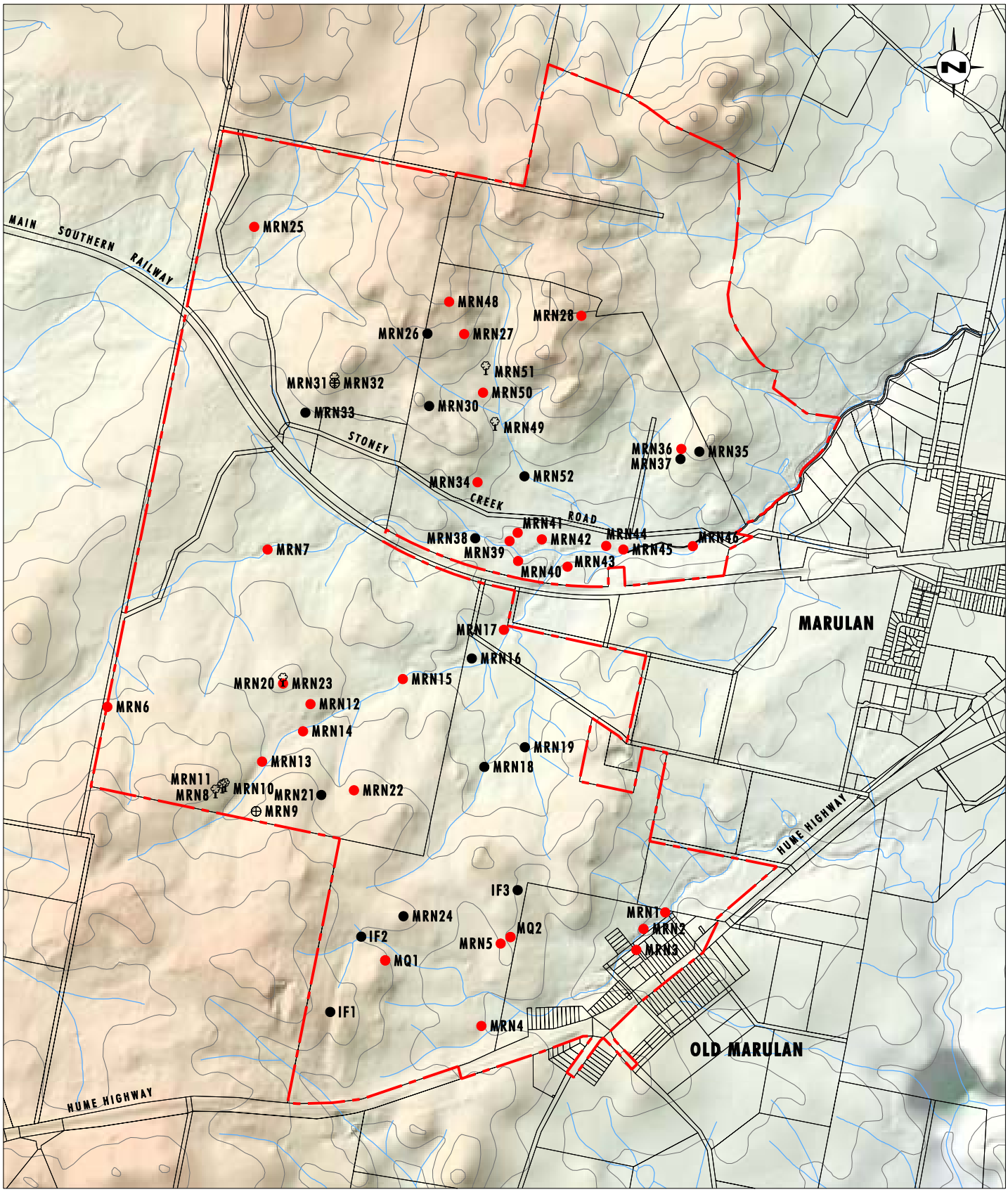
Transect	Total Area of Transect (ha)	Exposure %	Area of Exposure (ha)	Visibility %	Area available for Detection (ha)	% of Transect area available for site detection
Transect 1	16.21	53	8.63	51.45	4.44	27.39
Transect 2	16.09	22	3.58	11.73	0.42	2.59
Transect 3	14.01	7	0.98	13.27	0.13	0.94
Transect 4	18.14	16	2.99	14.05	0.42	2.34
Transect 5	10.46	7	0.78	5.13	0.04	0.38
Creeklines	276	26	71.76	13.82	9.92	3.6
Total	**350.91**		**88.72**		**15.37**	**4.4**

5.4 SITES LOCATED DURING THE SURVEY

A total of 52 previously unrecorded sites were located during the course of the survey. Two of these sites were later found to fall outside the project area. Of the 50 sites within the project area, 29 were artefact scatters (with two or more artefacts); 12 were isolated finds; seven were scarred trees and two were stone arrangements (refer to **Figure 5.2**).

Site locations were recorded using a handheld Global Positioning System and DEC site cards were recorded for each site. Each site was given a survey number with the prefix MRN (short for Marulan). Descriptions of the sites are provided in **Sections 5.4.1** to **5.4.4**. The sites are grouped by site type and plates are included in **Appendix D**. **Figure 5.3** indicates the geological context of the sites.

Umwelt
Environmental Consultants



Base Source: LPI 2004

Legend

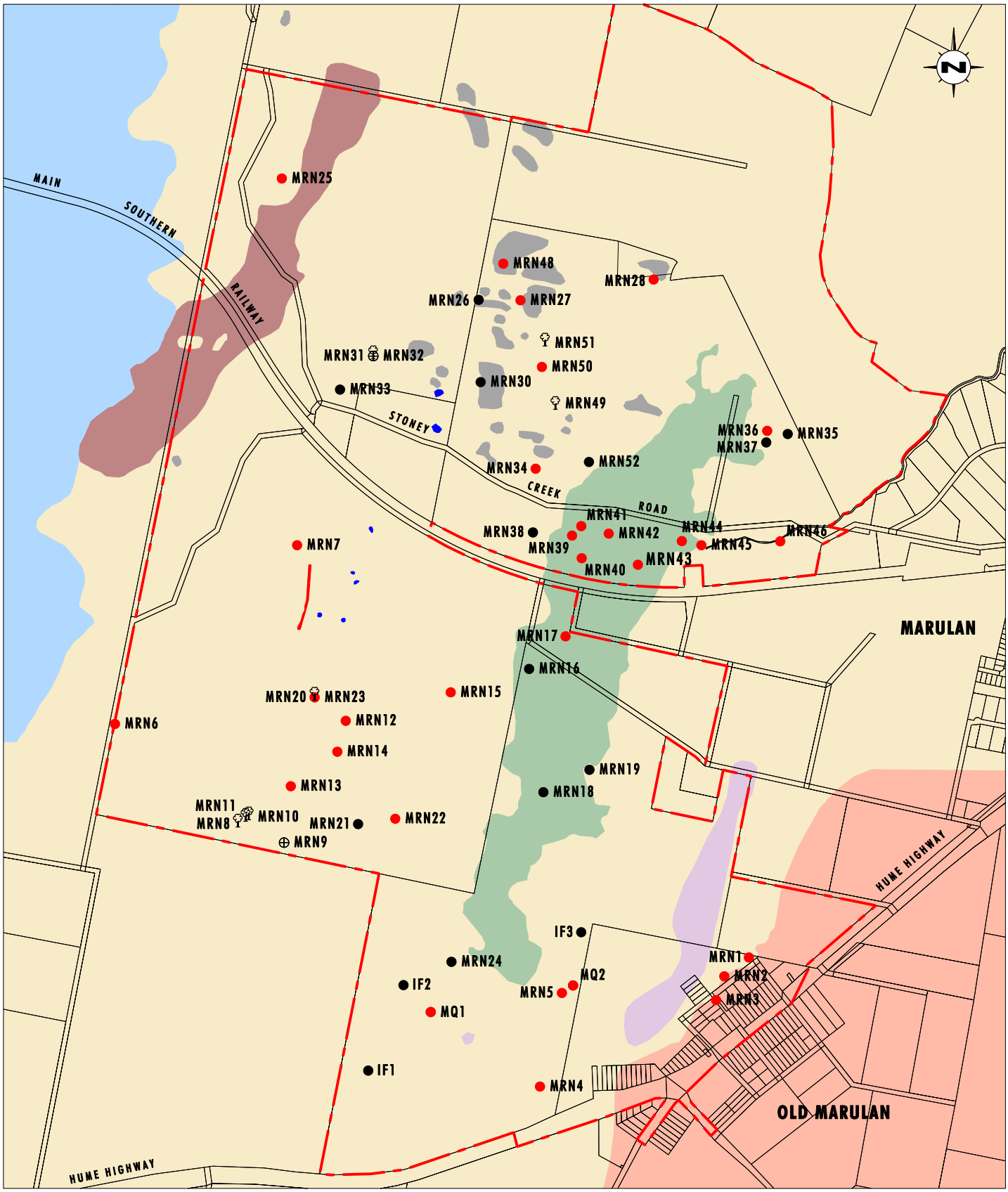
- Project Area
- Artefact Scatter
- Isolated Find
- Stone Arrangement
- Scarred Tree

FIGURE 5.2

Aboriginal Archaeological Sites within the Project Area

File Name (A4): R06_V1/1829_089.dgn

Umwelt
Environmental Consultants



Source: Bell Cochrane & Associates
Base Source: LPI 2004

Legend

- Project Area
- Sand
- Lockyersleigh Adamellite
- Adamellite Dyke
- Adamellite Dyke/Sills
- Siliceous Dyke
- Porphyritic Adamellite
- Andesite
- Marulan Granite
- Bindook Porphyry
- Artefact Scatter
- Isolated Find
- Stone Arrangement
- Scarred Tree

FIGURE 5.3

The Geological Context of the Sites

File Name (A4): R06_V1/1829_211.dgn

5.4.1 Stone Arrangements

MRN9

MRN9 is a stone arrangement with a parallel alignment of stones 13.8 metres long on its southern side and 8.7 metres long on its northern side with an average distance between the lines of 2.6 metres. The lines of stones close at their western end where they expand slightly into a bulbous shape 3.9 metres in diameter (refer to **Plate 5**). It is possible that this section may once have had a stone circle, however, some stones have been moved by stock trampling and this cannot be known for certain.

MRN9 is located at the head of a major north-flowing tributary of Joarimin Creek about 1500 metres north of the Hume Highway on a flat rocky outcrop area with little or no soil cover. The site has a westerly aspect. The dominant vegetation is smooth-barked grey gum (*E. punctata*) which is in stark contrast to the stand of red stringybarks *E. macrorhyncha* which dominates the opposite side of the valley to the west. Within this stand of stringybarks and within 200 metres of MRN9 are three trees identified as Aboriginal scarred trees by the Aboriginal survey participants (MRN8, 10 and 11). Approximately 250 metres to the north (downstream) is a large open campsite (MRN13) spread across both sides of the deeply incised watercourse.

The stone arrangement was interpreted by Bill Hardie (GTCAC) as occupying part of a women's campground (the men's campground would have been located across the valley among the stringybarks). The stone arrangement represents the womb and birth canal and was used as part of the first initiation of boys into men's lore. In the area of the stone arrangement the women would have given the boys over to the men; the boys would have been ceremonially reborn by passing out of the stone arrangement at the women's camp and then taken to the men's camp for the first time. Bill Hardie stated that to find this type of arrangement was unusual, although not unknown, because they were usually destroyed at the end of the ceremony in order to disguise the location (Bill Hardie 2004: pers. comm.).

Due to the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN9 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN32

MRN32 is a squarish arrangement of stones on a crest that incorporates *in situ* outcrop and loose rocks thought by the Aboriginal community to have been gathered from the surrounding area (refer to **Plate 6**). The site is adjacent to a tree identified by the Aboriginal participants as a scarred tree (MRN31) and is aligned roughly east-west with an easterly aspect. Neither of the Aboriginal community representatives was able to offer an explanation for this arrangement in terms of Aboriginal cultural heritage and it was suggested that it may have been "a women's business site" or more likely that it could be of European origin. It was suggested that the stones may have been used to hold down the sides of a tent.

Due to the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN32 is within an area to be impacted by the proposed quarry.

5.4.2 Scarred Trees

Most of the timber in the project area is recent regrowth. This has two effects on the location of scarred trees. The first is that the number of mature trees of an age likely to exhibit Aboriginal scars is limited, the second is that mature trees stand out in the landscape and are easily identified.

From an archaeological perspective for a tree to be recorded as a scarred tree it should exhibit a number of attributes. **Table 5.8** provides criteria adapted from the *NPWS Aboriginal Cultural Heritage Standards and Guidelines Kit* (1997) and *Identifying and Recording Aboriginal Scarred Trees in New South Wales* (Crew 1990).

Table 5.8 - Archaeological Criteria for Assessing Scarred Trees

Criteria		Yes	No
1	Is the species of tree endemic?	Yes	
2	Have scars been recorded on this tree species in the area?	Yes	
3	Is the tree mature enough to have been scarred in pre-European or early contact times?	Yes	
4	Symmetrical scar shape with parallel sides	Yes	
5	Even rate of callus regrowth on both sides	Yes	
6	End shape of scar characteristic of Aboriginal scar	Yes	
7	Does the scar run to the ground?		No
8	Is the scar at an ideal height above the ground to have been removed by humans?	Yes	
9	Does the scar morphology fit a possible type or function for Aboriginal use?	Yes	
10	Are there axe marks present on the heartwood?	Yes	
11	Does the scar display signs of weathering?	Yes	
12	Are there non-Aboriginal cultural causes that could account for the scar?		No

The trees and the scars located during an archaeological survey should conform to the majority of the criteria listed in **Table 5.8** (ie. answer yes/no for the appropriate questions). If the majority of the criteria are not met then an alternative origin for the scar is indicated. If the scar has been identified by the Aboriginal community as being of cultural origin, rather than its origin being determined by use of the above criteria, this should be noted in the report and on the site card provided to DEC.

If the trees with scars do not meet the majority of the criteria in **Table 5.8** then they must be assessed as having low archaeological significance, however, if the Aboriginal community identify the trees as scarred trees then they may still retain high cultural heritage value to the Aboriginal community.

During the survey seven trees were identified by the Aboriginal community as being Aboriginal scarred trees. These are described below. Within these descriptions the term "PAD" is referred to in relation to the surrounds and their potential to retain stratigraphic integrity or a subsurface assemblage that may have research potential.

MRN8, MRN10 and MRN11

MRN8, 10 and 11 (**Plates 7**, **8** and **9**) are all located within 20 metres of each other in a stand of timber on a crest in an area with only skeletal soil, 200 metres west of the stone arrangement MRN9. All three scarred trees are the result of the removal of bark only from the trunks of stringybark species. All scars are elongated and coolamon or shield-like in shape, but were interpreted by the Aboriginal representatives as the result of the removal of bark for a shelter. The scar on MRN8 is 200 cm long and has its base 30 cm above the ground; the scar on MRN10 is 168 cm long with its base 49 cm above the ground; the scar on MRN11 is 200 cm long with its base 20 cm above the ground. All three trees had recent damage to their bark from cattle rubbing and chewing.

All three of the recorded scarred trees are alive and in good condition. The scar is on the eastern side of the tree at MRN8, on the southeastern side of the tree at MRN10 and the western side of the tree at MRN11. MRN8 and MRN10 have an easterly aspect while MRN11 has a westerly aspect. In the same stand of stringybark numerous other trees were located with similar scars. Some of the trees had three or four scars of the same elongated shape around the circumference of the trees, all at the same level (around 50 cm above the ground).

The scars on MRN8, MRN10 and MRN11 met criteria 1, 3, 4, 5, 6, 7, 8, 9 and 11 listed in **Table 5.8** and thus the trees were recorded as archaeological sites. Mature stringybark inspected in other areas

within the project area did not have similar shaped scarring, or multiple trees with scarring, further supporting their cultural origin.

Due to the skeletal nature of the soil in this general area PAD is assessed as highly unlikely. All of the scarred trees in this area are outside the area to be impacted by the quarry and its infrastructure.

MRN23

MRN23 (refer to **Plate 10**) is located on a crest with a southerly aspect at the edge of mixed eucalypt woodland. The soil is thin with rock outcropping in places. The scar was on a western scribbly gum (*Eucalyptus rossii*) and was interpreted by the Aboriginal representatives taking part in the survey as having been created for the manufacture of a container (coolamon). The length of the scar is 75 cm and its base is 90 cm above the ground. The scar is rectangular in shape with square-cuts at the top and bottom (there has been some regrowth over the scar). There are no carvings into the exposed wood. The tree is alive and in good condition. The scar is on the northern side of the tree.

The scar met with criteria 1, 3, (partially with 4), 6, 7, 8 and 11 listed in **Table 5.8** and was assessed as an archaeological site.

Due to the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN23 is close to the southeastern boundary of a road that circumnavigates a proposed excess product emplacement area, but far enough away to be outside the area to be impacted.

MRN31

MRN31 (refer to **Plate 11**) is located on a crest with an easterly aspect and adjacent to stone arrangement MRN32. The scar in on a stringybark species and was interpreted by the Aboriginal community representatives taking part in the survey as having been removed for the manufacture of a container (a coolamon). The scar measures 60 cm in length and is 118 cm above the ground. The scar is overgrown and of indeterminate shape. The tree is dead and in poor condition having lost its upper trunk and branches; it has also suffered damage during at least one hot bushfire. There are no carvings in the exposed wood. The scar is on the southwestern side of the tree.

The scar met with criteria 1, 3, 7 and 11 only, and this was thought insufficient for it to be assessed as an archaeological site, however, it was recorded as it was seen by the Aboriginal community representatives as being Aboriginal in origin and thus significant.

Due to the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN31 is within an area to be impacted by the proposed quarry.

MRN49

MRN49 (refer to **Plate 12**) is located on a midslope with a westerly aspect in a mixed eucalypt woodland. The tree is dead and its condition is fair, but deteriorating. The scar is 160 cm long and almost fully closed. Its base is 110 cm above the ground. The scar in on a stringybark species and was interpreted by the Aboriginal community representatives taking part in the survey as having been removed to make a shelter. This scar was assessed by the Aboriginal participants as being possibly up to 200 years old. There are no carvings in the exposed wood. The scar is on the western side of the tree.

The scar met with criteria 1, 3, 7 and 11 only, and this was thought insufficient for it to be assessed as an archaeological site, however, it was recorded as it was seen by the Aboriginal community representatives as being Aboriginal in origin and thus significant.

Due to prior disturbance and erosion in this area PAD is assessed as highly unlikely. MRN49 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN51

MRN51 (refer to **Plate 13**) is located on a low spur crest with a southerly aspect between two drainage lines which merge about 50 metres further downslope. The associated vegetation is mixed eucalypt, acacia and tea tree. Bark has been removed from a stringybark species to leave an ovoid scar 200 cm long with its base 30 cm above the ground surface. The Aboriginal representatives thought the most likely application of the bark would have been for shelter construction. This scar, like MRN49, was assessed by the Aboriginal representatives as being of some antiquity, possibly up to 200 years old. The tree is dead and both it and the scar are in poor condition. There are no carvings in the exposed wood. The scar is on the southeastern side of the tree.

The scar met with criteria 1, 3 and 11 only, and this was thought insufficient for it to be assessed as an archaeological site, however, it was recorded as it was seen by the Aboriginal community representatives as being Aboriginal in origin and thus significant.

Due to erosion and the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN51 is outside the area to be impacted by the proposed quarry and its infrastructure.

5.4.3 Artefact Scatters

MRN1

MRN1 consists of three quartz flakes located on the northern bank of Marulan Creek close to the southeastern corner of the project area. The artefact scatter is spread across an area of 4 m^2 in open woodland and is in poor condition due to water erosion and trampling by cattle. The site has a southeasterly aspect.

Due to the degree of erosion and prior disturbance it is assessed that PAD is unlikely. MRN1 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN2

MRN2 is located on the southern bank of a tributary of Marulan Creek and consists of six quartz flakes scattered over a distance of about 30 metres along the creek bank. The site has suffered sheet erosion and trampling by cattle. The site has a northwesterly aspect.

Due to the degree of erosion and prior disturbance, it is assessed that PAD is unlikely. MRN2 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN3

MRN3 is situated on the south bank of Marulan Creek and comprises seven quartz flakes and a banded chert flake (refer to **Plate 14**) spread over an area of 5 m^2. The site has suffered sheet erosion and trampling by cattle. The site has a northwesterly aspect.

Due to the degree of erosion and prior disturbance, it is assessed that PAD is unlikely. MRN3 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN4

MRN4 is a scatter of six quartz flakes located at the end of a low spur separating two tributaries of Marulan Creek (refer to **Plate 15**). The site has an easterly aspect. The site is in poor condition due to scouring from slopewash and stock trampling.

Due to the degree of erosion and prior disturbance, it is assessed that PAD is unlikely. MRN4 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN5

MRN5 is assessed as being the site recorded by Navin in 1990 and designated as MQ 2 (#51-6-0060). The site contains six flakes manufactured from grey chert. Their greasy appearance suggests that the raw material has probably been heat treated. The site is located on a low saddle with a southwesterly aspect overlooking the head of a shallow valley to the west which contains a tributary of Marulan Creek. The site location was described by Bill Hardie as a favoured summer camping location due to the cooling breeze.

A north-south fenceline runs through the site to the east and there are several stringybarks which are used as shade trees by stock and kangaroos. This activity has destabilised the soil surface and instigated localised sheet erosion.

Due to the degree of erosion and prior disturbance, it is assessed that PAD is unlikely. MRN5 is within an area to be impacted by the access road for the proposed quarry.

MRN6

MRN6 consists of a scatter of three quartz flakes occurring on a northerly facing lower slope of a low ridge on the western boundary of the project area.

It is possible that further artefacts may exist in this general area in a subsurface context. MRN6 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN7

MRN7 consists of a scatter of four flakes manufactured from white quartz and one flake manufactured from brown chert. The artefacts are spread across a 20 metre area within the channel of Joarimin Creek. The origin of these artefacts is impossible to determine as there is extensive sheet erosion along the creek banks upstream of this location and the artefacts may have been washed from any of these areas.

PAD is not applicable to this site. MRN7 is within an area to be impacted by infrastructure.

MRN12

MRN12 consists of a scatter of two chert flakes located in regrowth woodland on a crest. The ground surface in this area is largely outcropping rock and loose rubble with skeletal soil. The aspect of the site is southeast.

Due to the skeletal nature of the soil it is assessed that PAD is highly unlikely. MRN12 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN13

MRN13 consists of a scatter of 20 artefacts spread along both banks of a tributary of Joarimin Creek. The eastern bank rises steeply to a heavily wooded spur and has suffered significant sheet erosion, while the western bank rises more gently and is generally covered in grassland (refer to **Plate 16**). The aspect of the site is to the north. To the north the site overlooks a broad open valley descending to Joarimin Creek. To the south the valley narrows as it rises to its maximum elevation of about 700 metres. Some 300 metres to the south is the stone arrangement MRN9 and the scarred trees MRN8, 10 and 11. The artefacts were manufactured from quartz, chert and porphyry. Most artefacts were flakes, however, there was one broken backed blade, two small fragments of a grindstone and a

ground edge axe. The axe (refer to **Plate 17**) was manufactured from a dark igneous material; both faces of the axe were ground and there were pecked hollows to assist hafting towards the poll. The broken backed blade appeared to have been manufactured from porphyry. A number of the quartz flakes were manufactured from reef quartz.

The Aboriginal community representatives felt that this site was associated with the MRN9 stone arrangement and the MRN8, 10 and 11 scarred trees and together formed part of a cultural complex.

The extensive erosion and skeletal remnant soils in this area indicate that it is highly unlikely that PAD exists in the area. MRN13 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN14

MRN14 is located 300 metres downstream of MRN13. Six quartz flakes and one chert flake are scattered in sheet erosion on both sides of the creek channel. This site is separated from MRN13 by grassland and both sites may once have been part of one larger artefact scatter. The aspect of the site is to the north.

The Aboriginal community representatives felt that this site was associated with the MRN13 artefact scatter and may be a visible section of the same site. The association was also seen to extend to the MRN9 stone arrangement and the MRN8, 10 and 11 scarred trees which together formed part of a cultural complex.

It is possible that small numbers of artefacts may exist in a subsurface context away from the erosion in this area, however, it is unlikely that they would retain stratigraphic integrity due to prior disturbance (land clearing, slope wash, stock trampling). MRN14 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN15

MRN15 consists of two quartz flakes located in a large erosion scour approximately 500 metres downstream of MRN14 on the northern bank of a tributary of Joarimin Creek. The aspect of the site is to the southeast. The quartz artefacts were manufactured from a pebble by bipolar reduction.

It is likely that small numbers of artefacts may exist in a subsurface context away from the erosion in this area, however, it is unlikely that they would retain stratigraphic integrity due to prior disturbance (land clearing, slope wash, stock trampling). MRN15 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN17

MRN17 is located on the northern side of the same tributary as MRN15, about 300 metres south of the Main Southern Railway. The aspect of the site is to the southeast. The site consists of four quartz flakes scattered over an area of approximately 25 m^2 within a much larger area of sheet erosion.

Due to the degree of erosion and prior disturbance it is assessed that PAD is highly unlikely in this area. MRN17 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN20

MRN20 is located on a thickly wooded isolated crest with a 360 degree outlook. The ground surface is outcropping stone and loose rock scree (<30 cm). To the southeast the site overlooks the Joarimin Creek tributary associated with the stone arrangement site MRN9. Two pieces of granitic rock, each about 10 cm square, located in this area were identified as upper grindstone fragments.

Due to the skeletal nature of the soil in this area PAD is assessed as highly unlikely. MRN20 is close to the southeastern boundary of a road that circumnavigates a proposed excess product emplacement area, but far enough away to be outside the area to be impacted.

MRN22

MRN22 is a low density artefact scatter covering an area of approximately 20 m^2, located at the head of a minor tributary of Joarimin Creek. The site is presently stable within thick regrowth woodland but has been disturbed by prior land clearing activities. The site has a 360 degree aspect. The site contains seven chert and three quartz flakes and a small grey chert core.

Due to the low numbers of artefacts and degree of prior disturbance, associated PAD is assessed as unlikely. MRN22 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN25

MRN25 is located on the lower slope/footslope boundary in the northwest corner of the project area adjacent to an upper tributary of Lockyersleigh Creek which drains to the southwest. It is in open grassland with a southeasterly aspect. It consists of 10 chert and quartz flakes, which were located on top of spoil excavated from an extensive field of wombat burrows which extend over an area of 100 m^2 (refer to **Plate 18**).

The location of the artefacts in the spoil heaps suggests that this area retains a light scatter of artefacts in a subsurface context. The degree of disturbance, however, indicates that there is little possibility of stratigraphic integrity. MRN25 is located within an area of colluvial sand aggradation. It is possible that the artefacts have been derived from the slopes above as well as from the original ground surface, as the depth and extent of the wombat burrows suggest they extend into the original ground surface below the aggraded sands. MRN25 is within an area to be impacted by overburden emplacement.

MRN27

MRN27 consists of 150+ quartz, quartzite, silcrete and chert artefacts plus three volcanic broken river pebbles located over an area 100 metres by 50 metres on a southeasterly facing upper, mid and lower slope and within a power easement which runs east-west in the northern part of the project area. As well as being in an area already heavily disturbed by the construction of the easement, the artefacts are also located on top of spoil excavated from an extensive area of wombat burrowing (refer to **Plate 19**). The artefacts consist of flakes, broken flakes, manuports and cores. Both bipolar reduction and freehand percussion are evident. Much of the quartz and quartzite has been sourced as small pebbles. The artefact scatter extends outside the power easement, however, this area is also highly disturbed by timber felling and animal activity (wombat burrows and cattle trampling). The site area is composed of deep sands from *in situ* weathering of the porphyry. These deep sands have been targeted by the wombats for their burrows and areas without active burrows show evidence of former collapsed burrows.

It is highly likely that relatively large numbers of artefacts still remain in a subsurface context between the active wombat burrows, however, due to the degree of prior disturbance it is assessed that the area does not retain stratigraphic integrity. MRN27 is on the eastern boundary of the 30 year limit of the quarry and in an area that will be impacted by an internal haul road.

MRN28

MRN28 consists of one chert and two quartz flakes located on a crest spread over an area 75 metres by 25-50 metres within the power easement which runs east-west in the northern part of the project area. The site has a southerly aspect. As well as being in an area already heavily disturbed by construction of the easement, the artefacts are located on top of spoil excavated from an extensive area of wombat

burrowing. Like MRN27, this site is located in an area of deep sands formed from *in situ* weathering of porphyry and has been heavily disturbed by wombats.

It is likely that small numbers of artefacts still remain in a subsurface context between the active wombat burrows, however, due to the degree of prior disturbance it is assessed that the area does not retain stratigraphic integrity. MRN28 is in an area to be impacted by an internal haul road.

MRN29

MRN29 is an artefact scatter recorded when the survey transect was inadvertently carried on beyond the eastern boundary of the project area. A DEC site card was prepared for the site, however, as the site is outside the project area it will not be assessed within this report.

MRN34

MRN34 is an assemblage of 30+ flakes, broken flakes and flaked pieces manufactured from quartz, silcrete and chert, thrown out with spoil excavated from an extensive area of wombat burrows. The site is located on the southeast facing lower slope/footslope boundary of a low spur above a tributary of Joarimin Creek. As well as the extensive wombat disturbance there is a large area of sheet erosion originating from wheel tracks cutting into the soil surface. The extent of the site is approximately 2500 m^2. The soil in this area consists of colluvial deposits from the slope above, over what appears to be shallow soil over bedrock (depth to bedrock observed in nearby creek bank). It is highly likely from the depth of the wombat burrows that they impact the original ground surface. The colluvial deposits have probably been emplaced since European land clearing.

A second visit in February 2005 located a bifacially backed geometric microlith (a symmetrical, backed blade <10 mm in length) manufactured from silcrete.

It is possible that very low numbers of artefacts may exist in this area in a subsurface context, however, the very high degree of disturbance indicates that there is little likelihood of stratigraphic integrity. MRN34 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN36

MRN36 consists of a scatter of three quartz flakes located in an eroded wheel track where it passes through a gate. The site is located on a south facing upper slope overlooking Joarimin Creek.

Due to the degree of erosion, the shallow nature of the soil and prior disturbance, PAD is assessed as highly unlikely. MRN36 is in an area to be impacted by overburden emplacement.

MRN39

MRN39 is located to the north of Joarimin Creek on the footslope. The site consists of three quartz flakes within an area of visibility provided by animals scraping away soil from the base of a tree. The site has a southeasterly aspect.

It is possible that low numbers of artefacts may be located in this area in a subsurface context. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN39 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN40

MRN40 consists of a low density artefact scatter of 25 quartz, silcrete and chert flakes and broken flakes located within a large area of sheet erosion (50 by 100 metres) on the footslopes along the southern bank of Joarimin Creek. The site has a northerly aspect. Apart from sheet erosion there is additional disturbance to the site from animal tracks and wombat burrows.

It is possible that low numbers of artefacts may be located in this area in a subsurface context. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN40 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN41

MRN41 is a low density scatter of 23 quartz, silcrete and chert flakes on the footslope on the northern side of the Joarimin Creek. The site has a southeasterly aspect. The artefacts are eroding out of animal tracks and areas of disturbance around the base of trees (refer to **Plate 20**).

It is possible that low numbers of artefacts may be located in this area in a subsurface context. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN41 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN42

MRN42 is a scatter of 10 quartz, silcrete and chert flakes and a porphyry core. The artefacts were located on the top of the B clay horizon where water runoff is cutting back into a pre-existing erosion gully which feeds into Joarimin Creek from the north. The scatter can be traced for about 50 metres along the edge of the gully. The site has a southeasterly aspect.

It is possible that low numbers of artefacts may be located in this area in a subsurface context away from the eroded tributary banks. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN42 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN43

MRN43 is also recorded as MRNH(Historical)7. MRNH7 is described as two clay pits lying between Joarimin Creek and the Main Southern Railway. The pits were possibly the source of raw material for a brick manufacturing operation to the north of the creek (refer to **Plate 21**). Located on its eastern rim is a scatter of 10 quartz and chert flakes mixed in with fragments of metal and glass. The site is on the footslope on the southern side of the creek and has a northerly aspect.

It is possible that low numbers of artefacts may be located in this area in a subsurface context away from the clay pit and the erosion. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN43 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN44

MRN44 consists of six quartz flakes washed into an erosion gully which drains from the north into Joarimin Creek.

As the artefacts have washed into the area their specific place of origin is indeterminate and the assessment of the likelihood of PAD in the area of the artefacts is not relevant. MRN44 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN45

MRN45 consists of three quartz flakes located on spoil excavated from a wombat burrow on the footslope on the northern side of Joarimin Creek. The site has a southeasterly aspect.

The location of the artefacts within the spoil suggests that there are likely to be low numbers of artefacts within this area in a subsurface context. MRN45 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN46

MRN46 consists of two artefacts located 10 metres apart within an area of sheet erosion on the footslope on the northern bank of Joarimin Creek some 75 metres from the causeway carrying the access road to the project area. The site has a southeasterly aspect. One of the artefacts is a quartz flake; the other is a steeply retouched grey chert flake that is adze-like in morphology (refer to **Plate 22**).

It is possible that a low number of artefacts may be located in a subsurface context outside the area of sheet erosion. It is unlikely, however, due to prior disturbance, that the area retains stratigraphic integrity. MRN46 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN47

MRN47 is an artefact scatter recorded when the survey transect was inadvertently carried on beyond the eastern boundary of the project area. A DEC site card was prepared for the site, however, as the site is outside the project area it will not be assessed within this report.

MRN48

MRN48 is located on a crest north of the power easement. The area is highly disturbed by wombat burrowing within the sand formed by *in situ* deep weathering of porphyry. The site has a southeasterly aspect. Two chert flakes were located on top of spoil excavated during this burrowing activity.

Due to the low numbers of artefacts in an extensive area of disturbance it is assessed that PAD is unlikely. MRN48 is within an area to be impacted by the proposed quarry.

MRN50

MRN50 is located on a low spur crest between two deeply eroded ephemeral tributaries of Joarimin Creek. The site has a northwesterly aspect. Six quartz flakes were located on spoil from wombat burrowing over an area 100 m^2 within tea tree scrub. The area of the site has deep sands formed by *in situ* weathering of porphyry (not mapped as dune sand on **Figure 5.3**).

Due to low numbers of artefacts and extensive prior disturbance PAD is assessed as highly unlikely. MRN50 is outside the area to be impacted by the proposed quarry and its infrastructure.

Marulan 1

The previously recorded site Marulan 1 could not be located during the survey, however, it is located outside the area to be impacted by the proposed quarry and its infrastructure.

5.4.4 Isolated Finds

MRN16

MRN16 consists of an isolated quartz flake located on an extensively eroded bank of a tributary of Joarimin Creek. The aspect of the site is to the north. Due to the low number of artefacts and extensive prior disturbance PAD is assessed as highly unlikely. MRN16 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN18

MRN18 consists of a quartz pebble core from which one flake has been struck by bipolar reduction. The artefact is located on an extensively eroded bank of a tributary of Joarimin Creek. The aspect of the site is to the northeast. Due to the low number of artefacts and extensive prior disturbance PAD is assessed as highly unlikely. MRN18 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN19

MRN19 consists of a quartz flake located on an extensively eroded bank of a tributary of Joarimin Creek. The aspect of the site is to the northeast. Due to the low number of artefacts and extensive prior disturbance, PAD is assessed as highly unlikely. MRN19 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN21

MRN 21 consists of a single chert flake located on the midslope above a tributary of Joarimin Creek. Soils in this area are skeletal have been subject to slopewash. Due to the low number of artefacts and skeletal soil, PAD is assessed as highly unlikely. MRN21 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN24

MRN24 consists of a quartz pebble, bipolar core located on a crest above Marulan Creek with a southerly aspect. Due to skeletal soil in this area PAD is assessed as highly unlikely. MRN24 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN26

MRN26 consists of a chert flake located on a crest within the clearing associated with a power easement and within an area of deep sand associated with *in situ* weathering of porphyry. The aspect of the site is to the southwest. The area has been heavily disturbed by wombat burrows and easement clearing. Due to the low number of artefacts and extensive prior disturbance, PAD is assessed as highly unlikely. MRN26 is within the area to be impacted by the proposed quarry.

MRN30

MRN30 consists of an unmodified cobble of indeterminate raw material that has been transported into the area (a manuport). The cobble is located on a crest with a southerly aspect. The area has sandy soil derived from *in situ* weathering of porphyry. The area has been heavily disturbed by wombat burrows. Due to the low number of artefacts and extensive prior disturbance, PAD is assessed as highly unlikely. MRN30 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN33

MRN33 consists of a chert flake located at the foot of a spur slope within minor sheet erosion. The site has a southerly aspect. It is possible that low numbers of artefacts may be located in a subsurface context in this area, however, archaeological integrity is highly unlikely due to prior disturbance. MRN33 is within the proposed quarry.

MRN35

MRN35 consists of an isolated chert flake located in an exposure on an upper slope with a southerly aspect above Joarimin Creek. The shallow nature of the soil in this area suggests that PAD is unlikely.

MRN35 is within an area between a proposed overburden emplacement area and a road that circumnavigates the area. The site will be adversely impacted.

MRN37

MRN37 consists of a broken river cobble (raw material indeterminate) located within a harrowed paddock on the midslope of a spur with a southerly aspect. The cobble was identified as a manuport (a cobble transported into the area). Due to the shallow soils and disturbed (cultivated) nature of this area, PAD is highly unlikely. MRN37 is within a proposed overburden emplacement area.

MRN38

MRN38 consists of an isolated chert flake located on a stock track on the footslope between Joarimin Creek and the Main Southern Railway. The site has a northeasterly aspect. It is likely that there will be small numbers of artefacts in this area in a subsurface context. Prior disturbance suggests that the artefacts will not have stratigraphic integrity. MRN38 is outside the area to be impacted by the proposed quarry and its infrastructure.

MRN52

MRN52 consists of a chert flake located at the base of a tree on the northern side of Joarimin Creek. The site has a southeasterly aspect. It is likely that there will be small numbers of artefacts in this area in a subsurface context. Prior disturbance suggests that the artefacts will not have stratigraphic integrity. MRN52 is within an area to be impacted by dam construction.

IF1, IF2, IF3

The previously recorded sites IF1, 2 and 3 could not be located during the survey, however, they are located outside the area to be impacted by the proposed quarry and its infrastructure.

5.5 SITE SUMMARY AND REVIEW OF PREDICTIVE MODEL

5.5.1 Stone Arrangements

Of the two stone arrangements located during the survey only MRN9 is thought to have high archaeological value. The indeterminate Aboriginal derivation of MRN32 is seen to lessen its (Aboriginal) archaeological value. Neither of the stone arrangements is located in areas where there is sufficient soil depth or integrity to suggest that there may be associated PAD in the area.

MRN9 is outside the area to be impacted by the proposed quarry and its infrastructure and MRN32 is within the area to be impacted by the proposed quarry. The locations of the stone arrangements within the project area conforms to the predictive model. The degree of disturbance to the stones within MRN9 also conforms to the model. The lack of disturbance to the stones in MRN32 suggests a very recent (in the last 200 years) construction, further reducing its archaeological significance.

5.5.2 Scarred Trees

Of the seven scarred trees recorded during the survey, four were assessed as scarred trees from both an Aboriginal and an archaeological perspective (MRN8, 10, 11 and 23). The remainder (MRN 31, 49 and 51) were recorded in line with the wishes of the Aboriginal participants in the survey. None of the scarred trees was located in areas where there was sufficient soil depth or integrity to suggest that there may be associated PAD in the site area. Only one of the scarred trees (MRN31) is within the area to be impacted by the proposed quarry. This tree is dead. The location of so many scarred trees within the project area does not conform to the predictive model and it appears that there has been some selective retention of mature trees in a few areas.

5.5.3 Artefact Scatters and Isolated Finds

Of the 29 artefact scatters and 12 isolated finds recorded within the project area, 14 scatters and two isolated finds were assessed as likely to have further artefacts in a subsurface context. Due to prior disturbance (mainly wombat burrowing), however, these sites are not assessed as likely to retain archaeological integrity.

The stone artefact scatters and isolated finds recorded along the creeklines generally indicate a discontinuous scatter except along the main channel of Joarimin Creek where the scatter became more continuous and the main channel of Marulan Creek where visibility was more patchy. In general, however, the location of sites along the creeks was not hampered by visibility which was excellent and many areas were noted with large expanses of visibility but no artefacts.

The Aboriginal community representatives present during the survey assessed that the artefact scatter sites MRN13 and MRN14 were associated with the MRN9 stone arrangement and the MRN8, 10 and 11 scarred trees. The area surrounding these sites was seen to form part of an important complex of sites from an Aboriginal cultural heritage perspective. Archaeologically this area provides an excellent cross-section of the site types within the project area that will not be impacted by the development and thus has archaeological conservation value.

Of the 29 artefact scatters and 12 isolated finds recorded within the project area, seven artefact scatters and five isolated finds are in areas that will be impacted by the proposed development of the quarry and its infrastructure (MQ2 and MRN5 are counted as one site in this instance).

The dominant artefact types observed in the sites were flakes, flaked pieces and cores manufactured from quartz (mainly pebble with minor reef quartz), silcrete, quartzite, chert, porphyry, granite and volcanic (pebbles). The majority of the artefacts were manufactured by freehand percussion, however, bipolar reduction was also common, especially for the quartz pebbles. The majority of the raw material was transported into the area. These findings accord with the predictive model.

Table 5.9 provides a summary of artefact numbers recorded within the sites located during the survey. The number of artefacts within each site assemblage recorded during the survey varies from one to over 150. Sites with less than 10 artefacts dominate (80.5%), followed by sites with between 10 and 20 artefacts (9.8%) and between 21 and 50 artefacts (7.3%). Only 2.4% of sites contain more than 50 artefacts.

Table 5.9 - Assemblage Size

No. of sites with <10 artefacts	No. of sites with 10-20 artefacts	No. of sites with 21-50 artefacts	No. of sites with >50 artefacts
33	4	3	1

The number of artefacts within the sites generally accords with the predictive model which stated that the majority of the sites would have less than 10 artefacts. The predictive model also stated that if sites with larger assemblages were found, that they may relate to ceremony or to resource targeting. The site with more than 150 visible artefacts, MRN27, may fall into the latter category. This site is located within an area of deep sand formed by *in situ* weathering of porphyry which acts as a focus for wombat occupation. The area also provides plant food resources not available or not as abundant in other parts of the survey area.

5.5.4 All sites

5.5.4.1 Site Location

Table 5.10 summarises the geographic distribution of all the Aboriginal sites located during the survey in the project area. **Table 5.11** indicates distance to the nearest watercourse. The majority of sites are located along watercourses, with 50% of sites within 30 metres of a watercourse. In terms of landform, 24% of sites are located along the banks of minor tributary channels and 28% are located along the banks of the main tributary channels. Away from watercourses, 8% of sites are located on lower slopes, 6% on the midslopes and 4% are located on the upper slopes. Crests and saddles contained 30% of the sites. The site distribution pattern accords with the predictive model. Within **Table 5.10** site MRN27 has been included in the upper slope category as the majority of the artefactual material was located in this area, though the site extended down the slope to the bank of a tributary of Joarimin Creek. Within **Table 5.11** site MRN27 has been included in the "within 30 metres of a watercourse" category.

Table 5.10 – Geographic Distribution of Sites in the Landscape

Site	Footslope/bank minor creek channel	Footslope/bank major creek channel	Lower slope	Midslope	Upper slope	Crest/ saddle	Total
Isolated finds	3	2	1	2	1	3	12
Artefact Scatters	8	12	3	0	1	5	29
Stone Arrangement	1					1	2
Scarred tree				1		6	7
Total	12	14	4	3	2	15	50

Table 5.11 - Distance to Nearest Watercourse

Distance to water course	Within 30 metres	31-100 metres	101-200 metres	201-500 metres	Total
No. of sites	25	3	8	14	50

5.5.4.2 Site Aspect

Table 5.12 provides information related to the aspect of the sites. From the table it can be seen that 56% of the sites have an aspect that would have afforded some protection from westerly and southwesterly winds and 40% of sites were exposed to these prevailing winds. The sites marked in bold are those sites with 10 or more artefacts. These sites are located in areas protected from the southwesterly winds suggesting that Aboriginal people preferred to camp in areas where they were not exposed to the prevailing wind. The site with the largest assemblage, MRN27, has a southeasterly aspect and is protected by a ridge that afforded shelter from the prevailing winds. It is informative to note that wombat burrows across the top of the crest upslope of site MRN27, and within an area affected by the wind, did not have artefacts exposed in their spoil.

The location of smaller sites across the landscape may relate to activities other than overnight camps, whilst the larger sites like MRN29 (located outside the project area), facing into the prevailing wind, may relate to summer camps. In terms of the predictive model the results were somewhat surprising with sites more commonly located in areas of exposure than predicted.

Table 5.12 - Site Aspect

Site Type	Washed into Creek Channel	360	N to NE	E to SE	S to SW	W to NW	Total
Stone Arrangement				MRN32		MRN9	**2**
Scarred Tree (refers to aspect of landform not scar)				MRN8 MRN10 MRN31	MRN23 MRN51	MRN11 MRN49	**7**
Artefact Scatter	MRN7 MRN44	MRN20 MRN22	MRN4 MRN6 **MRN13** MRN14 **MRN40** **MRN43**	MRN1 MRN12 MRN15 MRN 17 **MRN25** **MRN27** **MRN34** MRN39 **MRN41** **MRN42** MRN45 MRN46 MRN48	MRN5 MRN28 MRN36	MRN2 MRN3 MRN50	**29**
Isolated Find		MRN22 MRN38	MRN16 MRN18 MRN19 MRN21	MRN52	MRN24 MRN30 MRN33 MRN35 MRN37		**12**
Total	**2**	**4**	**10**	**18**	**10**	**6**	**50**

Note: The sites shown in bold are those with 10 or more artefacts.

5.5.4.3 Site Integrity and Subsurface Deposits

The Aboriginal artefact scatter and isolated find sites recorded during the survey were generally exposed by erosion along creeklines and on slopes or crests. Many were in areas with skeletal soils or in areas of rock outcrop. None of these sites was assessed as likely to have PAD (subsurface artefacts in an undisturbed context). Several sites were located in areas of deep sand resulting from either *in situ* weathering of porphyry or the build-up of colluvium at the lower slope/footslope boundary. These sites and their surrounds had all been heavily impacted by wombat burrows and some sites had also been affected by power easement clearing. The majority of these sites were assessed as having the likelihood of small numbers of artefacts in a subsurface context, however, due to their highly disturbed nature it was assessed that they would not retain archaeological (stratigraphic) integrity. Only the MRN27 site is assessed as likely to have large numbers of artefacts in a subsurface context, however, once again it was assessed that this site would not retain archaeological integrity.

The burrowing by wombats constantly brings artefacts to the surface. The wombats excavate their burrows so that the sand dug out is on the downslope side of the burrow. Thus the artefacts are moved downslope and then subsequently reburied under spoil. Eventually they are dug up again when a new burrow is excavated and moved further downslope. In this manner almost the entire area of the deep sands within the site areas has been turned over by the wombats. **Table 5.13** lists the sites assessed as unlikely or likely to have subsurface artefacts. None of the sites is assessed as likely to have archaeological integrity.

Table 5.13 - Sites Unlikely or Likely to have Subsurface Artefacts

MRN Sites Unlikely to have Subsurface Artefacts	MRN Sites Likely to have Subsurface Artefacts
1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 30, 31, 32, 35, 36, 37, 39, , 44, 48, 49, 50, 51	6, 14, 15, 25, 27, 28, 34, 39, 38, 40, 41, 42, 43, 45, 46, 52
Total 34	**Total 16**

5.6 REPRESENTATIVENESS VALUE OF THE SITES LOCATED WITHIN THE READYMIX HOLDINGS

During the survey period the Marulan area was in drought and ground surface visibility was well above the average recorded for surveys undertaken in areas of pastoral grasslands. This allowed for the detection of sites in all landform units.

As almost the entire length of the tributary system within the project area was surveyed and as ground surface visibility was excellent, the sites located along the tributaries are seen to provide an accurate representation of what is present in this area. That is, in general, small discrete sites along the upper tributary system and higher density, overlapping sites along the main channel of Joarimin Creek and Marulan Creek.

The results of the transects away from the tributaries indicate that there is likely to be a very light background scatter of artefacts across the entire project area with greater concentrations in areas protected from the southwesterly winds. Artefact concentrations may also occur in areas with deep sands formed by *in situ* weathering of porphyry. These concentrations appear to be related to resource targeting (for example wombats and plant foods).

Overall, the distribution and nature of the sites located during the survey is seen to provide a representative sample of what is likely to be present within the project area and provides sufficient information to allow significance assessment and management recommendations for the entire area and not just the sites.

5.7 RELATIONSHIP OF SITES TO DEVELOPMENT IMPACT

Table 5.14 provides information in relation to the location of the sites and the areas proposed for the quarry and infrastructure. This table also includes information related to the sites MQ1 and IF1, 2 and 3, previously recorded by Navin (1990), that could not be located during the current survey. The MRN5 site is assessed as being the same site as MQ2.

Table 5.14 - Relationship of Sites to Development Impact

Site Type	Sites to be Impacted by Development	Sites Outside Development Impact Area	Total
Stone Arrangement	MRN32	MRN9	**2**
Scarred Tree	MRN31	MRN8, MRN10, MRN11, MRN23, MRN49, MRN51	**7**
Artefact Scatter	MRN5 (MQ 2), MRN7, MRN25, MRN27, MRN28, MRN36, MRN48	MRN1, MRN2, MRN3, MRN4, MRN6, MRN12, MRN13, MRN14, MRN15, MRN17, MRN20, MRN22, MRN34, MRN39, MRN40, MRN41, MRN42, MRN43, MRN44, MRN45, MRN46, MRN50, MQ1	**30**

Table 5.14 - Relationship of Sites to Development Impact (cont)

Site Type	Sites to be Impacted by Development	Sites Outside Development Impact Area	Total
Isolated Find	MRN26, MRN33, MRN35, MRN37, MRN52	MRN16, MRN18, MRN19, MRN21, MRN24, MRN30, MRN38, IF1, IF2, IF3	**15**
Total	**14**	**40**	**54**

The table indicates that of the 54 known sites within the project area, only 14, or 26% of the sites will be impacted by the proposed quarry and associated infrastructure after 30 years of operation. This leaves 74% of the sites outside the area of direct impact. All four site types located during the survey are represented by the sites that are proposed for destruction, as well as by the sites outside the area of impact. Of the rarer site types (scarred trees and stone arrangements), the scarred tree (MRN31) and the stone arrangement (MRN32) that will be impacted by the development, were not assessed as archaeological sites and were only recorded in accordance with the wishes of the Aboriginal representatives present during the survey. The majority of the scarred trees and the stone arrangement outside the area of impact were, however, assessed as archaeological sites.

6.0 SIGNIFICANCE ASSESSMENT

Cultural heritage significance is a measure of the relative value or importance of Aboriginal sites. Significance is assessed according to principles outlined originally in Australia in the Burra Charter (1979), which was adapted from the UNESCO sponsored ICOMOS (International Council for Monuments and Sites) Venice Charter. The assessment of significance assists in the determination of appropriate cultural heritage management procedures for sites/artefacts that may be threatened by development activities. Assessing the significance of Aboriginal archaeological sites is a process that must take into account the interests of many parties.

The Burra Charter defines cultural significance as the 'aesthetic, historic, scientific or social value for past, present or future generations' of a place. The DEC guidelines (NPWS 1997) provide further discussion on the assessment of cultural significance for Aboriginal sites, and for artefact scatter sites in particular. Categories of significance relevant to Aboriginal archaeological sites include Aboriginal significance, archaeological/scientific significance, aesthetic significance, tourism potential and educational significance. *The NSW NPWS Guidelines for Archaeological Report Writing* (1997: 25) states:

> While Aboriginal sites and places may have educational, tourism, and other values to groups in society their principal values are likely to be in terms of their cultural/social significance to Aboriginal people and their scientific significance to archaeologists. It is thus possible to identify two main streams in the overall significance assessment process: the assessment of cultural/social significance to Aboriginal people and the assessment of scientific significance to archaeologists.

Therefore, the significance of the sites within the project area will be assessed in relation to their Aboriginal significance and their scientific or archaeological significance. The criteria for assessing each type of archaeological 'significance' will be detailed in **Section 6.2**. The scientific significance assessment of the sites recorded during the survey for this project and those previously recorded (MQ1 and 2, IF1, 2 and 3) will be discussed and justification for their significance ranking provided. The archaeological sensitivity of areas predicted to have sites but for which zero surface visibility precluded the observation of any evidence of sites will be discussed following the site significance assessment.

6.1 ABORIGINAL SIGNIFICANCE

Aboriginal cultural significance can only be assessed by the relevant Aboriginal community groups and often varies from that of archaeological significance. **Table 6.1** presents the assessment of Aboriginal significance provided by the representatives of the GTCAC and the PLALC during the survey period. The Aboriginal significance of the sites is derived from their cultural heritage sensitivity. The sites that fall within the development impact area are shown in bold in **Table 6.1**.

From the table it can be seen that many of the isolated find sites and artefact scatters were assessed as having low to moderate Aboriginal cultural heritage significance. The stone arrangement MRN9 identified by the Aboriginal community as having played a role in male initiation was assessed as having the highest Aboriginal cultural heritage significance. The scarred trees and artefact scatters located within the general area of the MRN9 stone arrangement had their Aboriginal significance increased to moderate to high or high due to their relationship to what was seen as an important ceremonial site. The remainder of the scarred trees were assessed as having moderate or moderate to high Aboriginal significance. One artefact scatter (MRN27) was assessed as having high Aboriginal significance. **Figure 6.1** indicates the location of the sites, colour coded to reflect their Aboriginal cultural heritage significance.

Figure 6.1 indicates the area identified by the Aboriginal community groups as containing a complex of inter-related sites of high Aboriginal cultural heritage significance. It should be noted that whilst this area has been specifically identified, and various sites have been afforded varying levels of

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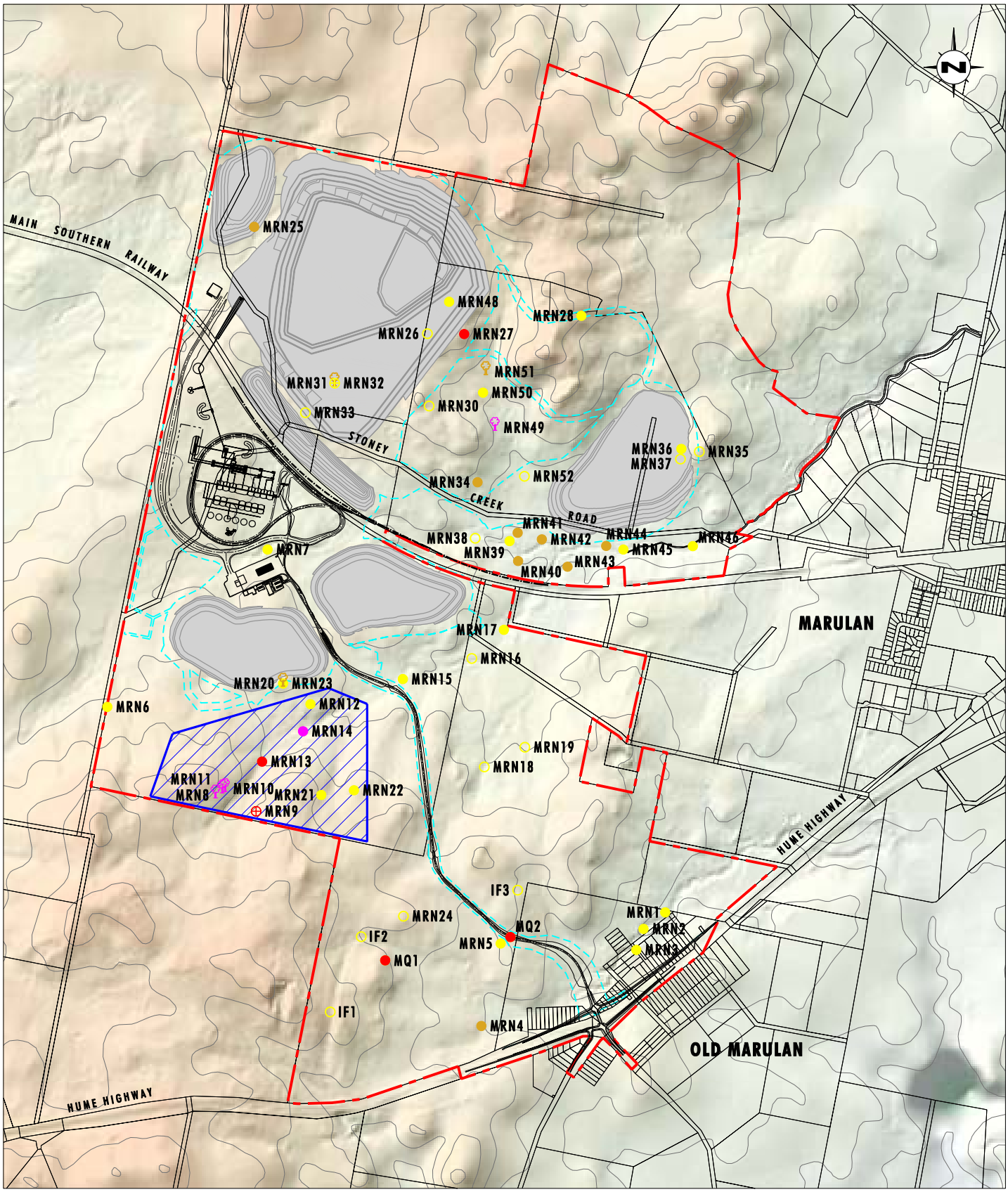


Legend

- Project Area
- Cultural Heritage Management Area
- Approximate Disturbance Footprint
- Artefact Scatter
- Isolated Find
- Stone Arrangement
- Scarred Tree

Aboriginal Cultural Heritage Significance

- Low
- Moderate
- Moderate to High
- High

FIGURE 6.1

Aboriginal Cultural Heritage Significance

File Name (A4): R06_V1/1829_104.dgn

Aboriginal significance, that the GTCAC consider the whole of the project area to be "a highly significant place" (refer to **Appendix B**).

As mentioned in **Section 1.6** comments on the draft report were not available from the PLALC at the time of printing. A letter of comment from the PLALC will, however, be provided to DIPNR and DEC under separate cover.

Table 6.1 – Aboriginal Significance of Sites

Site Name	Site Type	Aboriginal Cultural Heritage Significance
MRN1	Artefact Scatter	Low
MRN2	Artefact Scatter	Low
MRN3	Artefact Scatter	Moderate
MRN4	Artefact Scatter	Moderate
MRN5/ MQ 2	**Artefact Scatter**	**Low**
MRN6	Artefact Scatter	Low
MRN7	**Artefact Scatter**	**Low**
MRN8	Scarred Tree	Moderate to high
MRN9	Stone Arrangement	High
MRN10	Scarred Tree	Moderate to high
MRN11	Scarred Tree	Moderate to high
MRN12	Artefact Scatter	Low
MRN13	Artefact Scatter	High
MRN14	Artefact Scatter	Moderate to high
MRN15	Artefact Scatter	Low
MRN16	Isolated Find	Low
MRN17	Artefact Scatter	Low
MRN18	Isolated Find	Low
MRN19	Isolated Find	Low
MRN20	Artefact Scatter	Low
MRN21	Isolated Find	Low
MRN22	Artefact Scatter	Low
MRN23	Scarred Tree	Moderate
MRN24	Isolated Find	Low
MRN25	**Artefact Scatter**	**Moderate**
MRN26	**Isolated Find**	**Low**
MRN27	**Artefact Scatter**	**High**
MRN28	**Artefact Scatter**	**Moderate**
MRN30	Isolated Find	Low
MRN31	**Scarred Tree**	**Moderate**
MRN32	**Stone Arrangement**	**Low**
MRN33	**Isolated Find**	**Low**
MRN34	Artefact Scatter	Moderate
MRN35	**Isolated Find**	**Low**
MRN36	**Artefact Scatter**	**Low**

Table 6.1 – Aboriginal Significance of Sites (cont)

Site Name	Site Type	Aboriginal Cultural Heritage Significance
MRN37	**Isolated Find**	**Low**
MRN38	Isolated Find	Low
MRN39	Artefact Scatter	Low
MRN40	Artefact Scatter	Moderate
MRN41	Artefact Scatter	Moderate
MRN42	Artefact Scatter	Moderate
MRN43	Artefact Scatter	Moderate
MRN44	Artefact Scatter	Moderate
MRN45	Artefact Scatter	Low
MRN46	Artefact Scatter	Low
MRN48	**Artefact Scatter**	**Low**
MRN49	Scarred Tree	Moderate to High
MRN50	Artefact Scatter	Low
MRN51	Scarred Tree	Moderate
MRN52	**Isolated find**	**Low**
MQ 1	Artefact Scatter	Low
IF1	Isolated find	Low
IF2	Isolated find	Low
IF3	Isolated find	Low

Note: Sites shown in bold type are located within development impact area.

Table 6.1 and **Figure 6.1** indicate that the 14 sites to be impacted by the proposed development of the quarry and its infrastructure range in their Aboriginal significance from low to high. It can also be observed that there are many other sites of equal Aboriginal significance that are outside the area of impact. **Figure 6.1** indicates that a large number of the sites with moderate to high Aboriginal significance are located within areas that will not be directly impacted by the development. Many of these are within the area identified by the Aboriginal community as containing a complex of inter-related sites of high Aboriginal cultural heritage significance and proposed for protection (i.e. Cultural Heritage Management Area).

6.2 ARCHAEOLOGICAL/SCIENTIFIC SIGNIFICANCE ASSESSMENT

The archaeological or scientific significance of Aboriginal sites was assessed according to their value to contribute to furthering of the archaeological/scientific understanding of Aboriginal culture (their archaeological research potential). Six criteria were assessed for each site to deduce its archaeological research potential from a local and regional perspective. These criteria were:

- rarity;
- representativeness;
- integrity;
- connectedness;

- complexity; and
- potential for archaeological deposit.

6.3 RANKING OF CRITERIA FOR EVALUATING ARCHAEOLOGICAL SIGNIFICANCE

Table 6.2 indicates how the sites were evaluated in relation to each of the six criteria to assess their overall archaeological research potential. Following the table, each criterion is discussed and justification is provided for assessment of particular levels of significance. One stone arrangement (MRN32) and three of the scarred trees (MRN31, 49 and 51) were not assessed as being archaeological sites but were recorded in line with the wishes of the Aboriginal community. These sites have not been subject to significance assessment. Instead they have been assessed as having no archaeological significance.

The sites were afforded a numerical value for each significance criterion so that an overall significance assessment could be quantified. The values for each criterion were scored as follows:

- low significance was afforded a score of 1;
- moderate significance was afforded a score of 2; and
- high significance was afforded a score of 3.

Overall significance was scored as follows:

- low significance 12-15;
- low to moderate significance 16-19;
- moderate significance 20-23;
- moderate to high significance 24-27; and
- high significance 27+.

If a site was assessed to have low local significance (when compared to other sites within a 5 kilometre radius) for any criterion then this aspect of the site was also deemed to be low at the regional level. If, however, the site was assessed as having moderate or high archaeological significance on a local scale, it was then assessed against other sites known from the literature in the broader Marulan/Goulburn area. In most cases this resulted in the site having lower significance on a regional level.

Table 6.2 - Criteria used in evaluating archaeological significance

Criterion	Low (Score of 1)	Moderate (Score of 2)	High (Score of 3)
Rarity	• The location of the site within the landscape, its type, integrity, contents and/or potential for subsurface artefacts, are common within the local and regional context.	• The location of the site within the landscape, its type, integrity, contents and/or potential for subsurface artefacts, are common within the regional context but not the local context.	• The location of the site within the landscape, its type, integrity, contents and/or potential for subsurface artefacts, are rare within the local and regional context.
Representativeness	• This site, when viewed in relation to its type, contents, integrity and location in the landscape, is common within a local and regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	• This site, when viewed in relation to its type, contents, integrity and location in the landscape, is uncommon within a local context but common in a regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	• This site, when viewed in relation to its type, contents, integrity and location in the landscape, is uncommon within a local and regional context and sites of similar nature (or in better condition) are not already set aside for conservation within the locality or region.
Integrity	• Stratigraphic integrity of the site has clearly been destroyed due to major disturbance/loss of topsoil. The level of disturbance is likely to have removed all spatial and chronological information.	• The site appears to have been subject to moderate levels of disturbance, however, there is a moderate possibility that useful spatial information can still be obtained from subsurface investigation of the site, even if it is unlikely that any useful chronological evidence survives.	• The site appears relatively undisturbed and there is a high possibility that useful spatial information can still be obtained from subsurface investigation of the site, even if it is still unlikely that any useful chronological evidence survives. (In cases where both spatial and chronological evidence is likely to survive the site will gain additional significance from high scores for rarity and representativeness).
Connectedness	• There is no evidence to suggest that the site is connected to other sites in the local area or the region through: – their chronology (rarely known); – their site type (e.g. connectedness could be argued between an axe quarry, a nearby set of axe grinding grooves and an adjacent site exhibiting evidence of axe reduction);	• There is some evidence to suggest that the site is connected to other sites in the local area or the region through: – their chronology (rarely known); – their site type (e.g. connectedness could be argued between an axe quarry, a nearby set of axe grinding grooves and an adjacent site exhibiting evidence of axe reduction);	• There is good evidence to support the theory that the site is connected to other sites in the local area or the region through: – their chronology (rarely known); – their site type (e.g. connectedness could be argued between an axe quarry, a nearby set of axe grinding grooves and an adjacent site exhibiting evidence of axe reduction);

Table 6.2 - Criteria used in evaluating archaeological significance (cont)

Criterion	Low (Score of 1)	Moderate (Score of 2)	High (Score of 3)
Connectedness (cont)	– by the use of an unusual raw material, knapping technique/reduction strategy; – similar designs/motifs in the case of art sites and engravings; and/or – information provided by Aboriginal oral history.	– by the use of an unusual raw material, knapping technique/reduction strategy; – similar designs/motifs in the case of art sites and engravings; and/or – information provided by Aboriginal oral history.	– by the use of an unusual raw material, knapping technique/reduction strategy; – similar designs/motifs in the case of art sites and engravings; and/or – information provided by Aboriginal oral history.
Complexity	• The site does not exhibit and is not predicted to contain either of the following in a subsurface context: – a complex assemblage of stone artefacts in terms of artefact types and/or raw materials (including use of local and imported raw materials) and/or knapping techniques/reduction strategies; and/or – features such as hearths or heat treatment pits, activity areas.	• The site exhibits or can be predicted to contain one of the following in a subsurface context: – a complex assemblage of stone artefacts in terms of artefact types and/or raw materials and/or knapping techniques/reduction strategies and/or use of local and imported raw materials; and/or – features such as hearths or heat treatment pits, activity areas.	• The site exhibits or can be predicted to contain both of the following in a subsurface context: – a complex assemblage of stone artefacts in terms of artefact types and/or raw materials and/or knapping techniques/reduction strategies and/or use of local and imported raw materials; and – features such as hearths or heat treatment pits, activity areas.
PAD	• The site does not have or has only a low potential to contain subsurface archaeological material that has stratigraphic integrity or is of a nature that suggests its subsurface investigation would assist with answering questions of contemporary archaeological interest or that indicate it should be preserved for its future research potential.	• The site has a moderate potential to contain subsurface archaeological material that has stratigraphic integrity or is of a nature that its subsurface investigation would assist with answering questions of contemporary archaeological interest or that indicate it should be preserved for its future research potential.	• The site has a high potential to contain subsurface archaeological material that has stratigraphic integrity or is of a nature that its subsurface investigation would assist with answering questions of contemporary archaeological interest or that indicate it should be preserved for its future research potential.

6.3.1 Rarity

A site may be thought of as rare if it represents a site type or has site contents that are uncommon in the local and/or regional context. Other sites may be composed of common elements, but may be preserved in an unusually informative way or in a landform context that is atypical. Some common site types like artefact scatters, may have increased significance for "rarity" if most other similar sites in the area have been destroyed by development and if no similar sites are being conserved in the locale/region.

Stone arrangements are unknown locally and rare within a regional context, thus the MRN9 site is assessed as having high archaeological significance for rarity on both a local and regional scale.

Scarred trees are rare in the local context but less rare in a regional context. The four scarred trees identified as archaeological sites (MRN8, 10, 11 and 23) are therefore assessed as having high archaeological significance for rarity on a local scale and moderate significance on a regional scale.

Artefact scatter and isolated find sites are common both locally and regionally, however, the sites located in the sands derived from *in situ* weathering of porphyry have a geological context that is rare (refer **Figure 5.3**). Thus the majority of the artefact scatter and isolated find sites are assessed as having low archaeological significance for rarity on a local and regional scale, however, sites MRN27, MRN28, MRN48 and MRN50 and the isolated find sites MRN26 and MRN30 are assessed as having high archaeological significance for rarity on a local and regional level.

6.3.2 Representativeness

One of the objectives of cultural heritage management is to ensure that a representative sample of all site types is preserved in the variety of landscapes in which they occur. Like many other natural resources, archaeological sites are a non-renewable resource. Once they are destroyed they cannot be replaced or replicated. As a result, one of the aims of a scientific value assessment is to examine the potential of newly discovered sites to be conserved to act as "representative" examples of a particular site type.

Stone arrangements were previously unknown locally and within a regional context, thus any positively identified stone arrangement must have high archaeological significance for representativeness. Thus MRN9 is assessed as having high archaeological significance for representativeness on both a local and regional scale.

Scarred trees are rare in the local context (outside the project area) and also rare in a regional context, making any scarred trees "representative" of their site type. The cluster of scarred trees in the southwest of the project area represents the only recorded cluster of scarred trees and thus these trees are also "representative" of a site cluster. Thus the four scarred trees identified as archaeological sites (MRN8, 10, 11 and 23) are assessed as having high archaeological significance on a local scale for representativeness and moderate significance for representativeness on a regional scale.

Artefact scatter and isolated find sites are common both locally and regionally and occur in all landform types. However, the artefact scatter sites located in the sands derived from *in situ* weathering of porphyry have a geological context that is rare and thus these sites are "representative" of a site type in this particular geological setting. Thus the majority of the artefact scatter and isolated find sites are assessed as having low archaeological significance on a local and regional scale for representativeness, however, sites MRN26, MRN27, MRN28, MRN30, MRN48 and MRN50 (refer **Figure 5.3**) are assessed as having high archaeological significance for representativeness on a local and regional scale.

6.3.3 Integrity

Each archaeological site represents a number of pieces of evidence spatially organised both by human behaviour and by subsequent environmental and land-use effects. When a site has been subject to relatively few environmental or land-use (post-depositional) processes it will represent more directly the original human activities which created it. Such undisturbed sites are considered to have archaeological (stratigraphic) integrity and may have the potential to answer research questions of relevance to both the Aboriginal and archaeological community. Sites with archaeological integrity are necessary to answer questions related to the antiquity of Aboriginal occupation or related to change over time in the ways people were behaving within the landscape.

In sites which have been heavily disturbed by post-depositional processes such as erosion, tree clearance, rural, urban and/or industrial development and/or animal burrowing, aspects of the original activities which formed the sites will be disturbed and site integrity lost. This has a severe constraining effect on the ability of the site to inform about the Aboriginal past.

The MRN9 stone arrangement has been disturbed to an extent by stock trampling. Some of the stones have been moved from their original alignment either into or outside the line. The shape of the arrangement is, however, still identifiable and thus the MRN9 stone arrangement site is assessed as having moderate archaeological significance for integrity on a local and regional scale.

The four scarred trees identified as archaeological sites (MRN8, 10, 11 and 23) are assessed as having moderate archaeological significance for integrity on a local and regional level. They were not afforded high integrity due to the scars closing over and recent damage from cattle rubbing and chewing.

There are no artefact scatter or isolated find sites located during the survey that are assessed as having archaeological integrity due to prior disturbance. Thus all the artefact scatter and isolated find sites are assessed as having low archaeological significance for integrity.

6.3.4 Connectedness

Connectedness can be considered in a number of ways, at a number of scales. In its broadest sense, ‘connectedness’ refers to patterns linking sites within an area. Connectedness is often difficult to ascertain as the chronological sequence of use of surface sites is unknown at the survey stage of their assessment. Thus connectedness must be related to other features of sites and/or their assemblages. Sites may appear connected due to their location within the landscape (e.g. a series of sites along a tributary system or within a valley) or because of the nature of their assemblages (e.g. the use of similar raw materials and reduction sequences aimed at producing similar implement types) or the nature of features within the sites (e.g. heat treatment pits and knapping floors containing heat treated artefacts).

In some cases, it may be that a series of sites within an area relates to a number of different activities which are in fact all components of a single land use system (e.g. a stone quarry, a camp site at which reduction of that stone takes place, a sandstone outcrop on which that stone is ground).

Connectedness is demonstrated by the scarred tree sites MRN8, 10 and 11, which are all located within the same geographic area and on the same landform unit (albeit on different parts of the landscape unit) and on the same tree species and on trees of relatively the same age. Thus these scarred trees are assessed as having high archaeological significance for connectedness on a local and regional scale. Connectedness between these scarred trees and the stone arrangement site MRN9 has been proposed by the Aboriginal community groups taking part in the assessment. They also extend this connectedness to include the artefact scatter sites MRN13 and MRN14. From an archaeological perspective connectedness for these sites cannot be demonstrated so they have been assessed as having low archaeological significance for connectedness.

The remainder of the artefact scatter and isolated finds share common attributes with other sites within and outside the project area, which suggests they are no more connected to each other than they are to any other site in the general Marulan area, thus they are assessed as having low archaeological significance for connectedness on a local and regional scale.

6.3.5 Complexity

The complexity of a site is assessed on the basis of its ability to contribute to our understanding of the Aboriginal past. The more complex a site, the more potential it has to be interpreted in an informative way. Complexity can be related to the artefact assemblage located within a site, or predicted in a subsurface context and/or the nature of features (heat treatment pits, hearths, knapping floors) within a site, the arrangement of stones within a stone arrangement, the number of scars on a tree etc.

As none of the scarred trees (MRN8, 10, 11 or 23) or the stone arrangement (MRN9) can be described as "complex" they are afforded low archaeological significance for complexity on a local and regional scale.

Of the artefact scatter sites and isolated finds only the MRN27 artefact scatter site is considered to have an assemblage (surface and subsurface) that has the potential to have sufficient complexity to warrant a moderate significance assessment for complexity on a local scale and a low significance assessment for complexity on a regional scale. The remainder of the sites are assessed as having low significance for complexity on both a local and regional scale.

6.3.6 Potential Archaeological Deposits

Potential archaeological deposits (PADs) are places where the subsurface profile is assessed as having a high probability of containing cultural heritage materials in a relatively undisturbed context. Factors that need to be considered when assessing PADs include:

- the depth of the 'A' (topsoil) soil horizon;
- any potential disturbances to the subsurface environment (e.g. wombat burrowing, stock trampling, mechanical disturbance);
- the probability of cultural materials being present as assessed through the environmental setting and/or a surface artefact assemblage; and
- any geomorphic agencies likely to have affected the area (e.g. slopewash, colluvial erosion and deposition).

Many of the sites located during this survey were recorded in areas where either the depth of the A horizon was minimal, where the A horizon had been removed altogether by post-depositional processes or where rock was outcropping at the surface. This was particularly true of many sites located on ridge crests and slopes and along many of the tributaries where (remnant) soil depth was generally very shallow. Sites in these areas were assessed as unlikely to have PAD (refer to **Table 5.13**).

Even those sites (MRN26, MRN27, MRN28, MRN30, MRN48 and MRN50) that retained substantial soil depths had lost substantial depths of topsoil due to power easement clearing and/or geomorphic processes brought about by tree clearance (downslope movement of soil, aeolian processes). Additionally, the sand produced by weathering of porphyry forms a hard crust but underneath has no structure to prevent artefacts from moving down through the soil profile, resulting in loss of stratigraphic integrity. When this is coupled with wombat activity, the artefacts located in these areas are subject to both vertical and horizontal displacement and recycling from a subsurface to a surface context. Thus these sites also have low archaeological significance on a local and regional scale for PAD.

The sites on the lower slope/footslope boundary with substantial depths of colluvial aggradation (MRN25 and MRN34), may retain a buried soil profile beneath the colluvium. Both of these sites have, however, been highly disturbed by wombat burrowing and it is not possible to know if the small number of artefacts located in these sites are derived from the colluvial deposits and thus were derived from the slopes above or from the soil profile buried beneath the colluvium. Whatever the case the depth and extent of the wombat burrows indicate that both soil profiles have been subject to significant disturbance in these areas and the likelihood of the buried soil profile having any integrity is highly unlikely.

Other sites that have been assessed as likely to have low numbers of artefacts in a subsurface context are located along the creeks where visible artefacts are interspersed by grassed areas (MRN29 33, 38 and 52). Once again these areas have been subject to disturbance from tree clearance, stock trampling and slopewash and thus are highly unlikely to have subsurface deposits with archaeological integrity.

Therefore, all of the sites located within the project area are assessed as having low archaeological significance for PAD on a local and regional scale.

6.4 SUMMARY OF ARCHAEOLOGICAL SITE SIGNIFICANCE

Table 6.3 provides the significance assessment for each of the archaeological sites. The scores are based on the ranking criteria provided in **Table 6.2** and the discussions in **Sections 6.3.1** to **6.3.6**. Significance assessments are also provided for the sites recorded by Navin (1990). These significance assessments are based on the assessments provided by Navin. **Figure 6.2** indicates the locations of the sites and their archaeological significance.

6.4.1 Archaeological Research Potential

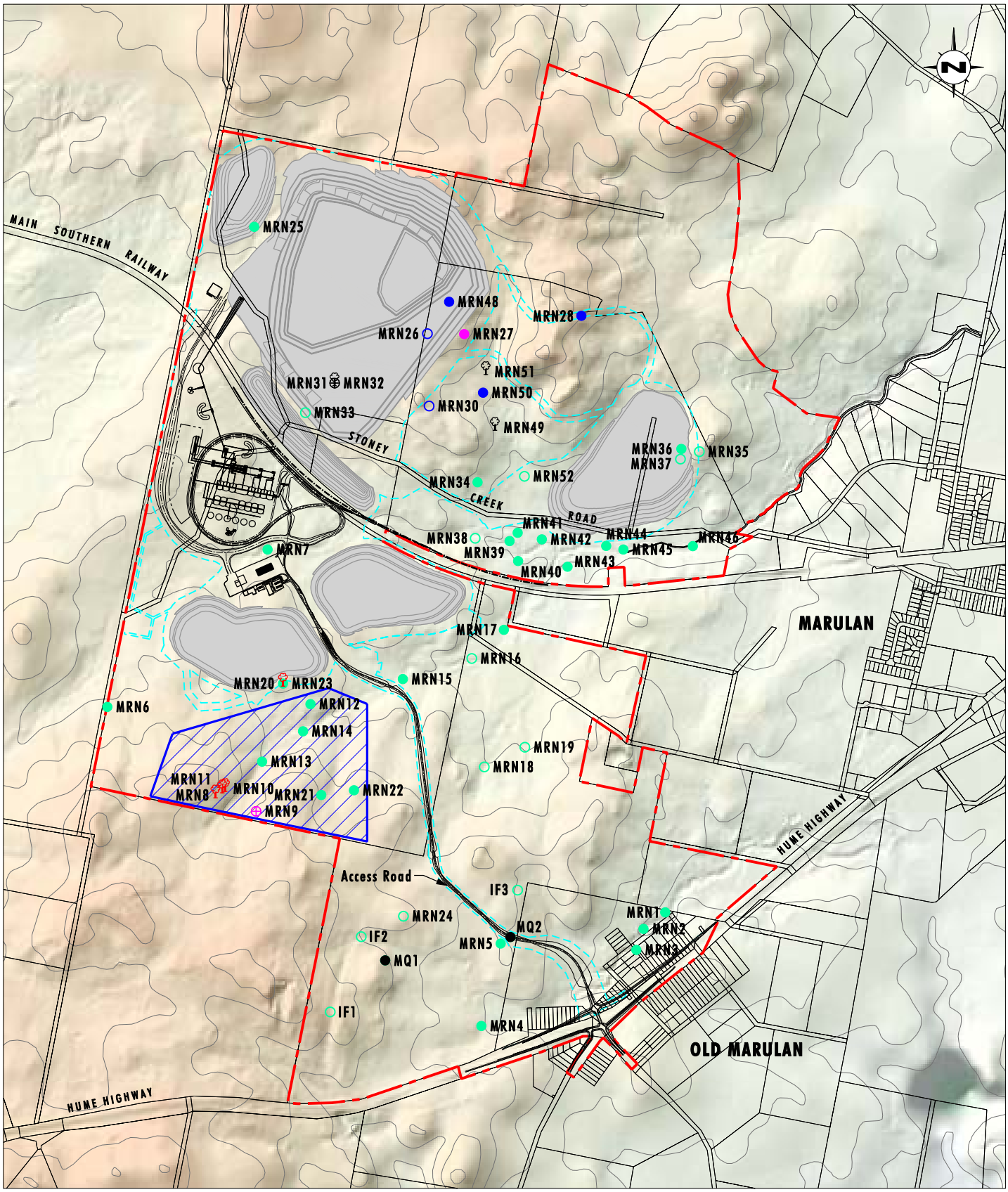
The research potential of a site is assessed on the basis of the potential for the site, through further investigation, to add significantly to our understanding of the past. A number of factors contribute to this assessment, including the complexity of the site, how well preserved the site is, how the site relates to prevailing research themes, and whether the site is able to provide information that is not otherwise available. As such, this assessment draws heavily from the preceding assessments and does not form part of the initial ranking process.

Of the 54 sites located within the project area, only 11 sites were assessed as being above overall low archaeological significance. These sites include the MRN9 stone arrangement, the MRN8, 10, 11 and 23 scarred trees, the MRN27, 28, 48 and 50 artefact scatter sites and the MRN26 and 30 isolated find sites. The stone arrangement and scarred trees had the highest archaeological significance (moderate and moderate to high respectively) mainly derived from their rarity, representativeness, integrity and connectedness. The isolated finds and artefact scatter sites gained the majority of their archaeological significance due to their unusual geological location (rarity and representativeness), and in the case of MRN27 its complexity.

Unfortunately the lack of PAD in the area of the stone arrangement and scarred trees limits their potential for research, though it does not limit their Aboriginal cultural heritage or conservation value.

The degree of prior disturbance within the project area has resulted in an overall lack of site integrity for the artefact scatter and isolated find sites which is assessed as the most important component when assessing a site for its research potential. Thus none of the sites can be seen to have high research potential, however, it is argued that as so little is actually known about the Aboriginal use of this area that information derived from further investigation at the site with the highest potential for complexity (MRN27) is warranted. It is further argued that the rarity of the stone arrangement site (MRN9) indicates that its conservation is warranted along with the scarred trees in that general area (MRN8, 10, 11 and 23).

Umwelt
Environmental Consultants



Base Source: LPI 2004, Readymix Holdings Pty Ltd

0 0.5 1 1.25km

Legend

- Project Area
- Cultural Heritage Management Area
- Approximate Disturbance Footprint
- Artefact Scatter
- Isolated Find
- Stone Arrangement
- Scarred Tree

Archaeological Significance
- Low
- Low to Moderate
- Moderate
- Moderate to High

FIGURE 6.2

Archaeological Significance of the Sites

File Name (A4): R06_V1/1829_105.dgn

Table 6.3 – Summary of Archaeological Site Significance

Site MRN	Rarity		Representativeness		Integrity		Connectedness		Complexity		PAD		Score	Significance
	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional		
1	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
2	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
3	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
4	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
5	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
6	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
7	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
8	3	2	3	2	2	2	3	3	1	1	1	1	24	Mod → High
9	3	3	3	3	2	2	1	1	1	1	1	1	22	Mod
10	3	2	3	2	2	2	3	3	1	1	1	1	24	Mod → High
11	3	2	3	2	2	2	3	3	1	1	1	1	24	Mod → High
12	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
13	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
14	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
15	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
16	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
17	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
18	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
19	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
20	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
21	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
22	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
23	3	2	3	2	2	2	1	1	1	1	1	1	24	Mod → High
24	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
25	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
26	3	3	3	3	1	1	1	1	1	1	1	1	20	Low→ Mod
27	3	3	3	3	1	1	1	1	2	1	1	1	21	Mod
28	3	3	3	3	1	1	1	1	1	1	1	1	20	Low→ Mod

Overall Significance: Low 12-15 Low to Mod 16-20 Mod 21-24 Mod to High 24-27 High 27+

Table 6.3 - Summary of Archaeological Site Significance (cont)

Site MRN	Rarity		Representativeness		Integrity		Connectedness		Complexity		PAD		Score	Significance
	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional		
30	3	3	3	3	1	1	1	1	1	1	1	1	20	Low→ Mod
31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
34	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
35	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
36	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
37	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
38	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
39	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
40	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
41	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
42	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
43	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
44	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
45	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
46	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
48	3	3	3	3	1	1	1	1	1	1	1	1	20	Low→ Mod
49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50	3	3	3	3	1	1	1	1	1	1	1	1	20	Low→ Mod
51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
52	1	1	1	1	1	1	1	1	1	1	1	1	12	Low

Overall Significance: Low 12-15 Low to Mod 16-20 Mod 21-24 Mod to High 24-27 High 27+

Table 6.3 - Summary of Archaeological Site Significance (cont)

Site MRN	Rarity		Representativeness		Integrity		Connectedness		Complexity		PAD		Score	Significance
	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional	Local	Regional		
MQ1	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
MQ2	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
IF1	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
IF2	1	1	1	1	1	1	1	1	1	1	1	1	12	Low
IF3	1	1	1	1	1	1	1	1	1	1	1	1	12	Low

Overall Significance: Low 12-15 Low to Mod 16-20 Mod 21-24 Mod to High 24-27 High 27+

The significance assessments provided in **Table 6.3** are summarised in **Table 6.4** for ease of reference. Those shown in bold in **Table 6.4** are the sites within in the 30 year quarry and associated infrastructure footprint.

Table 6.4 – Summary of Archaeological Significance of Sites

Site Name	Site Type	Archaeological Significance
MRN1	Artefact Scatter	Low
MRN2	Artefact Scatter	Low
MRN3	Artefact Scatter	Low
MRN4	Artefact Scatter	Low
MRN5/MQ 2	**Artefact Scatter**	**Low**
MRN6	Artefact Scatter	Low
MRN7	**Artefact Scatter**	**Low**
MRN8	Scarred Tree	Moderate to High
MRN9	Stone Arrangement	Moderate
MRN10	Scarred Tree	Moderate to High
MRN11	Scarred Tree	Moderate to High
MRN12	Artefact Scatter	Low
MRN13	Artefact Scatter	Low
MRN14	Artefact Scatter	Low
MRN15	Artefact Scatter	Low
MRN16	Isolated Find	Low
MRN17	Artefact Scatter	Low
MRN18	Isolated Find	Low
MRN19	Isolated Find	Low
MRN20	Artefact Scatter	Low
MRN21	Isolated Find	Low
MRN22	Artefact Scatter	Low
MRN23	Scarred Tree	Moderate to High
MRN24	Isolated Find	Low
MRN25	**Artefact Scatter**	**Low**
MRN26	**Isolated Find**	**Low to Moderate**
MRN27	**Artefact Scatter**	**Moderate**
MRN28	**Artefact Scatter**	**Low to Moderate**
MRN30	Isolated Find	Low to Moderate
MRN31	**Scarred Tree**	**N/A**
MRN32	**Stone Arrangement**	**N/A**
MRN33	**Isolated Find**	**Low**
MRN34	Artefact Scatter	Low
MRN35	**Isolated Find**	**Low**
MRN36	**Artefact Scatter**	**Low**
MRN37	**Isolated Find**	**Low**
MRN38	Isolated Find	Low
MRN39	Artefact Scatter	Low
MRN40	Artefact Scatter	Low
MRN41	Artefact Scatter	Low
MRN42	Artefact Scatter	Low

Table 6.4 – Summary of Archaeological Significance of Sites (cont)

Site Name	Site Type	Archaeological Significance
MRN43	Artefact Scatter	Low
MRN44	Artefact Scatter	Low
MRN45	Artefact Scatter	Low
MRN46	Artefact Scatter	Low
MRN48	**Artefact Scatter**	**Low to moderate**
MRN49	Scarred Tree	N/A
MRN50	Artefact Scatter	Low to moderate
MRN51	Scarred Tree	N/A
MRN52	**Isolated find**	**Low**
MQ 1	Artefact Scatter	Low
IF1	Isolated find	Low
IF2	Isolated find	Low
IF3	Isolated find	Low

Note: Sites in bold type will be affected by the project.

Table 6.4 and **Figure 6.2** indicate that the 14 sites to be impacted by the proposed development of the quarry and its infrastructure range in their archaeological significance from low to moderate. It can also be observed that there are other sites of the same type of equal or higher archaeological significance that are outside the area of impact. **Figure 6.2** indicates that one of the sites of moderate archaeological significance and most of the sites with moderate to high archaeological significance are located within the area identified by the Aboriginal community as containing a complex of inter-related sites of high Aboriginal cultural heritage significance.

6.5 DISCUSSION: ARCHAEOLOGICAL AND ABORIGINAL SIGNIFICANCE OF LANDFORM UNITS WITHIN THE PROJECT AREA

It was concluded in **Section 5.6** that the site distribution pattern recorded during the survey allowed for an interpretation of the likely whereabouts of sites within the project area. It was stated at that time that there is likely to be a light scatter of artefacts across the project area with greater concentrations in areas along the main creek channels and in areas where there are deep sands from *in situ* weathering of porphyry (refer to **Figure 2.2**).

The sites located along the main channel of Marulan Creek and Joarimin Creek were afforded only low archaeological significance due to their disturbed nature and lack of PAD, however, the Aboriginal significance of the sites located in these areas was assessed as ranging from low to high. All of the sites along the main channel of Marulan Creek and any potential sites within that area that were not detected due to lack of ground surface visibility are in areas outside proposed development impact and thus there is the capacity for site conservation. All of the sites, except MRN7, located along the main channel of Joarimin Creek and any potential sites within the majority of its channel that were not detected due to lack of ground surface visibility are also in areas outside proposed development impact and thus also have the capacity for site conservation. The MRN7 site that will be impacted by development consists of four artefacts that have washed into the Joarimin Creek channel from somewhere upstream and as such have low archaeological significance. The banks along the stretch of creekline in the vicinity of MRN7 have been heavily scoured and have little potential for subsurface artefacts.

As the access track from the Hume Highway will cross both creeks there is, however, the capacity to impact on a previously unidentified (subsurface) site at some of these points. In relation to the

archaeological significance of the points of impact it is assessed that similar areas along the creeks will remain intact which will act to adequately represent the areas crossed by these roads, thus the impact points do not have a predicted high archaeological significance. In relation to the impact point near MRN7 the creek banks in this area are so heavily scoured that impact is not thought a problem from an archaeological perspective. In relation to the Aboriginal significance of the impact points, this is seen to be much higher and to reflect the Aboriginal significance afforded the known sites in these areas.

The sites along the minor channels of the creeks and in the intervening areas of slopes and crests have been assessed as having low to moderate to high archaeological significance and low to high Aboriginal significance. The number of known (14) sites in the impact areas is relatively low when compared to the number of sites (40) outside the impact area that can be managed for conservation. Likewise the development impact area is more limited in size than the area outside that can be managed for its cultural heritage values.

The majority of the quarry pit will be located within the upper catchment of Lockyersleigh Creek. In this area there is one known site (MRN25) of low archaeological significance and moderate Aboriginal significance. To the west and outside the project area the majority of the Lockyersleigh Creek catchment is within farmland which can be predicted to have more sites and more extensive sites downstream towards the main channel of the creekline. There are no areas of Lockyersleigh Creek within the project area which can be set aside for conservation of Aboriginal cultural heritage sites/values.

In the upper catchment of Joarimin Creek there are seven sites to be impacted by the development. These are MRN25, 26, 27, 28, 31, 32, 48 and 52. MRN 26, 28, 48 and 52 are assessed as having low to moderate archaeological significance and MRN27 as having moderate archaeological significance. The Aboriginal significance afforded these sites was low (MRN32 and 52) to moderate (MRN25, 28, 31 and 48) and high (MRN27). Four of these sites (MRN26, 27, 28 and 48) are within the areas of sand derived from deep *in situ* weathering of porphyry. The distribution of these sands is limited, but not limited to the area of impact (refer to **Figure 2.1**) and further areas of these sands exist that can be predicted to have sites within the project area to the east of the proposed quarry pit. These areas will not be impacted during the first 30 years of operations, however, they are within the northern resource area and at least some of this area should be set aside for conservation due to its geological rarity[*] as well as its archaeological and Aboriginal significance.

The other sites in the upper Joarimin Creek catchment (the MRN25 artefact scatter, the MRN31 scarred tree and the MRN32 stone arrangement) are represented by other sites of the same type in the southern portion of the project area that will not be impacted by the development (N.B. MRN31 and MRN32 were not assessed as being archaeological sites but were recorded in line with the wishes of the Aboriginal community representatives present on the survey).

[*] It is possible that the sand derived from deep *in situ* weathering of porphyry exists outside the project area, however, this is not evident from the geological mapping, possibly due to the scale of the maps which only show major geological features.

7.0 MANAGEMENT OPTIONS

The following sections discuss the management options for sites/areas within the project area thought appropriate by the GTCAC and the PLALC and from an archaeological perspective. Various management options will be discussed in relation to all the known sites/areas and a preferred management option provided on a site by site basis. The sites discussed and their Aboriginal and archaeological significance are shown on **Figures 6.1** and **6.2**.

7.1 OPTION 1 SITE CONSERVATION

Conserve all or a selected number of Aboriginal sites/areas within the project area.

7.1.1 Discussion

The present 30 year quarry concept plan indicates that the proposed development will not impact the following sites:

- MRN1 to MRN4, MRN6, MRN8 to MRN24, MRN30, MRN34, MRN38 to MRN46, MRN49 to MRN51, MQ1, IF1, IF2, IF3

The sites MRN1 to MRN4 are located along the main channel of Marulan Creek and in an area where the only development impact is related to the access track. Therefore, the known sites and the areas along the main channel of the creekline that will not be impacted by the access track should be afforded protection from direct and indirect impact. The area to be impacted by the access track has low archaeological significance, however, it has moderate Aboriginal significance and a high likelihood of having artefactual material. Moving the access track would not solve the problem of impacting artefactual material as the track must cross Marulan Creek at some point and all points along the creek are likely to have artefacts. Thus, an alternative management option to conservation is appropriate for the point where the access track will cross Marulan Creek.

The sites MRN8 to MRN14 are located in an area afforded high Aboriginal significance that contains sites of moderate to high Aboriginal significance and moderate to moderate to high archaeological significance. This area is also outside the development impact area and should be afforded protection from direct and indirect impact. As this area contains four artefact scatters, one isolated find, three scarred trees and a stone arrangement, it has the benefit of being able to conserve a cross-section of all the site types present within the project area.

The artefact scatter MRN20 was afforded low Aboriginal and archaeological significance and the adjoining scarred tree site MRN23 was afforded high Aboriginal significance and moderate to high archaeological significance. The area of these two sites is also outside the development impact area and should be afforded protection from direct and indirect impact. It cannot, however, be incorporated into the adjacent area to be conserved for its high Aboriginal significance as there is a proposal by Country Energy to construct a powerline between these two sites and the area of high Aboriginal significance (northwest of MRN12). Therefore these sites will have to be conserved within another designated area.

The remaining sites outside the development impact area: MRN6, MRN15 to MRN19, MRN24, MRN30, MRN34, MRN38 to MRN46, MRN50, MQ 1, IF1, IF2 and IF3 and any undiscovered sites that may be located between them, are in areas that will not be impacted by the development and thus can be afforded protection from direct and indirect development impact and should be able to be managed to conserve their cultural heritage value.

7.1.2 Preferred Option

Aboriginal site conservation can take various forms. For the project area the preferred management option for the sites to be conserved is as follows:

- the area containing sites MRN8 to 14 and MRN21 and MRN22 will be conserved as a Cultural Heritage Management Area in recognition of its high Aboriginal cultural heritage value/significance and as it contains an excellent cross-section of site types and sites of moderate to moderate to high archaeological significance. This area will be fenced, sign-posted and stock excluded. The management of the sites and areas predicted to have sites within the Management Area will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC;

- the area containing sites MRN20 to 23 will be conserved with an appropriate buffer zone between the sites and the Excess Product Emplacement Area to the north and the proposed Country Energy power easement to the south. The area will be fenced, sign-posted and stock excluded. The management of the sites will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC;

- the remaining sites outside the development impact area: MRN6, MRN15 to MRN19, MRN24, MRN30, MRN34, MRN38 to MRN46, MRN50 to MRN51, MQ 1, IF1, IF2 and IF3 and the majority of their environs, are also in areas where there is no current requirement for impact by the development. Thus, the known sites and those areas not to be directly or indirectly impacted by the quarry or its infrastructure should be managed to conserve their cultural heritage values. The *in situ* management of these sites and areas predicted to have sites (aside from those areas where infrastructure is required) will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC; and

- if the above areas are managed for Aboriginal site conservation, conservation of sites MRN5 (MQ 2), MRN7, MRN25 to MRN28, MRN31 to 33, MRN35 to 37, MRN48 and MRN52 is not seen as a requirement.

7.2 OPTION 2 SITE DESTRUCTION WITHOUT SALVAGE

Apply to the Director-General of the DEC for a Section 90 consent for all sites within the project area to be impacted by the proposed development and allow development to proceed without any further investigation/salvage.

7.2.1 Discussion

All of the sites within the project area are of significance to the local Aboriginal community. The landscape in which these sites are situated is also of significance to the Aboriginal community. Destruction without salvage is therefore not seen as appropriate from the perspective of the Aboriginal community groups involved in the project for any of the sites within the proposed development impact area.

From an archaeological perspective, although all of the areas proposed for impact are disturbed, and there are no artefact scatter or isolated find sites/areas assessed as retaining archaeological integrity, the destruction of the sites without some form of salvage is not thought appropriate. As so little is actually known about the Aboriginal use of this area, the artefacts within even these disturbed sites, when analysed, still have the potential to provide evidence of past Aboriginal activities and may add significantly to the present limited knowledge.

The stone arrangement (MRN32) was not assessed as an archaeological site and even the Aboriginal community groups present thought it may have been of recent European origin. Thus site destruction without salvage or further investigation is thought appropriate (a scale plan of the stone arrangement was undertaken during the survey).

The scarred tree (MRN31) was not assessed as an archaeological site, however, the Aboriginal community groups present thought it had moderate Aboriginal significance and suggested that it should be moved into the area they identified as having high Aboriginal cultural heritage value. Thus site destruction without salvage or further investigation is not thought appropriate.

7.2.2 Preferred Option

Site destruction without salvage is appropriate for site MRN32, however, it is not appropriate for any of the other sites within the proposed development impact area.

7.3 OPTION 3 SITE DESTRUCTION WITH SALVAGE (SURFACE COLLECTION)

This applies specifically to the artefact scatter and isolated find sites within the proposed development impact area.

Apply to the Director-General of DEC for a Section 90 consent with salvage (surface collection only) for all artefact scatters and isolated finds within the development impact area and allow development to proceed following the collection of all artefacts.

7.3.1 Discussion

Throughout the survey and site inspection, the Aboriginal community groups involved made it clear that all of the artefact scatter sites (MRN5 (MQ2), 7, 25, 27, 28, 36 and 48) and isolated finds (MRN26, 33, 35, 37, 52) within the areas to be impacted by development had some level of Aboriginal cultural heritage value and thus surface artefact collection and subsequent analysis was their minimum expectation in regard to management of these sites. Surface collection only, was deemed appropriate management by the Aboriginal community for MRN5 (MQ2), 7, 25, 26, 28, 33, 35, 36, 37, 48 and 52). Surface collection only was not thought appropriate management, however, for MRN27.

From an archaeological perspective, subsurface testing of the artefact scatter and isolated find sites is not warranted. Only four of the sites (MRN26, 27, 28 and 48) to be impacted by the proposed development retain sufficient soil depth to warrant subsurface testing. All of these sites are pocked with wombat burrows which provide more information about the subsurface extent of the artefactual material than generally provided by an extensive subsurface testing program. Of the four sites the wombat burrowing indicates that only site MRN27 is likely to have sufficiently large numbers of artefacts in a subsurface context to warrant subsurface investigation. For MRN26, 28 and 48 surface collection is considered to be adequate.

None of the remaining artefact scatter and isolated find sites (MRN5 (MQ2) MRN7, MRN25, MRN29, MRN33, MRN35, MRN36, MRN37 and 52) retained sufficient deposit to warrant subsurface testing.

7.3.2 Preferred Option

Section 90 consent with salvage (surface collection only) is thought appropriate for the following artefact scatter and isolated find sites within the proposed development impact area:

- MRN5 (MQ 2), MRN7, MRN25, MRN26, MRN28, MRN29, MRN33, MRN35, MRN36, MRN 48 and MRN52.

GTCAC requested that some of the artefacts collected be retained by their group, the artefacts to be held at their office in Katoomba and used for cultural and educational training purposes. They further requested that the remainder of the artefacts collected be placed in a location within the project area where they will not be impacted by future development. It is suggested that the Cultural Heritage Management Area (refer to **Figure 6.1**) would be a suitable area for placement of the artefacts.

7.4 OPTION 4 SITE DESTRUCTION WITH SALVAGE (SUBSURFACE SALVAGE)

Apply to the Director-General of DEC for a Section 90 consent with subsurface salvage for Aboriginal sites identified within the development impact area.

7.4.1 Discussion

The Aboriginal community groups involved in the project indicated that they would require some form of subsurface salvage of site MRN27. From an archaeological perspective it is also recommended that some form of subsurface salvage be undertaken in this area.

Various options were considered including:

- grader scrapes;
- backhoe trenches; and
- broad area manual excavation.

In determining what is the appropriate salvage strategy various factors must be taken into account, such as:

- the nature of the deposits (loose sand);
- the impacts on the environment of broad area impacts such as those produced by grader scrapes and backhoe trenches (vegetation loss, increased erosion, injury to wombats);
- the economics of, or rationale for, undertaking broad area manual excavation in an area with no site integrity; and
- the requirements of the Aboriginal community groups to feel that the area had been adequately salvaged.

Taking all the above into account, mechanical excavation was thought inappropriate. Broad area manual excavation using the usual archaeological methodologies was also thought inappropriate as the artefacts salvaged would have no vertical or horizontal integrity and thus the recording of their whereabouts within the soil profile in any particular area would be meaningless. Thus it was concluded that the most productive method of salvaging the artefacts without adversely affecting the environment was to simply divide the area into landform units (upper slope, midslope, lower slope, footslope adjacent to the creek) and manually excavate a sample of each area and pass the sand through sieves to retrieve the artefacts. In this manner a systematic sample can be obtained from the various landforms within the site area for subsequent analysis.

7.4.2 Preferred Option

Section 90 consent with salvage (subsurface salvage) is thought appropriate for site MRN27; the details of the salvage operation to be determined in consultation with the relevant Aboriginal community groups and DEC.

As noted in **Section 7.3.2**, GTCAC requested that some of the artefacts salvaged be retained by their group, the artefacts to be held at their office in Katoomba and used for cultural and educational training purposes. They further requested that the remainder of the artefacts salvaged be placed in a location within the project area where they will not be impacted by future development. It is suggested that the Cultural Heritage Management Area (refer to **Figure 6.1**) would be a suitable area for placement of the artefacts.

7.5 OPTION 5 SECTION 90 CONSENT SALVAGE (SCARRED TREE REMOVAL)

Apply to the Director-General of DEC for a Section 90 consent to remove a scarred tree.

7.5.1 Discussion

The Aboriginal community groups involved in the project indicated that they would like to have the scarred tree MRN31 removed ahead of quarry development. The scarred tree could then be placed inside the Cultural Heritage Management Area in the south of the project area. The remainder of the scarred trees can be conserved *in situ*.

7.5.2 Preferred Option

Section 90 consent with salvage (scarred tree removal) is thought appropriate for site MRN31; the details of the salvage operation to be determined in consultation with the relevant Aboriginal community groups and DEC.

7.6 OPTION 6 SUBSURFACE TESTING

Apply to the Director-General of DEC for a Section 87 Preliminary Research Permit for subsurface testing of a PAD within the development impact area.

As discussed in **Section 7.3** the recorded sites and their environs within the proposed development impact area do not warrant subsurface testing. There are three areas, however**,** where the access road will cross Marulan Creek and Joarimin Creek that could be predicted to contain subsurface artefacts. These areas are seen as sensitive from an Aboriginal cultural heritage perspective. From an archaeological perspective the disturbed nature of these areas suggests very little likelihood of site integrity, though it is probable that there may be small numbers of artefacts in a subsurface context within 50 metres either side of the creek channels. In view of the Aboriginal sensitivity of the creeklines it would be appropriate to allow the Aboriginal community to be present during initial ground disturbance works for access road construction to identify and collect any artefactual material uncovered. The monitoring would require a DEC Section 87 Preliminary Research Permit.

7.6.1 Preferred Option

Section 87 Preliminary Research Permit (subsurface testing) to allow Aboriginal community monitoring of initial ground disturbance works in the area of Marulan Creek and Joarimin Creek to be crossed by the access road; the details of the monitoring program to be determined in consultation with the relevant Aboriginal community groups and DEC.

7.7 SUMMARY OF PREFERRED MANAGEMENT OPTIONS

Table 7.1 provides a summary of the preferred management options.

Table 7.1 - Preferred Management Options

Conservation	**Section 90 consent without salvage**	**Section 90 consent with salvage** (collection only)	**Section 90 consent** (subsurface salvage)	**Section 90 consent** (scarred tree removal)	**Section 87 Permit** (access track monitoring)
MRN1	MRN32	MRN5	MRN27	MRN31	Joarimin Creek
MRN2		MQ2			
MRN3		MRN7			Marulan Creek
MRN4		MRN25			
MRN6		MRN26			
MRN8		MRN28			
MRN9		MRN33			
MRN10		MRN35			
MRN11		MRN 36			
MRN12		MRN37			
MRN13		MRN48			
MRN14		MRN52			
MRN15					
MRN16					
MRN17					
MRN18					
MRN19					
MRN20					
MRN21					
MRN22					
MRN23					
MRN24					
MRN30					
MRN34					
MRN38					
MRN39					
MRN40					
MRN41					
MRN42					
MRN43					
MRN44					
MRN45					
MRN46					
MRN49					
MRN50					
MRN51					
MQ1					
IF1					
IF2					
IF3					
40	**1**	**11**	**1**	**1**	**3 areas**

7.8 PREPARATION OF AN ABORIGINAL CULTURAL HERITAGE MANAGEMENT PLAN

There are currently many sites within the project area for which Section 90 consent will not be required or which may not be impacted for a period of more than two years (the life of a Section 90 consent) after construction/operations commence. These sites should be subject to an Aboriginal

Cultural Heritage Management Plan (ACHMP) to ensure their ongoing management/protection during quarrying operations or until they are salvaged. An ACHMP will also address the possibility of new sites that could be located during the quarrying process or during salvage operations and address the detail of the salvage operations. The ACHMP should be prepared in consultation with the relevant Aboriginal community groups and DEC. The ACHMP has two principal functions:

- to provide an overview of which sites/areas are subject to a Section 90 consent or Section 87 permit, and the status and conditions associated with each of these consents/permits; and

- to provide guidance to quarry personnel about the day to day management of cultural heritage sites/values within the project area, both for known sites and sites that may be encountered during the course of quarrying operations.

The ACHMP will address the following issues:

- *in situ* management of sites that will not be impacted by quarrying operations including sites within the Cultural Heritage Management Area, and the remainder of the project area outside the area of proposed impact;

- *in situ* management of sites/areas until they are subject to Section 90 consent/Section 87 permit;

- placement of artefacts collected/salvaged under consent;

- timing of Section 90 consent applications and compliance during the implementation of Section 90 consent conditions;

- general land management issues to protect cultural heritage sites/values;

- participation in decision making by the Aboriginal community; and

- access and induction issues for the Aboriginal community wishing to visit areas set aside for site conservation.

8.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- the legal requirements imposed by Section 90 of the *National Parks and Wildlife Act* 1974 which states that it is an offence to disturb, deface or cause or permit the destruction of objects or an Aboriginal place without the written consent of the DEC;

- the results of a search of the DEC Site Register and archaeological literature relating to the general locality of the proposed development;

- the requirements of the Mulwaree LEP;

- the results of the surface surveys;

- an evaluation of the impacts of the project on the project area;

- the assessment of the Aboriginal and archaeological significance of the project area and the sites it contains and can be predicted to contain; and

- consultation with the relevant Aboriginal groups regarding management options and recommendations during the assessment process and comments received on the draft report.

With these considerations in mind, if the proposed Lynwood quarry is to proceed, Readymix must undertake the following measures:

- the area containing sites MRN8 to 14 and MRN21 and 22 will be conserved as a Cultural Heritage Management Area. This area will be fenced, sign-posted and stock excluded. The management of the sites and areas predicted to have sites within the Cultural Heritage Management Area will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC;

- the area containing sites MRN20 to 23 will be conserved within an area with an appropriate buffer zone between the sites and the Excess Product Emplacement Area to the north and the proposed power easement to the south. The area will be fenced, sign-posted and stock excluded. The management of the sites will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC;

- the remaining sites outside the development impact area: MRN6, MRN15 to MRN19, MRN24, MRN30, MRN34, MRN38 to MRN46, MRN50, MRN51, MQ1, IF1, IF2 and IF3 and the majority of their environs are also in areas where there is no requirement for impact by the development. Thus, the known sites and those areas not to be directly or indirectly impacted by the quarry or its infrastructure should be managed to conserve their cultural heritage sites/values. The *in situ* management of these sites and areas predicted to have sites (aside from those areas where infrastructure is required) will be detailed in an Aboriginal Cultural Heritage Management Plan to be prepared in consultation with the relevant Aboriginal community groups and DEC;

- application should be made to the Director-General of the DEC for a Section 90 consent (without salvage) for site MRN32;

- application should be made to the Director-General of DEC for a Section 90 consent with salvage (surface collection only) for MRN5 (MQ 2), MRN7, MRN25, MRN26, MRN33, MRN35, MRN36, MRN37, MRN48 and MRN52;

- application should be made to the Director-General of DEC for a Section 90 consent with subsurface salvage for site MRN27. The details of the salvage operation to be determined in consultation with the relevant Aboriginal community groups and DEC;

- application should be made to the Director-General of DEC for a Section 90 consent with salvage (scarred tree removal) for MRN31. The details of the salvage operation to be determined in consultation with the relevant Aboriginal community groups and DEC;

- application should be made to the Director-General of DEC for a Section 87 Preliminary Research Permit to allow Aboriginal monitoring of initial ground disturbance works in the areas of Joarimin Creek and Marulan Creek to be crossed by the access road. The details of the monitoring program to be determined in consultation with the relevant Aboriginal community groups and DEC;

- a "care" agreement be organised with DEC so that GTCAC can retain a selection of artefacts for cultural and training purposes;

- permission be obtained from DEC for the remainder of the collected and salvaged artefacts to be placed at a location (agreed to by the PLALC, GTCAC and DEC) within the Cultural Heritage Management Area; and

- an Aboriginal Cultural Heritage Management Plan is to be prepared to ensure the ongoing management/protection of Aboriginal sites/values within the project area during the life of the quarry.

Figure 8.1 indicates the locations of the sites, the area proposed for a Cultural Heritage Management Area and the management recommendations for each site.

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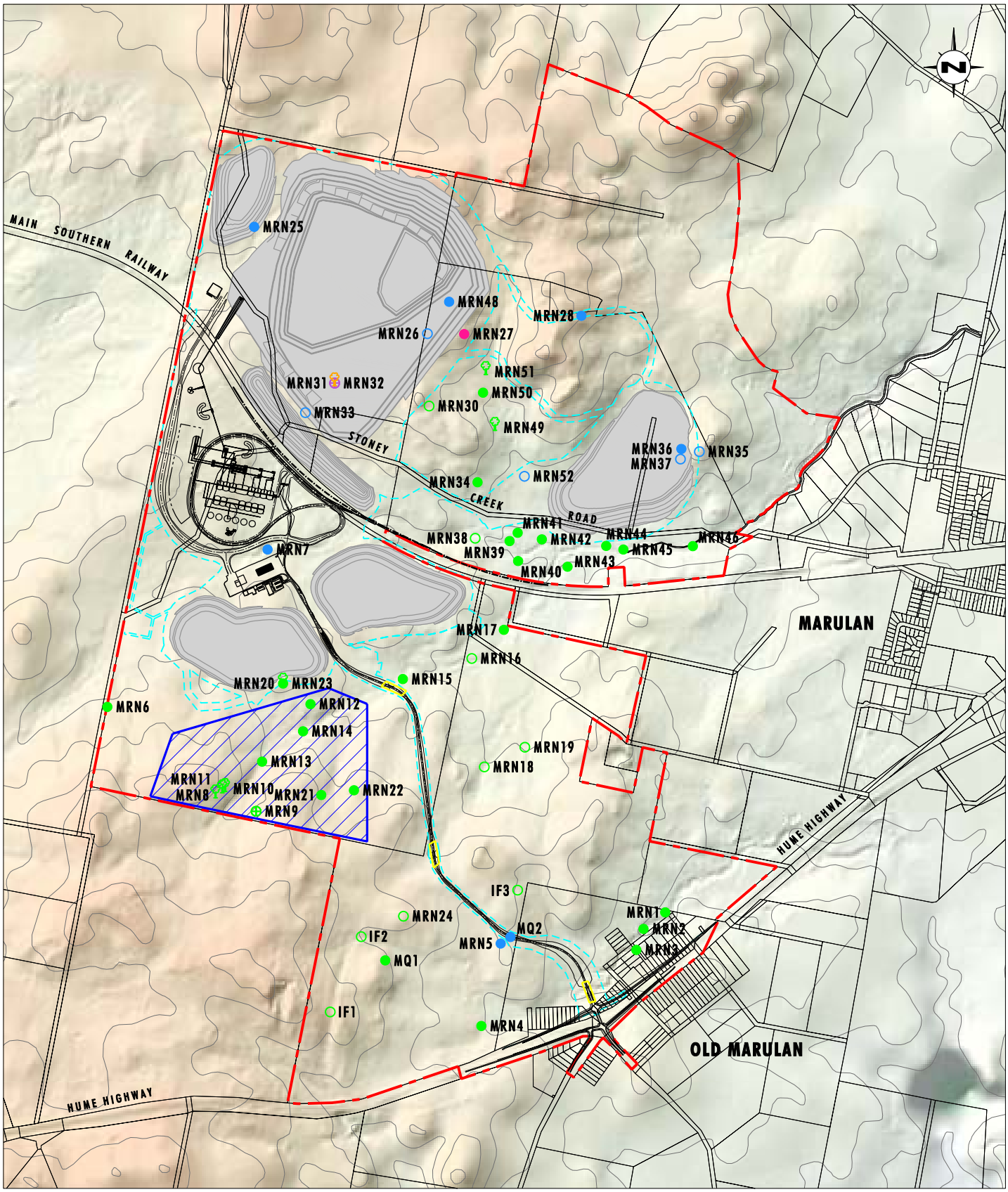
Environmental Consultants



Base Source: LPI 2004, Readymix Holdings Pty Ltd

0 0.5 1 1.25km

Legend

- Project Area
- Cultural Heritage Management Zone
- Approximate Disturbance Footprint
- Artefact Scatter
- Isolated Find
- Stone Arrangement
- Scarred Tree

Management Recommendations

- Managed In-situ
- Section 90 Consent with Collection
- Section 90 Consent with Subsurface Salvage
- Section 90 Consent for Scarred Tree Removal
- Section 90 Consent without Salvage
- Section 87 Permit for Monitoring of Access Track Construction

FIGURE 8.1

Management Recommendations for the Project Area

File Name (A4): R06_V1/1829_133.dgn

9.0 REFERENCES

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APPENDIX A

National Native Title Tribunal Search

NATIONAL NATIVE TITLE TRIBUNAL

Level 25
25 Bligh Street
SYDNEY NSW 2000
AUSTRALIA

GPO Box 9973, SYDNEY NSW 2001
Telephone: (02) 9235 6300
Facsimile: (02) 9233 5613
Website: www.nntt.gov.au

Our Ref: 816/04af
Your Ref: 1829

Graham Houghton
Umwelt Environmental Consultants
PO Box 838
Toronto NSW 2283

RECEIVED
21 JUN 2004

17 June 2004

Dear Mr Houghton

Native title search results of Greater Argyle Local Government Area

Thank you for your letter of 17 June 2004.

My search on 17 June 2004 found:

Register Type	NNTT Reference Numbers
National Native Title Register	Nil.
Register of Native Title Claims	NC97/7, NC00/1.
Unregistered Claimant applications	Nil.
Register of Indigenous Land Use Agreements	Nil.

I have included more detailed information and a fact sheet to help you understand the search result.

Please note, recent applications lodged or amended in the Federal Court may not have been sent to us.

We will send you an invoice for $30.45.

If you need more information please call me on (02) 9235 6300.

Yours sincerely

Amy Fitzell
Administration Assistant

816/04AF

Umwelt (Australia) Pty Limited
2/20 The Boulevarde
PO Box 838
Toronto NSW 2283

Umwelt
Environmental Consultants

Ph. 02 4950 5322
Fax. 02 4950 5737

ABN 18 059 519 041

COPY

FACSIMILE TRANSMISSION

DATE: 17 June 2004

NO OF PAGES (including cover sheet):3

TIME:

ATTENTION:M Mann

COMPANY: Dept of Environment & Conservation

FAX NO:

02 9233 5613

Dear Michelle

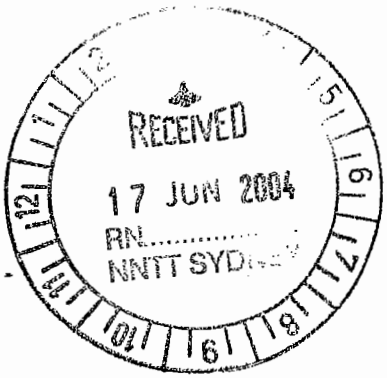
Re: NATIVE TITLE SEARCH

Following the Native Title search request of November last year for the local government area of MULWAREE, I need a new search based on the newly amalgamated local government area of GREATER ARGYLE.

Thank you

Graham Houghton

Graham Houghton



Date 17.6.04
Action Officer A Tighe
Attached To File
Document No 141172
Copy on

1829-Mann-17/06/04-fax

NATIONAL NATIVE TITLE TRIBUNAL

Search request form

Your details:

Name: GRAHAM HOUGHTON (Mr) Ms Mrs (please circle)

Company/organisation: UMWELT

Position: SENIOR ARCHAEOLOGIST Your reference: 1829

Address: PO BOX 838

TORONTO NSW Postcode: 2283

Tel: (02) 4950 5322 Fax: (02) 4950 5737 Email: 8

How long will the search take?
A search of the Tribunal Registers is a search to ascertain whether there is a native title determination, claim or land use agreement over a specified area. A search of the Registers may take between three and five working days. We will contact you if a result cannot be provided within this timeframe.

How much does a search cost?
We are unable to give estimates of costs for individual searches. A guide is $22.00 for a search where you provide us with the Tribunal/Federal Court file number or name. Charges are applied at a rate of $21.45 for the first 15 minutes of searching and $7.15 each 5 minutes thereafter, plus postage/courier costs. Photocopy charges are 50c per page. In some complex cases, specialist geospatial skills may be required to address the relationship between native title boundaries and the search area. The average cost of geospatial analysis is $79.20 per hour. This charge will be included in the total cost of the search. All charges include GST.

Please do not send any monies or cheques before the search is completed. The Tribunal will send you an invoice.

To help determine whether charges apply, tick the appropriate box if you are:

- ☐ a party to a native title application (or their legal representative) – please provide the Federal Court or Tribunal file number or name
- ☐ an interest holder in the area of the search and intend to become a party to an application in that area
- ☐ a party to native title negotiations related to indigenous land use agreements (ILUAs), objection to ILUA or statutory access (or their legal representative)
- ☐ an officer of a State or Territory government organisation
- ☐ unable to pay due to financial hardship (The Tribunal will require some evidence of your financial position, for example, a Commonwealth health care or concession card.)

How would you like to receive the search results and invoice (if applicable)?

- ☑ Post
- ☑ Fax — large attachments, such as maps, can not be faxed with search results
- ☐ Email — attachments such as maps (if any) can not be emailed with search results
- ☐ Courier

go to page 2

Request details:

Date of request: 16 June '04 **When are the results required by?** ASAP

Is there a reason this request should receive priority? (For example: Court order, mediation etc):

.....

We will contact you if this timeframe cannot be met.

Federal Court/Tribunal file number/application name (If known): .....

Details of area to be searched

Please complete at least one of the following description fields ***or*** **provide a clear map of the area** including landmarks:

Mining Tenement or block/sub block description:

.....

OR **Land parcel (Northern Territory):**

Lot: .....Town: .....

Section: .....Hundred:.....

Northern Territory Portion:.....

Pastoral Lease number or name:.....

OR **Land parcel (other):**

Lot number(s): .....

Property name: .....

Tenure (for example, agricultural lease): .....

Shire(s): .....

Parish: .....

County: .....

Town: .....

State/Territory: .....

Other details (additional information may be attached):

GREATER ARGYLE - NEW LOCAL GOUERNMENT AREA FORMERLY MULWAREE LGA.

Fax, mail or email the completed form to the:

National Native Title Tribunal
GPO Box 9973 in your capital city
Fax: WA: (08) 9221 7158
NSW: (02) 9233 5613
Vic/Tas:(03) 9606 0680
NT: (08) 8981 7982

Freecall: 1800 640 501
Email: info@nntt.gov.au

Brisbane: (07) 3226 8235
Cairns: (07) 4051 3660
SA: (08) 8224 0939

Privacy notice

We are authorised under the *Native Title Act 1993* (Cth) to collect this information. We will use the information you provide to process your register search request. We do not disclose the information you give us to others. If there is a request for your personal information under another law of the Commonwealth or a state, we may need to disclose your information to a court or to another Commonwealth agency or other persons as required or authorised by law.

Tribunal use only:

☐ fee exemption ☐ request completed ☐ assistance recorded

☐ geospatial request — client contacted on (date): ☐ invoice generated on (date):

searchrequestform191203

NATIONAL NATIVE TITLE TRIBUNAL

Claimant Application Summary

Application numbers	Federal Court number: N6001/00 NNTT number: NC00/1
Application name	Donald Thomas Bell on Behalf of the Ngunawal People (Ngunawal People (NSW))
Name of body where application filed	Federal Court of Australia
Date application filed	02/03/2000
Current stage(s)	Notification Complete, In Mediation
Applicants	Mr Donald Thomas Bell
Address for service	Dean Bell 11 Berger Street SOUTH WINDSOR NSW 2756
Persons claiming to hold native title	The claim is brought on behalf of the people listed below and their children:, Donald Thomas Bell, Erin Bell, Dean Bell, Merekai Bell, Danicka Bell, Tiara Biggs, Raymond Brydon, Caitlin Brydon, Darrell Brydon, Robert Brydon, Emily Brydon, Leesa Brydon, Jacob Brydon, Jordanne Brydon, Jeremy Brydon, Joshua Brydon, Samantha Brydon, Dawn Brydon, Deborah Brydon, Gavin Brydon, Angela Brydon, Brett Brydon, Andrew Brydon, Amanda Brydon, Malcolm Brydon, Dorothy Carroll, Darroll Charles Tighe, Phyllis Gertrude Carroll, Nicole Hall, Mitchell Hall, Barry Honeysett, Pamela Honeysett, Kaziah Honeysett, Curtis Honeysett, Darryl Honeysett, Lucille Honeysett, Dean Honeysett, Donna Honeysett, Dwayne Honeysett, James Honeysett, Angela Honeysett, Gordon Honeysett, Colleen Honeysett, Lyle Honeysett, Isobella Honeysett, Hilary Honeysett, Annika Honeysett, Teresa Honeysett, Shaun Honeysett, Jessica Honeysett, Maxine Honeysett, Wayne Honeysett, Letisha Honeysett, Shiana Honeysett, Cameron Honeysett, Rhiana Honeysett, Craig Honeysett, Damien James Denny, Tyronne James Bell, Rebecca Jane Denny, Akina Jasmine Button Young, Phillip John Young, Ruth Josephine Bell, Tegan Marree Denny, Karen Rebecca Denny, Wayne Taylor, Nicholas Taylor, Jasmin Taylor, Nicollette Taylor, Lucianna Taylor, Pamela Tighe, Darroll Tighe Jnr, Aaron Tighe, Alex Tighe, Evelyn Tighe, Craig Vincent Honeysett, Pamela Young
Native title rights and interests claimed	The native title rights and interests claimed are the rights to the possession, occupation, use and enjoyment as against the whole world (subject to any native title rights and interests which may be shared with any others who establish that they are native title holders) of the area, and in particular comprise: a) rights to possess, occupy, use and enjoy the area; b) the right to make decisions about the use and enjoyment of the area; c) the right of access to the area; d) the right to control the access of others to the area; e) the right to use and enjoy resources of the area; f) the right to control the use and enjoyment of others of resources of the area; g) the right to trade in resources of the area; i) the right to maintain and protect places of importance under traditional laws, customs and practices in the area; and j) the right to maintain, protect and prevent the misuse of cultural knowledge of the common law holders associated with the area. Subject to: 1. To the extent that any minerals, petroleum or gas within the area of the claim are

	wholly owned by the Crown in the right of the Commonwealth or the state of New South Wales, they are not claimed by the applicants. 2. The claim area does not include any offshore place. 3. The applicants do not make a claim to native title rights and interests which confer possession, occupation, use and enjoyment to the exclusion of all others in respect of any areas in relation to which a previous non-exclusive possession act, as defined in s.23F of the NTA, was done in relation to an area, and, either the act was an act attributable to the Commonwealth, or the act was attributable to the state of New South Wales and a law of that State has made provision as mentioned in s.231 in relation to the act; 4. Paragraph 3 above is subject to such of the provisions of s.47, s47A and s.47B of the Act as apply to any part of the area contained within this application, particulars o which will be provided prior to the hearing. 5. The said native title rights and interests are not claimed to the exclusion of any other rights or interests validly created by or pursuant to the common law, a law of the State or a law of the Commonwealth.
Area	**Jurisdiction:** New South Wales **Local government region(s):** Boorowa Shire Council, Cooma-Monaro Shire Council, Cootamundra Shire Council, Upper Lachlan Council, Goulburn City Council, Gundagai Shire Council, Gunning Shire Council, Harden Shire Council, Mulwaree Shire Council, Queanbeyan City Council, Snowy River Shire Council, Tallaganda Shire Council, Yarrowlumla Shire Council, Yass Shire Council **ATSIC region(s):** Binaal Billa Regional Council, Queanbeyan Regional Council **Representative A/TSI body(s):** NSW Native Title Services Ltd **Land/water and/or sea:** Land/Water **Area covered by the claim (as detailed in the application):** EXTERNAL BOUNDARY Commencing at Longitude 149.371904 east, Latitude 36.182838 south being a point approximately 3km north west of Umaralla Mountain, the application boundary traverses generally north westerly, crossing the Monard Highway and the Reynolds Barkersdale Creek until Longitude 148.726600 east, Latitude 35.783503 south, being a point approximately 6km to the east of the southern end of the Tantangara Reservoir. Points 1 to 22 reference this section of the boundary as listed on Attachment "B" - Geographic Coordinates. From here the boundary traverses generally northerly through the Kosciusco National Park until Longitude 148.694374 east, Latitude 35.234315 south, then traverses generally north westerly until Longitude 148.543060 east, Latitude 35.090910 south, being a point south of the Bungongo State Forest. The boundary then traverses generally westerly, south of Paddy's Rock Hill, across the Serpentine Ridge and the Tumut River until Longitude 148.161500 east, Latitude 35.039421 south. From this point the boundary traverses generally north westerly until Longitude 148.144685 east, Latitude 35.030631 south being a point approximately located on the Murrumbidgee River. From here the boundary traverses northerly over the Murrumbidgee River again, until Latitude 148.132133 east, Longitude 34.977345 south, being a point approximately on the northern side of the Hume Highway. The boundary then traverses generally north easterly to the east of Nimby until Longitude 148.376766 east, Latitude 34.548290 south, being a point approximately on the eastern side of the town of Harden. Points 23 - 50 reference this section of the boundary as listed on Attachment "B" - Geographic Coordinates. From here the boundary traverses generally east south easterly crossing the Galong Boorowa Railway, then through the Midgee Range until Longitude 149.145529 east, Latitude 34.667445 south. From here the boundary traverses generally north easterly crossing the Lachlan River until Longitude 149.374453 east, Latitude 34.530503 south. From this point the boundary traverses generally south easterly, north of Lake Sooley and across the Oberon Goulbourn Road until Longitude 149.742200 east, Latitude 34.737239 south, being a point approximately on the north eastern outskirts of Goulbourn. From here the boundary traverses generally southerly, approximately 2.75km to the west of Blacks Peak until Longitude 149.806458 east, Latitude 35.505121 south, approximately 7km south of Braidwood. From here the boundary traverses generally south westerly through the Bedland, Tallaganda and Badja State Forests back to the commencement point. Points 51-116 reference this section of the boundary as listed on Attachment "B" - Geographic

Coordinates.

Geographic coordinates are referenced to Australian Geodetic Datum (AGD) 84, in decimal degrees and area based on the spatial reference data acquired from the various custodians at the time.

Use of Coordinates: Where coordinates are used within the description to represent cadastral or topographic boundaries or the intersection with such, they are intended as a guide only. As an outcome to the custodians of cadastral and topographic data continuously recalculation of the geographic position of their data based on improved survey and data maintenance procedures, it is not possible to accurately define such a position other than by detailed ground survey.

INTERNAL BOUNDARIES

1. The application excludes the area covered by the Australian Capital Territory.
2. The applicants exclude from the claim any areas covered by valid acts on or before 23 December, 1996, comprising such of the following as are included as extinguishing acts within the Native Title Act 1993, as amended, or the Native Title (New South Wales) Act 1994, as amended, at the time of the Registrar's consideration:

i) Category "A" Past Acts, as defined in NTA s.228 and s.229;
ii) Category "A" Intermediate Period Acts in NTA s.232A and s.232B.

3. The applicants exclude from the claim any areas in relation to which a previous exclusive possession act, as defined in section 23B of the NTA, was done in relation to an area, and, either the act was an act attributable to the Commonwealth or the state of New South Wales and a law of that State has made provision as mentioned in section 23E in relation to the act.

4. The applicants exclude from the claim areas in relation to which native title rights and interests have otherwise been extinguished, including areas subject to:-

a) an act authorised by legislation which demonstrates the exercise of permanent adverse dominion in relation to native title; or
b) actual use made by the holder of a tenure other than native title which is permanently inconsistent with the continued existence of native title.

To avoid any uncertainty, the applicants exclude from the claim area any of the areas contained within the following descriptions or tenures which have been validly granted, set out in Schedule B1.

== SCHEDULE B1==

B1.1) Any former or current unqualified grant of an estate in fee simple and all other freehold land.
B1.2) A permanent public work and "the land or waters on which a public work is constructed, established or situated" within the meaning given to that phrase by the Native Title Act 1993 (Cth) s.251D.
B1.3) An existing public road or street used by the public, or dedicated road.

5. Paragraphs 2 to 4 above are subject to such of the provisions of sections 47, 47A and 47B of the Act as apply to any part of the area contained within this application, particulars of which will be provided prior to the hearing but which include such areas as may be listed in Schedule L.

Registration information	*Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application.* **Date claim entered on Register of Native Title Claims:** 04/07/2000 **Registration test status:** Accepted for registration **Registration history:** Registered from 04/07/2000.

Attachments	1. Map of Claim Area showing External Boundary, Attachment A of the Application, 1 page - A0, Attached 02/03/2000. 2. Table of Geographical Co-ordintates of the External Boundary, Attachment B of the Application, 4 pages - A4, Attached 02/03/2000. NNTT map attached.

NNTT contact details	**Case manager:**	Nicole Maher
	Address:	National Native Title Tribunal Level 25 25 Bligh Street SYDNEY NSW 2000 GPO Box 9973 SYDNEY NSW 2001
	Phone:	(02) 9235 6300 Freecall 1800 640 501
	Fax:	(02) 9233 5613
	Web page:	www.nntt.gov.au

NATIONAL NATIVE TITLE TRIBUNAL

Application Information and Extract from the Register of Native Title Claims

Application Information

Application numbers: Federal Court number: N6001/2000
NNTT number: NC00/1

Application name: Donald Thomas Bell on Behalf of the Ngunawal People (Ngunawal People (NSW))

Registration history: Registered from 04/07/2000.

Register Extract (pursuant to s.186 of the *Native Title Act 1993*)

Application filed with: Federal Court of Australia

Date application filed: 02/03/2000

Date claim entered on Register: 04/07/2000

Applicants: Mr Donald Thomas Bell

Address for service: Dean Bell
11 Berger Street
SOUTH WINDSOR NSW 2756

Area covered by the claim:

EXTERNAL BOUNDARY

Commencing at Longitude 149.371904 east, Latitude 36.182838 south being a point approximately 3km north west of Umaralla Mountain, the application boundary traverses generally north westerly, crossing the Monard Highway and the Reynolds Barkersdale Creek until Longitude 148.726600 east, Latitude 35.783503 south, being a point approximately 6km to the east of the southern end of the Tantangara Reservoir. Points 1 to 22 reference this section of the boundary as listed on Attachment "B" - Geographic Coordinates.

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INTERNAL BOUNDARIES

1. The application excludes the area covered by the Australian Capital Territory.
2. The applicants exclude from the claim any areas covered by valid acts on or before 23 December, 1996, comprising such of the following as are included as extinguishing acts within the Native Title Act 1993, as amended, or the Native Title (New South Wales) Act 1994, as amended, at the time of the Registrar's consideration:

i) Category "A" Past Acts, as defined in NTA s.228 and s.229;
ii) Category "A" Intermediate Period Acts in NTA s.232A and s.232B.

3. The applicants exclude from the claim any areas in relation to which a previous exclusive possession act, as defined in section 23B of the NTA, was done in relation to an area, and, either the act was an act attributable to the Commonwealth or the state of New South Wales and a law of that State has made provision as mentioned in section 23E in relation to the act.

4. The applicants exclude from the claim areas in relation to which native title rights and interests have otherwise been extinguished, including areas subject to:-

a) an act authorised by legislation which demonstrates the exercise of permanent adverse dominion in relation to native title; or
b) actual use made by the holder of a tenure other than native title which is permanently inconsistent with the continued existence of native title.

To avoid any uncertainty, the applicants exclude from the claim area any of the areas contained within the following descriptions or tenures which have been validly granted, set out in Schedule B1.

== SCHEDULE B1==

B1.1) Any former or current unqualified grant of an estate in fee simple and all other freehold land.
B1.2) A permanent public work and "the land or waters on which a public work is constructed, established or situated" within the meaning given to that phrase by the Native Title Act 1993 (Cth) s.251D.
B1.3) An existing public road or street used by the public, or dedicated road.

5. Paragraphs 2 to 4 above are subject to such of the provisions of sections 47, 47A and 47B of the Act as apply to any part of the area contained within this application, particulars of which will be provided prior to the hearing but which include such areas as may be listed in Schedule L.

Persons claiming to hold native title:

The claim is brought on behalf of the people listed below and their children:, Donald Thomas Bell, Erin Bell, Dean Bell, Merekai Bell, Danicka Bell, Tiara Biggs, Raymond Brydon, Caitlin Brydon, Darrell Brydon, Robert Brydon, Emily Brydon, Leesa Brydon, Jacob Brydon, Jordanne Brydon, Jeremy Brydon, Joshua Brydon, Samantha Brydon, Dawn Brydon, Deborah Brydon, Gavin Brydon, Angela Brydon, Brett Brydon, Andrew Brydon, Amanda Brydon, Malcolm Brydon, Dorothy Carroll, Darroll Charles Tighe, Phyllis Gertrude Carroll, Nicole Hall, Mitchell Hall, Barry Honeysett, Pamela Honeysett, Kaziah Honeysett, Curtis Honeysett, Darryl Honeysett, Lucille Honeysett, Dean Honeysett, Donna Honeysett, Dwayne Honeysett, James Honeysett, Angela Honeysett, Gordon Honeysett, Colleen Honeysett, Lyle Honeysett, Isobella Honeysett, Hilary Honeysett, Annika Honeysett, Teresa Honeysett, Shaun Honeysett, Jessica Honeysett, Maxine Honeysett, Wayne Honeysett, Letisha Honeysett, Shiana Honeysett, Cameron Honeysett, Rhiana Honeysett, Craig Honeysett, Damien James Denny, Tyronne James Bell, Rebecca Jane Denny, Akina Jasmine Button Young, Phillip John Young, Ruth Josephine Bell, Tegan Marree Denny, Karen Rebecca Denny, Wayne Taylor, Nicholas Taylor, Jasmin Taylor, Nicollette Taylor, Lucianna Taylor, Pamela Tighe, Darroll Tighe Jnr, Aaron Tighe, Alex Tighe, Evelyn Tighe, Craig Vincent Honeysett, Pamela Young

Registered native title rights and interests:

The following Native Title Rights & Interests were entered on the Register on 04/07/2000:
The native title rights and interests claimed are the rights to the possession, occupation, use and enjoyment as against the whole world (subject to any native title rights and interests which may be shared with any others who establish that they are native title holders) of the area, and in particular comprise:
a) rights to possess, occupy, use and enjoy the area;
b) the right to make decisions about the use and enjoyment of the area;
c) the right of access to the area;
d) the right to control the access of others to the area;
e) the right to use and enjoy resources of the area;
f) the right to control the use and enjoyment of others of resources of the area;
g) the right to trade in resources of the area;

i) the right to maintain and protect places of importance under traditional laws, customs and practices in the area; and
j) the right to maintain, protect and prevent the misuse of cultural knowledge of the common law holders associated with the area.
Subject to:

1. To the extent that any minerals, petroleum or gas within the area of the claim are wholly owned by the Crown in the right of the Commonwealth or the state of New South Wales, they are not claimed by the applicants.

2. The claim area does not include any offshore place.

3. The applicants do not make a claim to native title rights and interests which confer possession, occupation, use and enjoyment to the exclusion of all others in respect of any areas in relation to which a previous non-exclusive possession act, as defined in s.23F of the NTA, was done in relation to an area, and, either the act was an act attributable to the Commonwealth, or the act was attributable to the state of New South Wales and a law of that State has made provision as mentioned in s.231 in relation to the act;

4. Paragraph 3 above is subject to such of the provisions of s.47, s47A and s.47B of the Act as apply to any part of the area contained within this application, particulars of which will be provided prior to the hearing.

5. The said native title rights and interests are not claimed to the exclusion of any other rights or interests validly created by or pursuant to the common law, a law of the State or a law of the Commonwealth.

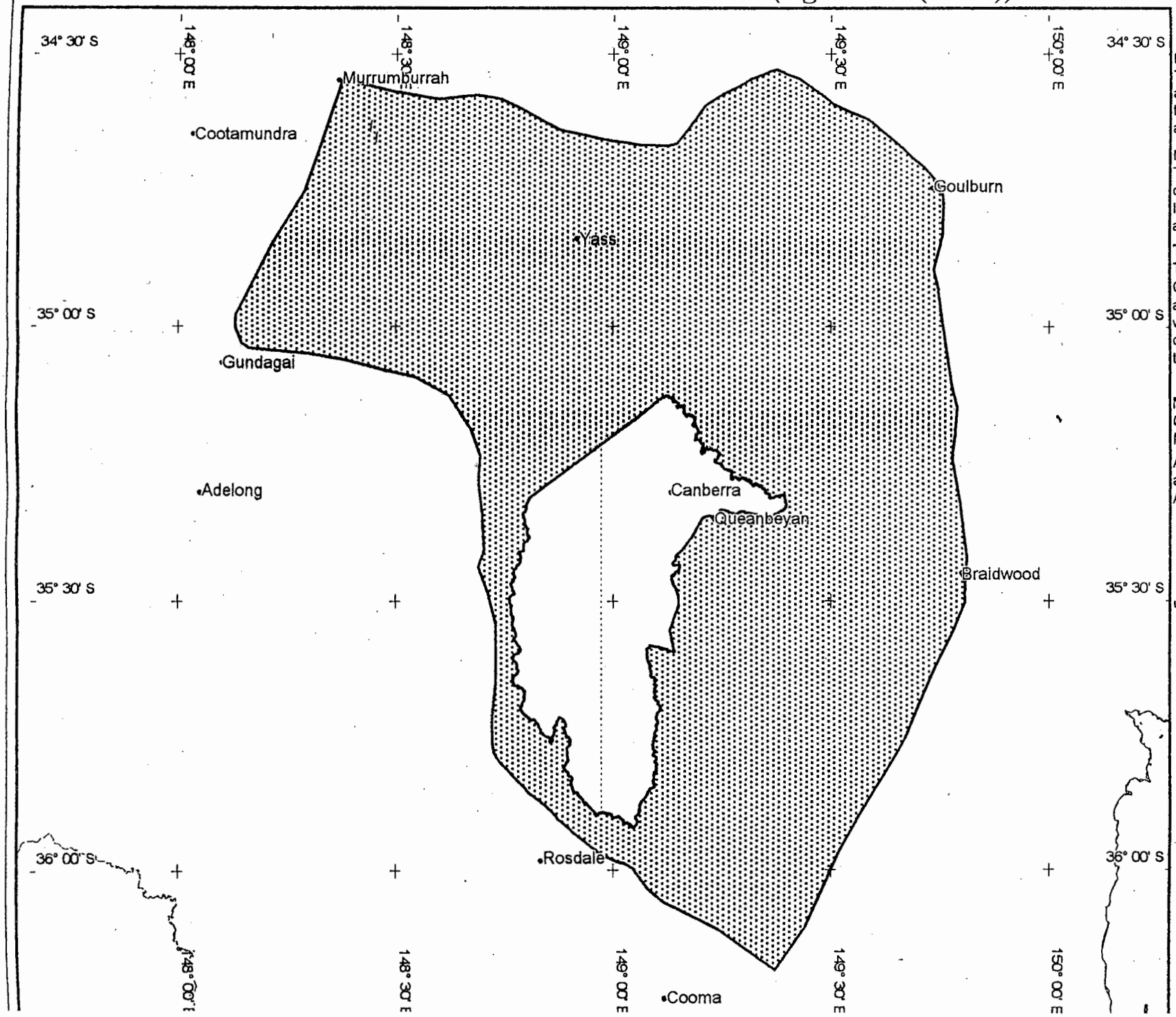
Register attachments:

1. Table of Geographical Co-ordintates of the External Boundary, Attachment B of the Application, 4 pages - A4, Attached 02/03/2000.

There is an AO size map of the application area which is too large to be included. This map can be viewed at the Sydney Registry of the National Native Title Tribunal.

Note: The Register may, in accordance with s.188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.

NATIVE TITLE CLAIMANT APPLICATION: NC00/001 (Ngunawal (NSW)) N6001/2000



Area of Application (geographic extent) = 14,437 sq km

NOTE: 1
To determine areas subject to claim, and rights and interests sought within the external boundary, reference to the application description is necessary.

NOTE 2
This map does not form part of the Register of Native Title Claims.
It is provided as general information only and to assist in locating the area involved.

The Registrar, the National Native Title Tribunal and its staff and officers and the Commonwealth, accept no liability for, and give no undertakings, guarantees or warranties concerning the accuracy, completeness or fitness for purpose of the map.

Map created by:
Geospatial Analysis & Mapping Branch,
National Native Title Tribunal (08/08/2000)

Application boundary data compiled by NNTT and referenced to spatial data sourced from AUSLIG.

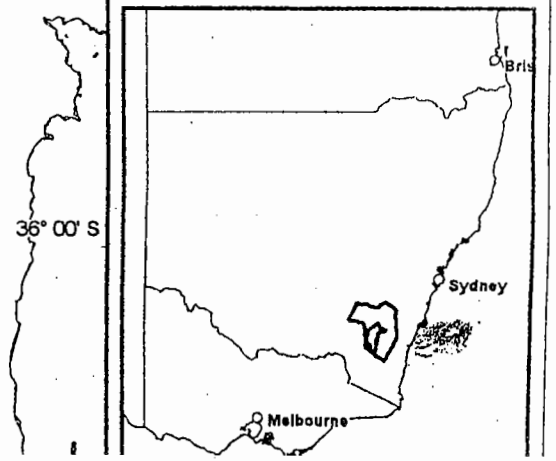
NORTH

0 50
KILOMETRES

Latitude and Longitude based on Australian Geodetic Datum 1984

P:\Geo_info\projects\assistance to case managers \nsw\nc00_001\nc00_001_A4l.wor

Location of NC00/001 within New South Wales



NATIONAL NATIVE TITLE TRIBUNAL

Searching the NNTT Registers for New South Wales

Search service

The National Native Title Tribunal will search its public registers for you. A search may assist you in finding out whether any native title applications, determinations or agreements exist over a particular area of land or water.

In New South Wales native title cannot exist on privately owned land including family homes or farms.

What information can a search provide?
Because the Tribunal cannot search individual parcels of land in New South Wales we search by local government area.

A search can confirm whether any applications, agreements or determinations are registered in a local government area. Relevant information, including register extracts and application summaries, will be provided.

Most native title applications do not identify each parcel of land claimed. They have an external boundary and then identify the areas *not* claimed within the boundary by reference to types of land tenure eg; freehold, agricultural leasehold, public works.

What if the search shows no current applications?
If there is no application covering the local government area this only indicates that at the time of the search either the Federal Court had not received any claims in relation to the local government area or the Tribunal has not yet been notified of any new native title applications.

It does not mean that native title does not exist in the area.

Native title may exist over an area of land or waters whether or not a claim for native title has been made.

What we search

National Native Title Register
The National Native Title Register contains determinations of native title by the High Court, Federal Court and other courts.

Register of Native Title Claims
The Register of Native Title Claims contains applications for native title that have passed a registration test.

Registered claims attract rights, including the right to negotiate about some types of proposed developments.

Register of Indigenous Land Use Agreements
The Register of Indigenous Land Use Agreements contains agreements made with people who hold or assert native title in an area.

The register identifies development activities that have been agreed by the parties.

Application summaries
An application summary contains a description of the location, content and status of a claimant application.

This information *may* be different to the information on the Register of Native Title Claims, eg; because an amendment has not yet been tested.

How do you request a search?
A search request form is available on the Tribunal's website at: www.nntt.gov.au. This form says how much searches cost.

Mail, fax or email your request to the Tribunal, identifying the local government area/s you want searched.

Email: sydney_search.nntt.gov.au
Fax: (02) 9233 5613
Address: GPO Box 9973, Sydney NSW 2001
Phone: (02) 9235 6300

NATIONAL NATIVE TITLE TRIBUNAL

Claimant Application Summary

Application numbers	Federal Court number: NG6060/98 NNTT number: NC97/7
Application name	Gundungurra Tribal Council Aboriginal Corporation #6
Name of body where application lodged	National Native Title Tribunal
Date application lodged	29/04/1997
Current stage(s)	Notification Complete, In Mediation
Applicants	Ms Elsie Stockwell, Ms Pamela Stockwell
Address for service	Mr Eduard Neumann Craddock Murray and Neumann Level 2 255 Castlereagh Street SYDNEY NSW 2000 Phone: 02 9283 4755 Fax: 02 9283 4180
Persons claiming to hold native title	The members of the Gundungurra Tribal Council Aboriginal Corporation
Native title rights and interests claimed	1. Subject to (2) - (5) below, the full and free enjoyment of the following native title rights and interests area are claimed in relation to the land and waters the subject of the application: a. A right to possess, occupy, use and enjoy the claim area; b. A right to make decisions about the use and enjoyment of the claim area; c. A right of access to the claimed area; d. A right to control the access of others to the claimed area; e. The right to control the use and enjoyment of others or resources of the claimed area; f. The right to trade in resources of the claimed area; g. The right to receive a portion of any resources taken by others from the claimed area; h. The right to maintain, protect and prevent the misuse of cultural knowledge of the common law holders associated with the claimed area. 2. With respect of those parts of the area the subject of the application which are, or have been, the subject of a previous non-exclusive possession act within the meaning of s 23F of the Native Title Act 1993, the native title rights and interests area set out in (1) are claimed subject to the rights and interests created in the 'non-exclusive possession act' which are not inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause. 3. With respect to those parts of the area the subject of the application which are, or have been, the subject of:

	a. a category B intermediate period act within the meaning of s232C of the Native Title Act 1993; b. a category C intermediate period act within the meaning of s232D of the Native Title Act 1993; c. a category D intermediate period act within the meaning of s232E of the Native Title Act 1993; the native title rights and interests claimed are those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause. 4. With respect to those parts of the area of the application which are, or have been, the subject of: a. a category B past act within the meaning of s230 of the Native Title Act 1993; b. a category C past act within the meaning of s231 of the Native Title Act 1993; c. a category D past act within the meaning of s232 of the Native Title Act 1993; the native title rights and interests claimed area those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any extinguishment or suspension of the native title rights and interests which those inconsistent rights and interests cause. 5. The native title rights and interests identified above do not extend to ownership of any minerals, petroleum or gas which are wholly owned by the Crown. 6. The native title rights and interests identified above do not include a claim for exclusive occupation and use of offshore areas as defined by s253 of the Native Title Act 1993.
Area	**Jurisdiction:** New South Wales **Location:** Land and waters in the area from the Blue Mountains south to Goulburn, following the Lachlan River west to Newbridge and then north to Mt Davidson. **Local government region(s):** Bathurst City Council, Blayney Shire Council, Blue Mountains City Council, Boorowa Shire Council, Camden Council, Campbelltown City Council, Cowra Shire Council, Upper Lachlan Council, Evans Shire Council, Goulburn City Council, Lithgow City Council, Gunning Shire Council, Liverpool City Council, Mulwaree Shire Council, Oberon Council, Penrith City Council, Tallaganda Shire Council, Wingecarribee Shire Council, Wollondilly Shire Council **ATSIC region(s):** Binaal Billa Regional Council, Sydney Regional Council, Queanbeyan Regional Council **Representative A/TSI body(s):** NSW Native Title Services Ltd **Land/water and/or sea:** Land/Water **Area covered by the claim (as detailed in the application):** (a) Commencing at 150.52997 east longitude and 34.591636 south latitude, approximately 15.5 kilometres east south east of Moss Vale, the application traverses clockwise starting in a south-westerly direction, passing through points 2 to 36,765 of the following geographic coordinates. They are in decimal degrees and referenced to Australian Geodetic Datum 1984 (AGD84). These coordinates are based on the position of spatial reference data sourced by Land Information Centre, Department of Information Management and Technology, New South Wales as of 18 May 1999. (b) Subject to clauses (d) and (e) the area covered by the application excludes any land or waters covered by:

	(i) a scheduled interest; (ii) freehold estate; (iii) a commercial lease that is neither an agricultural lease nor a pastoral lease; (iv) an exclusive agricultural lease or an exclusive pastoral lease; (v) residential lease; (vi) a community purposes lease; (vii) a lease dissected from a mining lease as referred to in s23B(2)(vii); (viii) any lease (other than a mining lease) that confers a right of exclusive use over particular land or waters; which was validly vested or granted on or before 23 December 1996. (c) Subject to clauses (d) and (e) the area covered by the application excludes any area covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996. (d) Where the act specified in (b) and (c) falls within the provisions of (i) s23B(9) - Exclusion of acts benefiting Aboriginal peoples or Torres Strait Islanders; (ii) s23B (9A) - Establishment of a national or state park; (iii) s23B (9B) - Acts where legislation provides for non-extinguishment; (iv) s23B (9C) - Exclusion of Crown to Crown grants; and (v) s23B (10) - Exclusion by regulation, the area covered by the act is not excluded from this application. (e) Where an act referred to in clauses (b) and (c) covers land or waters referred to in: s47 - Pastoral leases held by native title claimants; s47A - Reserves etc covered by claimant applications; and s47B - Vacant crown land covered by claimant applications, the area covered by the act is not excluded from the application. (f) Where an area is covered by a previous non-exclusive possession act (s 23F) the native title claim group does not claim possession, occupation, use and enjoyment to the exclusion of all others. (g) The area covered by the application excludes land where native title has been extinguished at common law. (h) The area covered by the application excludes areas covered by prior Gundungurra claims filed with the National Native Title Tribunal being NC96/7, NC96/27, NC96/30, NC96/36 and 97/4.

Registration information	*Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application.* **Date claim entered on Register of Native Title Claims:** 29/04/1997 **Registration test status:** Accepted for registration **Registration history:** Registered from 29/04/1997.

Attachments	1. Plan of Application Area, Attachment A of the Application, 1 page - A4, Attached 29/04/1997.

NNTT contact details		
	Case manager:	Nicole Maher
	Address:	National Native Title Tribunal Level 25 25 Bligh Street SYDNEY NSW 2000 GPO Box 9973 SYDNEY NSW 2001
	Phone:	(02) 9235 6300 Freecall 1800 640 501
	Fax:	(02) 9233 5613
	Web page:	www.nntt.gov.au

NATIONAL NATIVE TITLE TRIBUNAL

Application Information and Extract from the Register of Native Title Claims

Application Information

Application numbers:	Federal Court number: NNTT number:	NG6060/98 NC97/7
Application name:	Gundungurra #6	
Registration history:	Registered from 29/04/1997.	

Register Extract (pursuant to s.186 of the *Native Title Act 1993*)

Application lodged with: National Native Title Tribunal

Date application lodged: 29/04/1997

Date claim entered on Register: 29/04/1997

Applicants: Ms Elsie Stockwell, Ms Pamela Stockwell

Address for service:

Mr Eduard Neumann
Craddock Murray and Neumann
Level 2
255 Castlereagh Street
SYDNEY NSW 2000
Phone: 02 9283 4755
Fax: 02 9283 4180

Area covered by the claim:

(a) Commencing at 150.52997 east longitude and 34.591636 south latitude, approximately 15.5 kilometres east south east of Moss Vale, the application traverses clockwise starting in a south-westerly direction, passing through points 2 to 36,765 of the following geographic coordinates [forming part of Attachment "B" of the application]. They are in decimal degrees and referenced to Australian Geodetic Datum 1984 (AGD84). These coordinates are based on the position of spatial reference data sourced by Land

Information Centre, Department of Information Management and Technology, New South Wales as of 18 May 1999.

(b) Subject to clauses (d) and (e) the area covered by the application excludes any land or waters covered by:

(i) a scheduled interest;
(ii) freehold estate;
(iii) a commercial lease that is neither an agricultural lease nor a pastoral lease;
(iv) an exclusive agricultural lease or an exclusive pastoral lease;
(v) residential lease;
(vi) a community purposes lease;
(vii) a lease dissected from a mining lease as referred to in s23B(2)(vii);
(viii) any lease (other than a mining lease) that confers a right of exclusive use over particular land or waters;

which was validly vested or granted on or before 23 December 1996.

(c) Subject to clauses (d) and (e) the area covered by the application excludes any area covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996.

(d) Where the act specified in (b) and (c) falls within the provisions of

(i) s23B(9) - Exclusion of acts benefiting Aboriginal peoples or Torres Strait Islanders;
(ii) s23B (9A) - Establishment of a national or state park;
(iii) s23B (9B) - Acts where legislation provides for non-extinguishment;
(iv) s23B (9C) - Exclusion of Crown to Crown grants; and
(v) s23B (10) - Exclusion by regulation,

the area covered by the act is not excluded from this application.

(e) Where an act referred to in clauses (b) and (c) covers land or waters referred to in:

s47 - Pastoral leases held by native title claimants;
s47A - Reserves etc covered by claimant applications; and
s47B - Vacant crown land covered by claimant applications,

the area covered by the act is not excluded from the application.

(f) Where an area is covered by a previous non-exclusive possession act (s 23F) the native title claim group does not claim possession, occupation, use and enjoyment to the exclusion of all others.

(g) The area covered by the application excludes land where native title has been extinguished at common law.

(h) The area covered by the application excludes areas covered by prior Gundungurra claims filed with the National Native Title Tribunal being NC96/7, NC96/27, NC96/30, NC96/36 and 97/4.

Persons claiming to hold native title:

The members of the Gundungurra Tribal Council Aboriginal Corporation

Registered native title rights and interests:

The following Native Title Rights & Interests were entered on the Register on 23/06/2000:
1. Subject to (2) - (5) below, the full and free enjoyment of the following native title rights and interests area are claimed in relation to the land and waters the subject of the application:

a. A right to possess, occupy, use and enjoy the claim area;

b. A right to make decisions about the use and enjoyment of the claim area;

c. A right of access to the claimed area;

d. A right to control the access of others to the claimed area;

e. The right to control the use and enjoyment of others of resources of the claimed area.

2. With respect of those parts of the area the subject of the application which are, or have been, the subject of a previous non-exclusive possession act within the meaning of s 23F of the Native Title Act 1993, the native title rights and interests area set out in (1) are claimed subject to the rights and interests created in the 'non-exclusive possession act' which are not inconsistent with the rights and interests claimed and, in the case of rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause.

3. With respect to those parts of the area the subject of the application which are, or have been, the subject of:

a. a category B intermediate period act within the meaning of s232C of the Native Title Act 1993;

b. a category C intermediate period act within the meaning of s232D of the Native Title Act 1993;

c. a category D intermediate period act within the meaning of s232E of the Native Title Act 1993;

the native title rights and interests claimed are those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any suspension of the native title rights and interests which those inconsistent rights and interests cause.

4. With respect to those parts of the area of the application which are, or have been, the subject of:

a. a category B past act within the meaning of s230 of the Native Title Act 1993;

b. a category C past act within the meaning of s231 of the Native Title Act 1993;

c. a category D past act within the meaning of s232 of the Native Title Act 1993;

the native title rights and interests claimed area those set out in (1) above subject to the rights and interests created in the non-exclusive possession act which are not inconsistent with the rights and interests claimed

and, in the case of any rights granted which are inconsistent with the rights and interests claimed, subject to any extinguishment or suspension of the native title rights and interests which those inconsistent rights and interests cause.

5. The native title rights and interests identified above do not extend to ownership of any minerals, petroleum or gas which are wholly owned by the Crown.

6. The native title rights and interests identified above do not include a claim for exclusive occupation and use of offshore areas as defined by s253 of the Native Title Act 1993.

Register attachments:

1. Attachment "A" : Map of Application Area, 1 page - A4, Attached 23/06/2000.

Note: The Register may, in accordance with s.188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.

APPENDIX B

Correspondence from Aboriginal Groups

61 2 47829356

GUNDUNGURRA TRIBAL COUNCIL ABORIGINAL CORPORATION

P. O. Box 419 14 Oak St. KATOOMBA 2780.
Phone (02)4782-9354. Fax (02)4782-9356.
E-mail gtcac@bigpond.net.au ABN 84 578 695 549 Web: http:www.gundungurra.net.au

Friday, 13 May 2005

John Merrell
Environmental Scientist
Umwelt Consultants
PO Box 838
Toronto NSW 2283

Re: Aboriginal Archaeological Survey, Lynwood Quarry, Marulan.

Dear John.

We have read Umwelt's Draft Report for Lynwood Quarry and we support the recommendations. We wish to be present and participate in any ground breaking and / or salvage operations.

When any Cultural material is collected we wish to retain a sample to be kept in our Office for cultural and education training purposes. The remaining collection to be place at a location with in the area that will not be disturbed with any future developments and that , that area be protected as an Aboriginal Place under National Parks and Wildlife legislation.

We consider the whole proposed Quarry site as a highly significant place.

Yours truly,

William Hardie chairperson.

APPENDIX C

AHIMS Search

Job No 1829

Your Ref: 1829
Our Ref: AHIMS #8717

Umwelt (Australia) Pty Ltd
PO Box 838
Toronto NSW 2283

RECEIVED
BY:

Monday, 17 November 2003

Attention: Sarah Paddington

Dear Sir or Madam:

Re: AHIMS Search for the following area at Marulan
Zone 55 Eastings: 765000-779000 Northings: 6148000-6162000

I am writing in response to your recent inquiry in respect to Aboriginal objects and Aboriginal places registered with the NSW National Parks and Wildlife Service (NPWS) at the above location.

A search of the NPWS Aboriginal Heritage Information Management System (AHIMS) has shown that 30 Aboriginal objects and Aboriginal places are recorded in or near the above location. Please refer to the attached report for details.

The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.

The following qualifications apply to an AHIMS search:

- AHIMS only includes information on Aboriginal objects and Aboriginal places that have been provided to NPWS;
- Large areas of New South Wales have not been the subject of systematic survey or recording of Aboriginal history. These areas may contain Aboriginal objects and other heritage values which are not recorded on AHIMS;
- Recordings are provided from a variety of sources and may be variable in their accuracy. When an AHIMS search identifies Aboriginal objects in or near the area it is recommended that the exact location of the Aboriginal object be determined by re-location on the ground; and
- The criteria used to search AHIMS are derived from the information provided by the client and NPWS assumes that this information is accurate.

All Aboriginal places and Aboriginal objects are protected under the *National Parks and Wildlife Act 1974* (NPW Act) and it is an offence to destroy, damage or deface them without the prior consent of the NPWS Director-General. An Aboriginal object is considered to be known if:

- It is registered on AHIMS;
- It is known to the Aboriginal community; or
- It is located during an investigation of the area conducted for a development application.

NSW NATIONAL PARKS AND WILDLIFE SERVICE
ABN 30 841 387 271

Head Office
43 Bridge Street
PO Box 1967
Hurstville NSW
2220 Australia
Tel: (02) 9585 6444
Fax: (02) 9585 6555
www.npws.nsw.gov.au

If you are considering undertaking a development activity in the area subject to the AHIMS search, NPWS would recommend that an Aboriginal Heritage Assessment be undertaken. You should consult with the relevant consent authority to determine the necessary assessment to accompany your development application.

Yours Sincerely

Vanessa Kendall
Department of Environment & Conservation
Aboriginal Information Officer
Information Systems Unit
Cultural Heritage Division
Phone: (02) 9585 6345
Fax: (02) 9585 6325

Indigenous Archaeological Sites recorded in the area of Marulan Prior to 2004 survey

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

ahims#8717

Grid Reference Type = AMG Zone = 55 Easting From = 765000 Easting to = 779000 Northing From = 6148000 Northing to = 6162000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
51-6-0059	Marulan Quarry 1	AMG	55	771860	6152890	AFT,	Open Camp Site	Navin,K (01-AUG-90)	1995,
		Status Valid							
		Primary Contact							
51-6-0060	Marulan Quarry 2	AMG	55	772450	6153000	AFT,	Open Camp Site	Navin,K (01-AUG-90)	1995,
		Status Valid							
		Primary Contact							
51-6-0066	G11 outside area	AMG	55	765950	6158450	AFT,	Open Camp Site	McIntyre,S (01-JAN-89)	3112,
		Status Valid							
		Primary Contact							
51-6-0068	G13 Outside area	AMG	55	768800	6159650	AFT,	Open Camp Site	McIntyre,S (01-JAN-89)	
		Status Valid							
		Primary Contact							
51-6-0074	MAS1 Outside area	AMG	55	771450	6157600	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0075	MIF 1 Outside area	AMG	55	771900	6157800	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

ahims#8717

Grid Reference Type = AMG Zone = 55 Easting From = 765000 Easting to = 779000 Northing From = 6148000 Northing to = 6162000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
51-6-0076	MAS 4	AMG	55	771400	6157280	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0077	MAS 5	AMG	55	771450	6157320	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0079	MAS 3	AMG	55	771300	6157250	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0080	MAS 2	AMG	55	771300	6157320	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0086	Marulan 1	AMG	55	774500	6153130	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							
51-6-0087	Marulan 2	AMG	55	774530	6153100	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							
51-6-0088	Marulan 3	AMG	55	774630	6153170	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

ahims#8717

Grid Reference Type = AMG Zone = 55 Easting From = 765000 Easting to = 779000 Northing From = 6148000 Northing to = 6162000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
51-6-0089	Marulan 4	AMG	55	774510	6153000	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							
51-6-0090	Marulan 5	AMG	55	774380	6153800	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							
51-6-0091	Marulan 6	AMG	55	774310	6153270	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	3605,
		Status Valid							
		Primary Contact							
51-6-0092	Marulan 7	AMG	55	774220	6153450	AFT,	Open Camp Site	Sefton,C (16-OCT-96)	
		Status Valid							
		Primary Contact							
51-6-0093	MF 1 - Winfarthing Road	AMG	55	765080	6151200	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0094	MF 3 - Narambulla Creek	AMG	55	765870	6151120	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

ahims#8717

Grid Reference Type = AMG Zone = 55 Easting From = 765000 Easting to = 779000 Northing From = 6148000 Northing to = 6162000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
51-6-0095	MF 2 - Winfarthing Road	AMG	55	765190	6151120	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0096	MF 4 - Narambulla Creek	AMG	55	765950	6150620	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0097	MF 5 - Narambulla Creek	AMG	55	765700	6150360	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
51-6-0098	MF 6 - Narambulla Creek	AMG	55	765590	6150170	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0101	Isolated Find 2	AMG	55	774550	6152900	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0102	Isolated Find 3	AMG	55	777420	6153370	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0103	Isolated Find 1	AMG	55	774500	6153170	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
51-6-0104	Isolated Find 4	AMG	55	774550	6152900	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

ahims#8717

Grid Reference Type = AMG Zone = 55 Easting From = 765000 Easting to = 779000 Northing From = 6148000 Northing to = 6162000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
51-6-0105	Marulan ER Site 1	AMG	55	774500	6153220	AFT,	Open Camp Site		
	Same as Marulan1?	Status Valid							
		Primary Contact							
51-6-0114	Joarimin	AMG	55	774710	6158610	AFT,	Artefact Scatter	Edmonds,V (20-SEP-99)	
		Status Valid							
		Primary Contact							
57-3-0234	Millendale Creek;	AMG	55	774880	6161071	AFT,	Open Camp Site	Feary,S (14-FEB-89)	
		Status Valid							
		Primary Contact							

APPENDIX D

Plates

PLATE 1
Joarimin Creek following heavy rain. Note scoured banks from overnight flooding

PLATE 2
Deep sands formed from the in-situ weathering of the Bindook Porphyry (ignimbrite)

PLATE 3
Most crests have rocky outcrop and skeletal soils

PLATE 4
Scouring caused by downslope movement of soil following heavy rain

PLATE 5
MRN9 Stone arrangement. Flags mark current location of stones and prior location of stones where their original position could be ascertained

PLATE 6
MRN32 Stone Arrangement

PLATE 7
MRN8 Scarred Tree

PLATE 8
MRN10 Scarred Tree

PLATE 9
MRN11 Scarred Tree

PLATE 10
MRN23 Scarred Tree

PLATE 11
MRN31 Scarred Tree

PLATE 12
MRN49 Scarred Tree

PLATE 13
MRN51 Scarred Tree

PLATE 14
MRN3 Artefact scatter, chert and volcanic flake (dorsal surface)

PLATE 15
MRN4 Artefact scatter site

PLATE 16
MRN13 Artefact scatter site

PLATE 17
MRN 13 Edge-ground axe and reef quartz core

PLATE 18
MRN25 Artefact scatter exposed by wombat burrowing

PLATE 19
MRN27 artefact scatter site exposed by power easement and wombat burrowing

PLATE 20
MRN41 artefact scatter site

PLATE 21
MRN43 artefact scatter site. Artefacts located around edges of clay pit

PLATE 22
MRN46 retouched chert flake