

Colco Cultural Heritage Management



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Peppertree Quarry, MARULAN

ARCHAEOLOGICAL SALVAGE AND ARTEFACT

CATALOGUING

INTERIM REPORT

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1.0 Project Introduction and Background

Boral Resources (NSW) Pty Ltd (Boral) was granted Project Approval (06_0074) for the establishment and operation of Peppertree Quarry under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) in February 2007. The approval allowed for the granodiorite hard rock quarry (formerly called the Marulan South Quarry) including all in-pit quarrying activities and supporting infrastructure, processing plant and water supply dams.

An Aboriginal Heritage Management Plan (AHMP) was required and established for Boral by ERM in 2011, in accordance with the Conditions of Approval (CoA) for the project. However, following the fifth modification of the Project Approval in October 2019, the transitional provisions of the EPA&A Act relating to former Part 3A projects were repealed and project approvals transitioned to the State Significant Development classification, assessed under Part 4 of the EPA&A Act.

The now State Significant Development consent has been modified twice under section 4.55 (1A) of the EP&A Act over the 2020-2021 period including Modifications 6 (approved April 2020) and 7 (approved Sept 2021) allowing for the establishment of secondary/tertiary processing facilities, baghouses, replacement of the air filtration network and reconfiguration of the sediment basin to the west of the Western Overburden Emplacement, respectively.

The initial project approval and subsequent modifications were completed in conjunction with a number of heritage actions including subsurface testing, topsoil monitoring and salvage works, accompanied by a series of management plans and guides to ensure the protection of the identified significance of the heritage of the site.

Following the initial AHMP produced by EMM (January 2011), there have been subsequent revisions in 2017 and again in 2021, in accordance with Schedule 2B Condition B50 of the development consent. The 2021 AHMP includes the ongoing works and commitment Boral has with the Aboriginal Management Committee (AMC), updates to works associated with Modifications 5, 6 and 7 and in accordance with the requirements of CoA B51. As a dynamic document that will be subject to ongoing updates throughout the life of the quarry, the version of the AHMP referred to within this report refers to that dated December 2021.

Chapter 9 of the AHMP refers to monitoring, reporting and review requirements as of December 2021. Section 9.2 identifies the requirement for a full and final report to be produced upon completion of all salvage works at Peppertree Quarry.

‘This will detail the salvage works, findings, cultural values and significance of the Peppertree site. The report will be prepared by a suitably qualified professional in consultation with the AMC.’

However, due to the extensive timeframe of archaeological investigations, analysis and reporting and in response to the ever changing needs of the Quarry, it was acknowledged that interim reports would be required for the following identified works:

- The salvage excavation proposed at MSL 055;
- The broader salvage excavations and surface collection completed at Peppertree Quarry.

This document therefore comprises the required broader salvage excavation and surface collection interim report for Peppertree Quarry, with the MSL 055 Salvage Report having been completed in February 2023.

This document is supplementary to the AHMP and does not seek to repeat information already obtained within the AHMP except where necessary for contextualizing the progress and stages of completion of archaeological investigations and existing outstanding actions.

2.0 Peppertree Quarry – Operations Summary

Peppertree Quarry is located in Marulan South, approximately 10km south-east of the township of Marulan, 35km east of the city of Goulburn and 175km southwest of Sydney, within the Goulburn Mulwaree Local Government Area (LGA) in the Southern Tablelands of NSW.

The Quarry has an identified resources area of some 250 million tonnes with an expected quarrying life of 70 years or more and covering an area of approx. 104ha.

Quarry construction commenced in 2011 with operations commencing early 2014. Operations typically involve the stripping of overburden and extraction of hard rock using open-cut drill and blast techniques. Blasted rock is processed on-site using various crushers and screens to obtain the desired product, before being screened and shaped, stored in various covered storage bins held on site and finally dispatched off-site by train.

Figure 1 below shows the proposed project layout as at October 2021 and illustrated in the AHMP (2021:7 Figure 1).

3.0 Aboriginal Consultation

Consultation with the Aboriginal community is of utmost importance to Boral and the project has a strong record of consultation beginning in 2006 when initial heritage investigations commenced for the site (ERM 2006a).

The aboriginal groups that responded to the invitation to be consulted on the initial AHMP in 2011 were Pejar Local Aboriginal Land Council (PLALC), Buru Ngunawal Aboriginal Corporation (BNAC) and Ngunawal Heritage Aboriginal Corporation (now Mundawari).

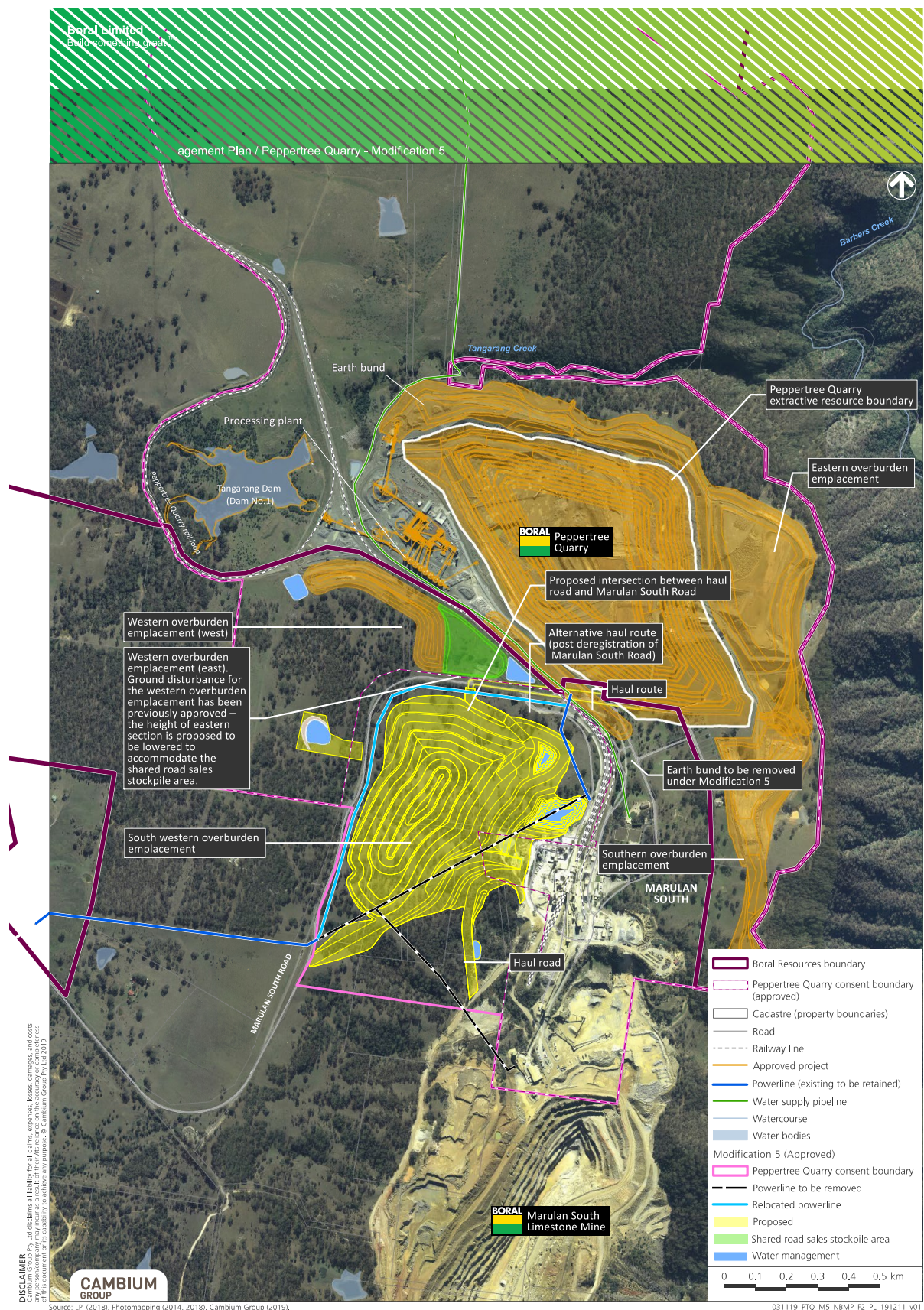


Figure 1. Peppertree Quarry Layout as of AHMP 2021

Representatives from these three stakeholder groups formed the membership of the Aboriginal Management Committee (AMC for Peppertree Quarry).

Consultation has been undertaken at all times with both NSW Heritage and the AMC, in accordance with the requirements of the CoA 50(b).

4.0 Identified Aboriginal Cultural Heritage Values and Programs of Investigation

Peppertree Quarry has now been subject to intensive heritage and archaeological investigation, commencing in 2006, with the sites initial Environmental Assessment and continuing to the present with artefacts now under detailed analysis. A summary of works completed to date follows:

4.1 2006 – Environmental Assessment

The site was subject to a cultural heritage survey commencing in 2006, during which a series of open artefact scatters were identified (ERM 2006). The survey concluded that the archaeological evidence at the site was suggestive of a consistent spread of low density artefacts across the landscape, with an area of higher archaeological sensitivity and greater artefact densities identified in areas immediately surrounding Tangarang Creek.

Eight sites were identified within the proposed quarry footprint, with another 11 sites located within the proposed Dam 1 reservoir. Sites within the proposed Dam 1 reservoir were assessed as having high potential to contain subsurface cultural deposits and determined to be of moderate scientific significance based on the assemblage composition, diversity and density across the different landforms, for their potential to contribute to archaeological research across the wider region.

4.2 2010 – Geotechnical Works

During geotechnical works, completed in July 2010, an archaeologist and Aboriginal representatives located ten new aboriginal sites within the PAA (project approval area). The sites occurred on a range of different landforms. The majority of these sites were salvaged.

4.3 2011 – Subsurface Excavation and Salvage Works

In 2011, a series of archaeological excavations were undertaken across identified sites MQ8-10 12-17, 19, 23 and 24 (see Figure 2) (EMM 2012). These excavations were in response to the 2006 Environment Assessment and subsequent 2011 AHMP. Excavation proceeded with a large testing program, involving the laying out of transects within the landscape in and around Tangarang Creek. Transect location were determined on the basis of findings of earlier assessments and in consultation with members of the AMC, with test-pits measuring 500mm x 500mm each.

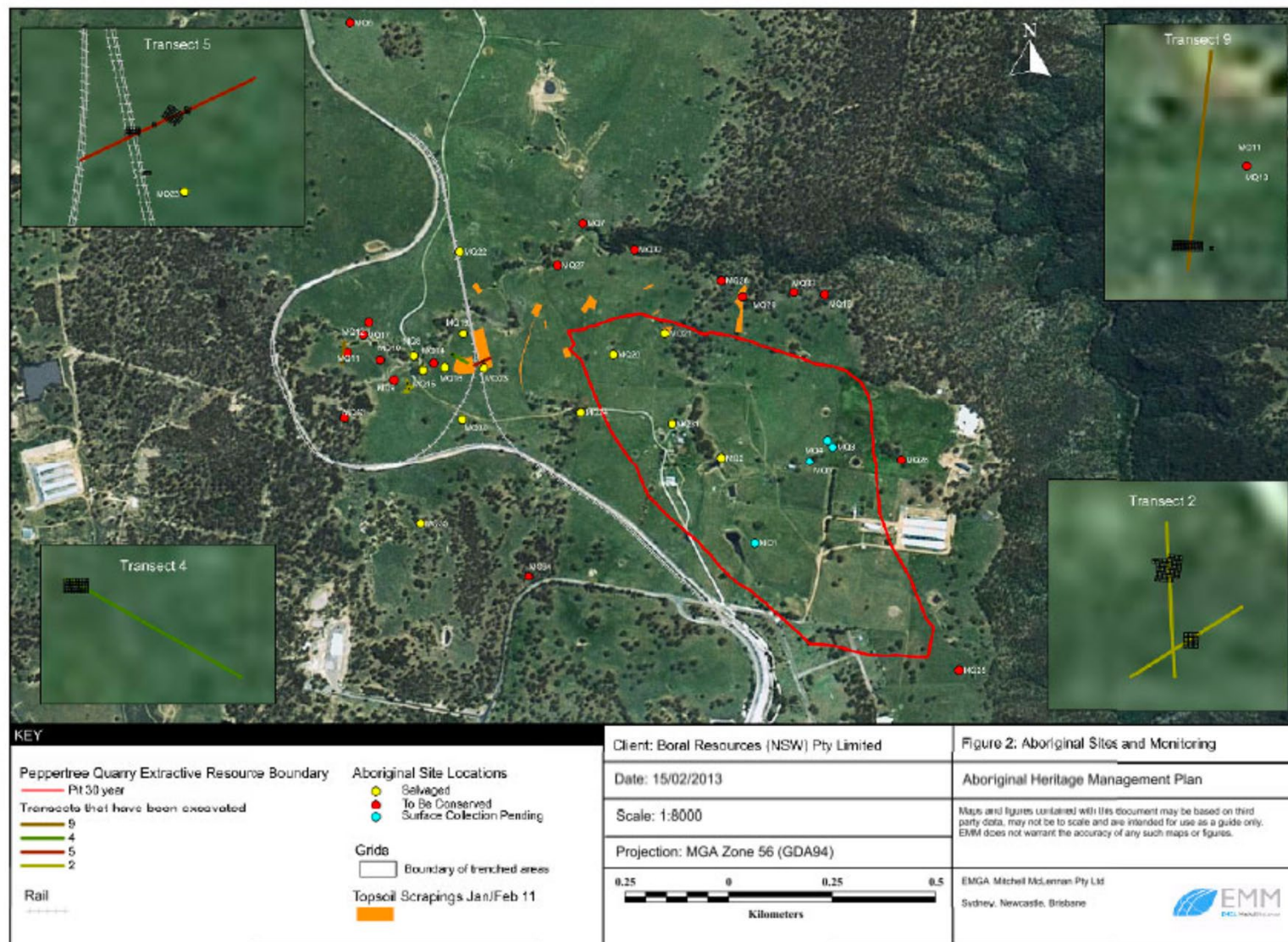


Figure 2. Locations of Aboriginal Sites and Monitoring (after EMM 2012 Figure 2)

The testing program was followed by open area excavation in areas of highest artefact densities or where features of interest were identified. A total of ten open area trenches were initially expanded; two of these expanded to 1m x 1m, with eight trenches excavated beyond this. A total of 122m² of open area excavation was undertaken within the study area, resulting a total of 2,089 artefacts being recovered from test excavations and a further 20,956 artefacts recovered from open area excavations. Minimum numbers of individual artefacts represented was determined to be 16,170 artefacts. Additional finds included a stone arrangement (believed to be a possible burial) adjacent to Dam 1, three stone ovens, a number of possible hearths and a possible post hole attributed to a Gunyah.

The report included a detailed analysis of the 22000 artefacts recovered during these works and interpretation of the sites discovered within the PAA to date.

4.4 2011/2012 – Predevelopment topsoil monitoring

The findings of the subsurface salvage investigations demonstrated a strong Aboriginal occupation once existed within the study area. As such, Boral invited members of the AMC to monitor topsoil in areas to be impacted by the initial quarry development. These areas included the noise bund, initial quarry pit, processing plant area and the approaches to the rail embankment.

A number of objects were salvaged during these works including a hammerstone, two cooking stones, red and white ochre, a number of stone-cores and large number of flaked artefacts.

4.5 2012 – Construction Site Topsoil Monitoring

Throughout the construction phase of the quarry, the AMC were involved in monitoring stockpiled topsoil which was spread on finished batters and landforms around the initial quarry pit, rail embankment and processing area; resulting in the recovery of approximately 7506 artefacts during these works.

4.6 2012 – Tangarang Creek Rehabilitation

A large rain event in 2012 identified the need for sediment stabilization within Tangarang Creek. Consequently, and in consultation with the EPA, sediment from within the creek was removed and stabilized. Due to the high cultural significance of the creek line and surrounds, the AMC were invited to monitor the works, however no artefacts were identified.

4.7 2012-2013 – Modification 3 Topsoil Monitoring

In August 2012 a modification for a high voltage power line to supply the new processing plant and minor extension to an existing rail siding was approved by DP&E. An Environmental Assessment was completed ahead of these works with member of the AMC

invited to participate in the fieldwork. A total of twenty-two (22) artefacts were salvaged at the northern end of the high voltage line, during drilling for installation of a pole.

4.8 2014-2016 – Pit Footprint Topsoil Monitoring (as per AHMP)

In accordance with the outline in the 2013 AHMP, topsoil monitoring works are required within a 50m radius of an identified artefact location or within 100m of the first and second order streams.

As such, monitoring requirements were triggered during the overburden removal and pit development works associated with the two water drainage channels traversing the site.

Figure 3 shows the topsoil monitoring and salvage works undertaken during this period.

The aim of monitoring topsoil stripping is to further understand the distribution of artefacts within the landscape and the materials utilized in artefact production. Monitoring was completed in 50m² units, with co-ordinates recorded at the center of each square. Each grid square was then stripped and monitored individually with all visible artefacts salvaged and bagged according to collection unit.

Where more than 10 artefacts were located within a 50cm² area, this area was classed as high density. High density areas were subject to subsurface excavation with 1m x 1m pits excavated by hand. Excavated pits were excavated in 10cm arbitrary spits, to clay or culturally sterile soil. All material was sieved, with artefacts collected and bagged according to pit, spit and site.

Where artefact densities exceeded 50 per m² within hand excavated pits, additional 1m² pits were excavated on each side of the original square, dug and sieved in accordance with the methodology detailed above. This process continued until pits comprised less than 50 artefacts per m². All high density sites were subsequently mapped, along with artefact densities across each of the 50m² grid units across the site (see Figure 3).

These works commenced in 2014 and continued through to June 2016, with the resulting salvage of over 90,000 artefacts.

Monitoring of further topsoil stripping will be ongoing when required throughout the 30 year quarry footprint and under the AHMP (2021) will be undertaken by members of the AMC with a consulting archaeologist where large densities are identified. The methodology to be utilised for these works is outlined in section 4.8.2 of the AHMP (2021).

4.9 2016-2018 - Assessment for Modification No.4 (2016)

Modification 4 was approved in August 2016 and allowed for an increase in pit operating hours and a resultant increase in production volumes to the approved 3.5m tonnes per



Figure 3. Salvage and Monitoring Works (after EMM 2016, Figure 3)

annum. The modification also proposed a new Southern Overburden Emplacement, extending the existing Eastern Overburden Emplacement (SOE).

Heritage assessments for the proposed Modification area identified two Aboriginal sites within the area, comprising the previously salvaged MQ25 and MQ120 – a culturally modified tree (EMM 2016). Several areas of moderate archaeological potential were also recorded within the study area.

Site MQ120 occurred outside the identified bounds of the Southern Overburden Emplacement and hence was not impacted by the proposal. Protective fencing was recommended and implemented around the tree to avoid inadvertent impacts.

It was determined that the SOE might result in compaction disturbance to previously identified sites within the impact area, however these impacts were not considered sufficient to justify further salvage works given the large numbers of previous heritage investigations and salvage already undertaken within the bounds of the Quarry.

In February 2018, the AMC identified three trees with bark removal scars within the bounds of the Modification 4 study area, requesting further investigation to determine whether the scars were cultural in origin. Scarred tree specialist Andrew Long was engaged to undertake a site inspection of the trees on 15th February 2018, concluding that Tree 2 may be an Aboriginal scar tree. Trees 1 and 3 were determined to be natural. Regardless, Boral and the AMC consulted further and resolved to avoid impacting all three trees, with the SOE area design modified slightly to accommodate. Suitable long term fencing was sourced to secure the trees.

4.10 2018-2020 – Modification No.5

Approvals for Modification 5 were issued by the Department of Planning, Industry and Environment on 1st October 2019. These modifications included establishment of a new overburden area (South-West Overburden Emplacement (SWOE)), extension to the consent boundary and construction of new haul road to incorporate the SWOE and construction of a new intersection linking the SWOE with the existing quarry.

Heritage investigations were undertaken ahead of the Modification by EMM (2015) during which three Aboriginal sites were identified (MSL 017, MSL 018 and MSL 019), with subsurface testing/trenching excavated in five areas identified as having archaeological potential in accordance with predictive models for the region. High artefact densities (N=40) were identified within a testpit located on a large spur overlooking two drainage lines. The pit and the area of research potential around it was labelled MSL 055.

A second test pit, located on a broad spur featuring duplex soils, contained eight artefacts and was subsequently labelled MSL 056.

Away from these locations and towards the south of the Mod 5 study area, the landscape gradient increases dramatically, and conditions for camping decrease in quality. Test pits in these steeper locations occurred outside the current study area, but on comparable landforms still only contained artefact counts of <10 (EMM 2018:53).

On the basis of these findings, EMM developed an archaeological sensitivity model as a guide to indicate subsurface potential within the area. The model determined the Mod 5 study area to have low archaeological sensitivity except for the area of moderate archaeological potential surrounding site MSL 055 (EMM 2015). It was recommended that Sites MSL 017, MSL 018 and MSL 019 be salvaged and subsurface testing and open area salvage be undertaken and MSL 055 ahead of any works commencing in the Mod 5 study area. No further work was required for MSL 056.

AMC members were kept informed of the Mod 5 Development as representatives had previously been part of the investigation of the area. Following Project Approval of the Mod 5 changes under Section 75W *Environmental Planning and Assessment Act 1979* (EP&A Act) in October 2019, members of the AMC revisited the proposed SWOE area. During this site visit, the AMC identified several trees featuring scars of an indeterminate nature, which had previously not been identified. (EMM February 2020). Following these findings, EMM were engaged to undertake further investigations to assess the trees and determine the potentially cultural origins of the scars.

EMM (2020:2-3) assessed these newly identified possible scarred trees against the criteria outlined in Long's *Aboriginal scarred trees in New South Wales: a field manual* (2005), namely:

- Assumed age of the tree of at least 100 years
- Evidence of tool marks and/or
- The original scar dimensions and outline as symmetrical and representative of traditional practices.

While not definitive, in combination with the anomalous shapes and the broader scar-prone context of the ecological community across the quarry, the evidence is lacking for an anthropogenic origin' (EMM 2020:12)'.

Despite the outcomes of EMM's assessment, the AMC decided that the value of the trees was culturally significant and warranted appropriate management (AMC Meeting 28th January 2020). Due to the inability to avoid impacts to these trees by the proposed SWOE, the AMC supported the removal of these trees under suitable management provisions, to which Boral agreed.

4.11 2020-ongoing – Cataloguing of Artefacts

Commencing in 2020, cataloguing work began on the 90,000 plus artefacts salvaged from across the Peppertree Quarry Site. The program was undertaken on the Peppertree site and involved a representative from each of the 3 AMC groups as well as stone artefact specialist Dr Sophie Collins.

The cataloguing process and subsequent artefact analysis differed from traditional approaches in which an arbitrary sample size is selected for analysis (e.g. 10% sample or similar) and assumed to be 'representative' of the range of variation demonstrated within the assemblage.

The traditional method of taking an arbitrary sample cannot, by definition, record the full range of variation existing within an assemblage as it is simply 'arbitrary'. As such, an arbitrary sample will be argued to be 'representative' but in fact, may not be at all. Moreover, a random sample means that categories in which a wider range of variation is present – such as heavily retouched forms – will not be adequately represented by an arbitrary sample, while those such as 'debitage' or edge rejuvenation flakes that display very little variation between items in the same size category, would be over analysed and over-represented in an arbitrary sample. As such, the time spent analysing the sample is misdirected, with too many simple forms analysed and too few complex forms analysed and neither being truly representative of the assemblage itself.

Instead, the analysis and cataloguing program implemented was designed to ensure that a statistically representative sample would be collected and analysed based on the range of variability evident in the assemblage. This being the case, the sample for analysis was not arbitrarily defined but was indicated by the assemblage itself based on several measures of variation as outlined below. This approach allowed for a much more accurate and truly representative understanding to be determined, allowing for more valid interpretations of the data to be made.

In summary, the methodology involved sub-dividing 100% of the artefacts in accordance with a series of variables identified as being important determinants of variation. All artefacts were initially subject to a 'pre-sort' in which artefacts were separated into various categories following a system of 'materialist classification' which assigns items to a class on the basis of technological category (after Hiscock 2000). As such, all artefacts were classified as either flakes, cores or grinding/hammerstones. Flakes were subdivided on the basis of the presence or absence of retouch, resulting in retouched and unretouched flake categories. A fifth category was established; flaked pieces. These are items that strongly indicate cultural production, but cannot be definitively classified into any of the above technological categories (i.e. core, flake, retouched flake, grinding/hammer stone). This class of artefact is largely useless due to the inability to definitively demonstrate artifactuality. As such, these pieces were removed from the analysis, but have been counted and recorded for raw numbers. Pieces mistakenly included as being artefactual, being

salvaged in a rush and while monitoring behind machinery etc, were removed during this process and collected for their return to country later, despite not being cultural in origin.

One hundred percent of retouched artefacts, cores and grinding/hammer stones/anvils were set aside for analysis, with the sampling methodology mentioned above, only applied to unretouched flakes. This determination was made on the grounds that retouch creates too great a degree of variability to be legitimately sampled, with unretouched flakes generally demonstrating more uniformity in morphological features.

All unretouched flakes were then size sorted through a series of nested sieves. Nested sieve sizes increased in 5mm increments ranging from <5mm to >30mm with all flakes then bagged separately according to both provenance information as well as size category. Raw numbers were then recorded for all size categories.

Within each of these size categories, every flake was measured to 0.01g and dorsal scar counts were recorded for every flake.

4.11.1 Statistical Analysis

Using size, weight and dorsal scar count measurements, the mean and standard deviation was calculated for each size category and provenance across the assemblage. From these, the co-efficient of variation (cv) was calculated:

'The coefficient of variation (hereafter cv) expresses the standard deviation as a percentage of the mean value and allows comparison of the variability of different attributes (Norusis 1997:64). The formula (Norusis 1997:64) to calculate the cv is:

$$\text{coefficient of variation (cv)} = \frac{\text{standard deviation}}{\text{mean}} \times 100$$

Using the figures obtained for each of the size grade categories and their respective cv's, sample sizes can be calculated with a desired confidence interval. Initially, a 99% confidence interval was desired, however, the variability in the assemblage was such that some 80% of unretouched flakes would need to have been analysed in order to represent 95% of the variation demonstrated by the assemblage. Due to financial and time constraints for the program, a 99% confidence interval was simply unable to be attained on an assemblage of this size. Statistical checks were completed at 95% and 90% confidence intervals respectively, however the numbers required to be analysed at these levels exceeded the project's capacity. At 80% confidence, a sample size of approximately 19,000 artefacts was achieved. Including the 100% analysis of retouched flakes, cores and grinding/hammerstones etc, this quantity amounted to 22% of unretouched flakes recovered from the assemblage, with a total of 24,430 artefacts to be analysed from the entire 90,000 strong assemblage, equating to 27% of the total collection.

The statistical calculation for the sample generated is as follows:

$$n = \frac{N(c \times cv)^2}{N(p)^2 + (c \times cv)^2}$$

The sample formula breaks down as follows: where n= sample size needed, N = the total number of flakes in the size grade category, c=the reliability of the estimate, cv=the coefficient of variation, and p=the desired level of precision. For 80% confidence level, the reliability of the estimate in this case is 1.29.

Importantly, these results show that a 22% sample is only representative **of 80% of variation of unretouched flakes only** present in this assemblage. This speaks volumes for 10% random samples, which include all artefacts present (i.e. enormous variation will be present in retouched forms and cores). These numbers indicate that in many assemblages samples as low as 10% are unlikely to be representative in any way, instead accounting for well under 50% of the variation likely to be present in the assemblage. This concept will be explored further in the final report, when the artefact analysis has been completed and detailed numbers can be provided. However it is already clear from these results, that random samples are not as 'representative' as is purported and further, are unable to quantify the degree of confidence or the proportion of the assemblage 'represented' in each analysis. This is a significant finding for the legitimacy of sampling strategies in artefact analysis and interpretation.

In calculating the cv for the formula above, the largest cv was used for each variable i.e. within each size category, the largest cv out of dorsal scarring or weight was used in the subsequent sampling formula. Importantly, as the statistical analysis progressed, it became apparent that weight consistently resulted in a larger range of variability than dorsal scarring did, to the effect that it was clear dorsal scarring was a redundant variable. As such, it was abandoned approximately half way through the cataloguing process, with weight consistently used to determine the cv within each size category and provenance locality.

The sampling strategy utilized here therefore ensures every size category is adequately represented within the detailed analysis depending upon the degree of variation present in each case. Where a few flakes existed in any particular size category, a high degree of variability tended to be present, resulting in a larger number of flakes requiring analysis. Conversely, where hundreds of tiny unretouched flakes occurred, variability tended to be lower between them, resulting in the ability to take a much smaller sample in order to achieve the 80% confidence interval.

Several advantages exist in the use of this strategy to study unretouched flakes:

- 1) sample size is determined using the variability present in each respective size grade category within the actual assemblage thereby ensuring it is representative
- 2) results can be stated with precise confidence levels; and
- 3) the accuracy of the sample size can be easily verified by recalculating the mean values and re-entering them into the equation.

These points serve to reduce the risk of over or under-representing specific flakes types in the study sample. They also ensure sample sizes are large enough so that interpretations concerning the behaviours contributing to lithic assemblage variability at a site are sound.

4.11.2 Sampling Methodology

Following obtainment of the appropriate sample size in each location and size category, artefacts were run through a 2 way soil splitter in order to randomly generate the number of artefacts required in each case. Artefacts were run and re-run through the splitter until the desired number of artefacts in each category had been randomly selected.

Artefacts were then bagged in accordance with whether or not they were to be subject to detailed analysis or could now be returned to country along with the 20,956 artefact salvaged by ERM (2012), and the non-artefactual/flaked pieces removed from the assemblage during pre-sort.

The remaining 24,430 artefacts, comprising 100% of the cores and retouched flakes, grinding stones, hammerstones and anvils, plus a statistically representative sample (to 80% confidence) of unretouched flakes, are now to be subject to detailed artefact analysis.

4.11.3 Artefact Analysis

Artefact analysis is a time consuming process and will take several months to complete. These works have, however commenced and an intended completion date of mid-2024 for the provision of the report has been provided.

The following variables are being analysed subject to each artefact category:

All Artefacts:

- Provenance information
- Size category
- Raw Material
- Colour
- Weight
- % Cortex
- State – complete or broken

Flakes:

Platform surface – cortical, single scar, multiple scar, faceted, focal
Platform width, thickness and external platform angle
Presence/absence of overhang removal
Flake Thickness at centre point

Cores:

Type of processing - bipolar, single platform, multiple platform
Direction of blows ie along short axis or long axis or both
No of abrupt/step terminations
Dimensions - L, W and T measured at centre point of the core

Retouched Flakes:

Flake perimeter
Retouch location
Backed artefact types and metrics
Length of retouch
Retouch orientation
Retouch intensity

It is anticipated that the data generated from this analysis will inform us about the following aspects of Aboriginal occupation of the site:

- Basic numbers of artefacts for each site
- The range of raw materials present at each site and which materials were preferentially targeted
- Average sizes of each class of artefacts at each site
- Extent of damage evidenced at each site
- Variations in site size over the area
- General indication of the range of activities undertaken at each site (e.g. artefact manufacture vs maintenance or both)
- Evidence of raw material provisioning
- Establishment of reduction continuums if present
- Determination of type of occupation –
- Long versus short term occupation – long term occupation versus logistical forays
- Curation vs expedient artefact manufacture
- Extent and types of reduction undertaken
- Presence if any, of use wear, ranges of likely functions represented by retouched types (based on results of Dr Collins' PhD on edge effectiveness),
- Movement of raw materials within the area
- Preferential treatment of specific raw materials
- Evidence of manufacture of specific blanks
- Mobility patterns within the region

- Evidence of recycling or repeat visitation to sites versus a single palimpsest of material.

4.12 2022 – Modification 5 – Salvage Works and Scarred Tree Removal

The Modification 5 approval (issued 1st October 2019) included the following quarry components:

- A new overburden area (known as South-west Overburden Emplacement – SWOE);
- Extension of the boundary of consent to the south to incorporate the SWOE;
- Construction of a new haul road from the existing pit to the SWOE;
- Construction of a new intersection at Marulan South Road, linking the new haul road with the SWOE;
- Amendment of the design of the Western Overburden Emplacement (WOE);
- Removal of the Western Earth Bund (not yet constructed); and
- Relocation of the powerline which runs through the proposed site of the SWOE.

Several Aboriginal heritage sites exist within the Mod 5 boundary, comprising two artefact scatters, an isolated find, an area of archaeological sensitivity (MLS 055) and five potential scarred trees. Under the Notice of Modification (section B50 (c) point iv), impacts to these sites must be mitigated before any construction works are permitted within the project site.

Outstanding heritage requirements for the 73ha parcel of land approved for Modification 5, were completed between March and April 2022, by EMM and reported on by CCHM (2023). Recommendations for mitigation of impacts to sites within the Mod 5 project area included surface collection (Sites MSL 017, MSL 018 and MSL 019), salvage excavation (Site MSL 055) and the removal and relocation of 5 potentially scarred trees (Trees 1 to 5 Mod 5) (EMM 2015, 2018, 2020).

Site MSL 017 was successfully salvaged as part of this program of works, however neither Sites MSL 018 or MSL 019 were able to be relocated, despite protracted searches at both locations.

Site MSL 055 was subject to subsurface testing, followed by open area salvage excavation. A total of 19m² were excavated as part of these works, resulting in the recovery of >800 stone artefacts. These artefacts will be analysed as part of the larger cataloging and analysis program detailed above.

Trees 1 to 5 (Mod 5) were removed by qualified arborists in conjunction with EMM archaeologist Tyler Bebe and members of the AMC. The five trees were relocated to a temporary storage location, resting on rubber supports and covered with protective plastic. These trees await relocation to permanent storage when a suitable permanent location is selected by the AHMC.

Upon conclusion of these works, it was determined that no further salvage works were required.

4.13 2022 – Return to Country

After 12 years of cultural heritage investigations and consultation, the Peppertree AMC (Aboriginal Management Committee) requested that approved salvage artefacts be Returned To Country (RTC).

Artefacts returned included 100% of the artefacts salvaged and analysed by ERM (2012), from sites MQ1 through to MQ26 inclusive. An exception to this are those artefacts considered by members of the Peppertree AMC as valuable for educational purposes. These artefacts have been set aside for this purpose. This assemblage comprised approximately 22,610 pieces of artefactual stone.

Approximately 65,570 additional artefacts were included in the RTC, recovered from sites MQ27 to MQ150 across the quarry site. These artefacts had been statistically sampled for representativeness with a collection of 24,430 artefacts selected for detailed analysis. The remaining artefacts (65,570) were considered to be represented within the detailed analysis assemblage and determined to be ready for RTC. All non artefactual material recovered from the pre-sorting/cataloguing of the material was also returned as part of this process.

Detailed analysis of the 24,430 artefacts selected for interpretation is currently ongoing, but will be returned to country upon completion and in accordance with the methodology outlined and agreed upon, unless considered necessary for retention for educational purposes by the AHMC.

Four locations were selected within the Peppertree Quarry 'Habitat Management Area'. Artefacts were then returned to country in accordance with their proximity to each of these four locations, with cultural ceremony performed at each location and the entire process documented accordingly (CCHM 2022).

Each of the new RTC locations was formally recorded and registered on the Aboriginal Heritage Information Management System (AHIMS) with site cards submitted and approved for each.

5.0 Remaining Heritage Works

The following heritage requirements identified within the 2021 AHMP have now been undertaken and completed:

- Salvage Excavation Report completed for works undertaken at MSL 055
- Cultural trees 1-5 (Mod 5) have been relocated and stored for safekeeping
- Partial Return to Country of artefacts no longer requiring investigation.

As a consequence of the completion of these tasks, the following works remain to be undertaken for the Peppertree Quarry, subject to the need for any additional Modifications or topsoil monitoring that may arise:

- Detailed analysis of the sample of 24,430 artefacts is to be undertaken, with the provision of a high-level interpretation and report
- Upon conclusion of the detailed artefact analysis, all artefacts not held back for educational purposes are to be returned to country in accordance with the methodology outlined in CCHM (2022). Artefacts are to be returned to country in locations nominated by the AHMC at the time of implementation.
- Artefacts held back from the RTC for educational purposes need to be curated in a suitable fashion for future use, and a Care Agreement established;
- The final storage location for the cultural trees salvaged from Mod 5 needs to be determined and trees appropriately relocated to their final resting place for long term protection and conservation;
- A final report is to be produced, synthesising the entire program of works completed at Peppertree Quarry over the last 15 years or more and the outcomes of these research programs.

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