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Ref: 10-115-119

26/10/2023

Phillip Nevill
Department of Planning and Environment
Parramatta NSW

Dear Phil

RE: BOGGABRI COAL OPERATIONS BC-54 ARCHAEOLOGICAL SALVAGE WORK

As discussed over the phone on Wednesday, 25 October 2023, Boggabri Coal Operations are seeking the approval of the Department of Planning and Environment to complete archaeological salvage activities in line with the methodology outlined by Angela Besant in the attached methodology.

Boggabri Coal Operations are particularly seeking clarification regarding the use of a small digger to assist with the excavation of some of the already dug pits. As this activity would involve damage to some undergrowth vegetation outside of The Projects approved disturbance timeframe.

Please don't hesitate to contact me, should you have any further questions.

Please see included in this submission:

- Attachment A – Method statement excavation and artefact handling Rev D

Alex Williams
ENVIRONMENTAL COMPLIANCE SUPERINTENDENT

Attachment A – Method statement excavation and artefact handing Rev D

Method statement

Mechanical Excavation and Screening, BC-54.

1. INTRODUCTION

This document is a brief description of our proposed method for mechanical excavation and screening of deposit excavated at site BC-54, near Boggabri, NSW. BC-54 has been subject to extensive manual excavation over the course of 2022 and 2023, with more than 300 square metres excavated to date, and more than 15000 stone artefacts retrieved. The site has been assessed as being regionally significant. There is no prospect of conserving the site *in-situ* in the current plan for mine progression and consequently Aboriginal community stakeholders want a larger assemblage salvaged in a controlled manner. The method described below is designed to achieve a number of objectives:

- Salvage as much archaeological material as possible in the time available.
- Excavate in a manner that is controlled so as to be meaningfully comparable to the results from manual excavation.
- Relieve field workers of manual burden of excavation in predicted heat extremes.

2. EXCAVATION. Personnel Requirement: 1 Archaeologist, 3 RAPs, 1 Excavator Operator (if required)

2A. SELECTION

Initial excavation locations will be pre-selected by identifying new grid squares adjacent to those prior squares that yielded 35 artefacts or more. These squares will be assessed for accessibility and compliance with environmental imperatives – particularly potential for nesting animals.

A major consideration in the planning of excavation will be impact on any vegetation with the potential for nesting habitat. Prior to excavation ingress and egress selecting routes of the team would avoid disturbance/movement of fallen timber of >150mm diameter. In the event saplings of >100mm trunk diameter require potential structural compromise we would call on the mine's ecologist to inspect a work area and provide direction. The ecologists will also be consulted regarding the nesting potential of any areas of shrubs that may be impacted by the excavation process. Where machine excavation is not possible, but a grid square requires excavation we could revert to manual excavation.

2B. PROCEDURE

Excavation will be undertaken by a small, small excavator using a 'mud bucket' – that is, a flat edge rather than toothed (Figure 1). Excavation will proceed as an extension of a 1m x 1m grid previously established in each excavation location.

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Figure 1. Excavator and mechanical vibratory screen.

Prior to excavation the excavation director will mark 1m x 1m squares along the boundary of previously excavated squares to guide and control the excavation. The excavator will be positioned on the natural surface outside the previously excavated locations, and use the face of the previous excavation as the commencement point of excavation (Figure 2).

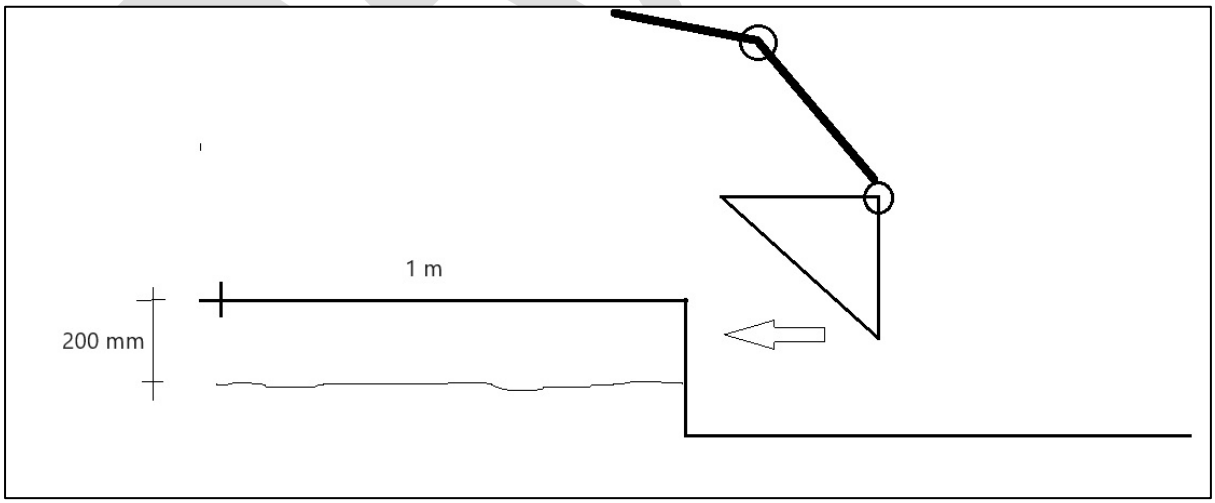

Figure 2. Excavation procedure schematic – cross section.

Extensive prior manual excavation has shown that ~97% of the assemblage at BC-54 is captured in the top 200mm of deposit. In order to retrieve the greatest number of artefacts in the time available we will excavate to 200-250mm in depth as one sample without recourse to arbitrary spits which are typically 100mm deep. The mechanically excavated squares will be excavated no deeper than 200-250mm as excavating deposit below that depth creates material that needs to be processed, but

with numbers of artefacts significantly reduced – the benefit returned for the effort expended makes it logical to excavate and process the top 200mm of an adjacent square.

The edges of the mechanically excavated squares will be slightly irregular and so following completion of mechanical excavation each square will be cleaned and shaped using shovels to ensure, as much as possible that the 1m x 1m grid is maintained and the isolation of individual samples in their nominated grid square.

The excavation director will attend the mechanical excavation at all times to supervise progress and/or halt and investigate as necessary. A communication procedure will be established to maintain an exclusion zone around the movement of the excavator.

It is acknowledged this method of excavation is less refined than its manual equivalent, although it is our observation that adherence by manual excavators to an exact 1m x 1m sizing, and exact 100mm spits is highly variable even in the best of conditions, and in gravelly deposit like at BC-54 ,almost impossible. Spatial results are accurate at a general level and mechanical excavation will not be significantly different given a proposed shovel clean up of each sample. Mechanical excavation will be more gentle on most artefacts as the contact between metal digging tool and stone artefact, if it occurs at all, will be slow with a comparatively blunt edge, as opposed to sharp and densely spaced (crow bar and shovel strikes).

Where manual excavation is required we would employ 1 person shovelling, one person using a crow bar to loosen deposit and one person moving buckets to the mechanical screen.

3. MECHANICAL SCREEN Personnel Requirements: Included with 'Excavation", above, 1 labourer.

The mechanical screen will be placed obliquely to the excavator, at a distance close enough for it to swing around and put the bucket of deposit directly on the screen table (Figure 1). Given the working radius of the excavator, it is unlikely that piles of residue will impede later excavation, but where this possibility needs to be accounted for the trailer mounted screen will be placed over a tarp, and fines will fall onto that tarp surface. In the event the spoil pile needs to be moved for further excavation the excavator will be used to move the fines further away and the tarp can be pulled back to reveal the natural surface. An alternative, in selected instances will be to situate the screen inside the previously excavated trenches so residue is returned to trenches as the sieve operates.

Deposit will be screened to remove sand and sub 5mm particles, and macro-sized vegetation (roots, leaves, sticks) will be removed from the sample. Residue remaining on the sieve table will be removed to 10L buckets and taken by trailer to a wet sieve where gravel will be washed. The sample will be appropriately labelled, and one sample at a time will be moved to the wet sieve to avoid mixing samples. Buckets will be moved by a labourer.

4. WET SIEVE Personnel requirements. 1 Archaeologist 2 RAPs

The wet sieve will be stationary and manually operated. Water will be supplied using a water tanker with hoses running off a fire fighting unit attached. Washing the gravel allows for vastly improved artefact identification at the sorting stage. This station would be supervised by the sieve coordinator who would ensure orderly system of sieving crew, and maintain sample and labelling integrity until transfer to the sorting coordinator.

5. FINAL SORTING Personnel requirements 1 Archaeologist 4-5 RAPs

Once washed, the gravel will be returned to buckets and sorted by being placed on plastic blow-mould tables, spread thinly and examined for stone artefacts (Figure 3). Natural gravel will be discarded. Stone artefacts will be bagged and labelled according to their excavation square unique identifier. This station would be managed by the sorting coordinator. Results from sorting will be

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communicated back to the excavation director to assist in on-site decisions regarding excavation progress. At the end of each day all records will be transferred to *Recorder's* vehicle (red Ford Ranger 4WD).

Figure 3. Sorting washed gravel.

The environmental context of the site are shown in Figures 4-7. The management of artefacts is detailed in Section 2.

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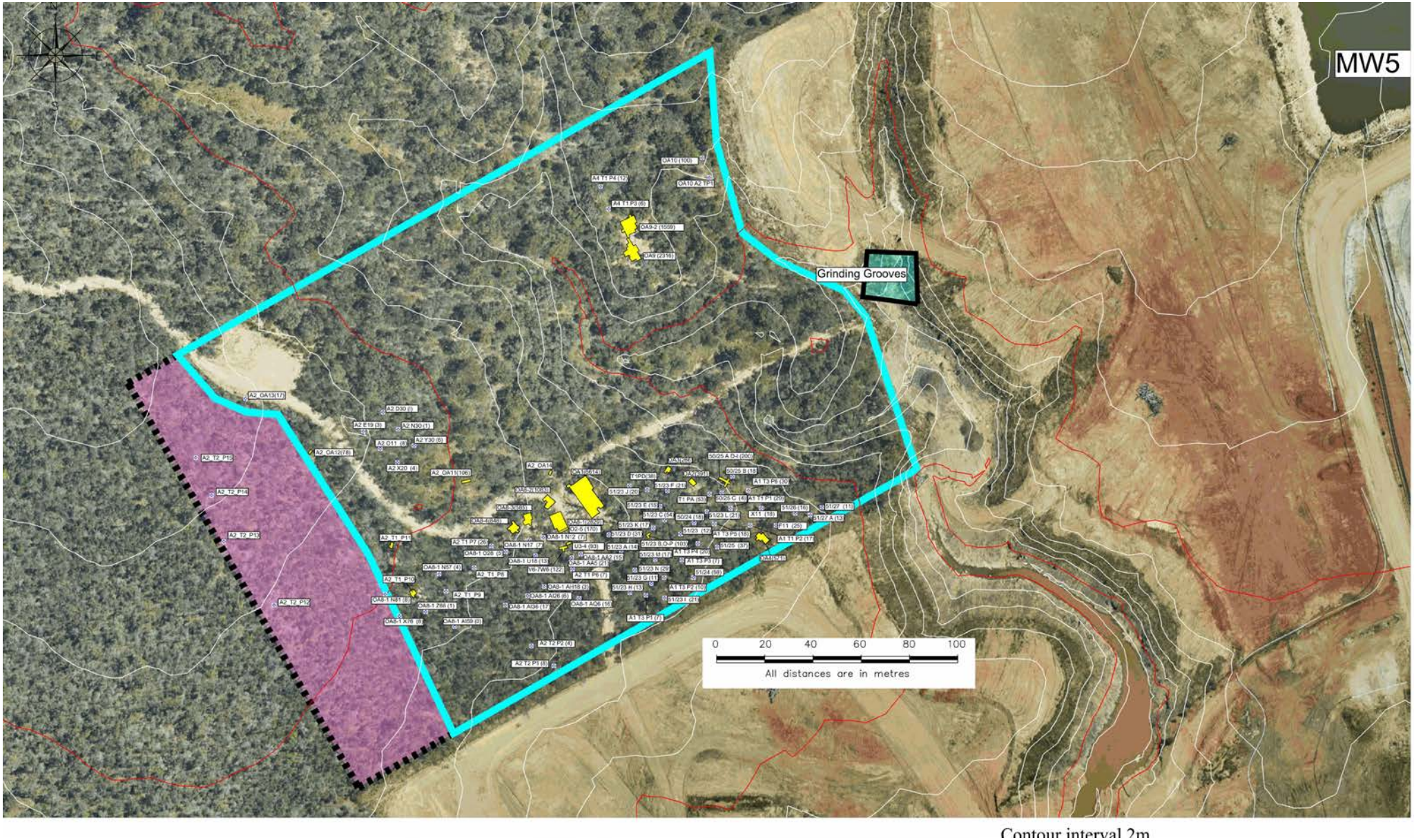

Figure 4 Overview of all open areas

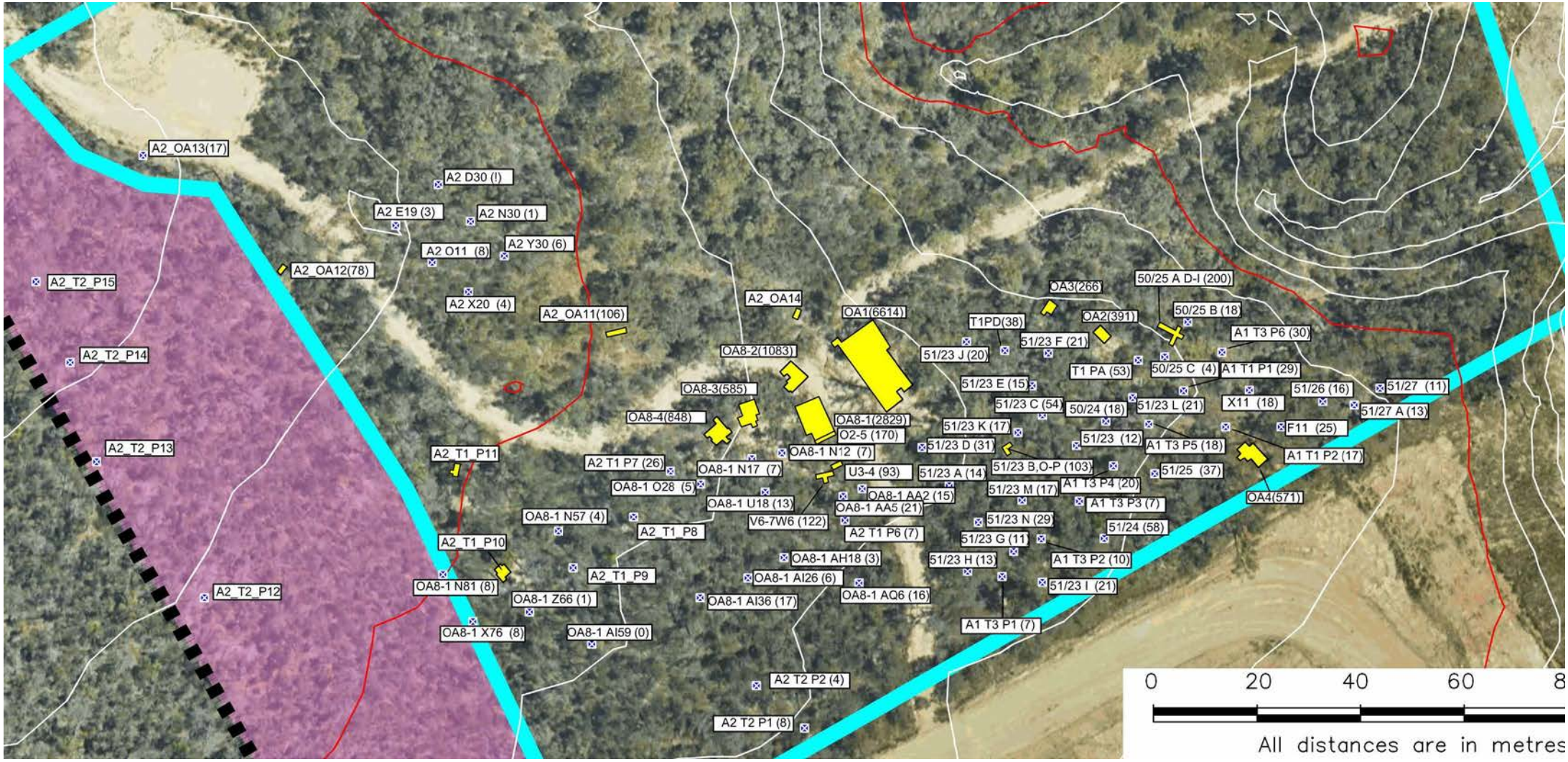

Figure 5 Open areas 1 (on right) & 8 (on left in four locales) - OA 1 & 8 will be the first areas accessed from the main existing dirt roads. Areas to the right will be accessed by routes after assessment by ecologists.

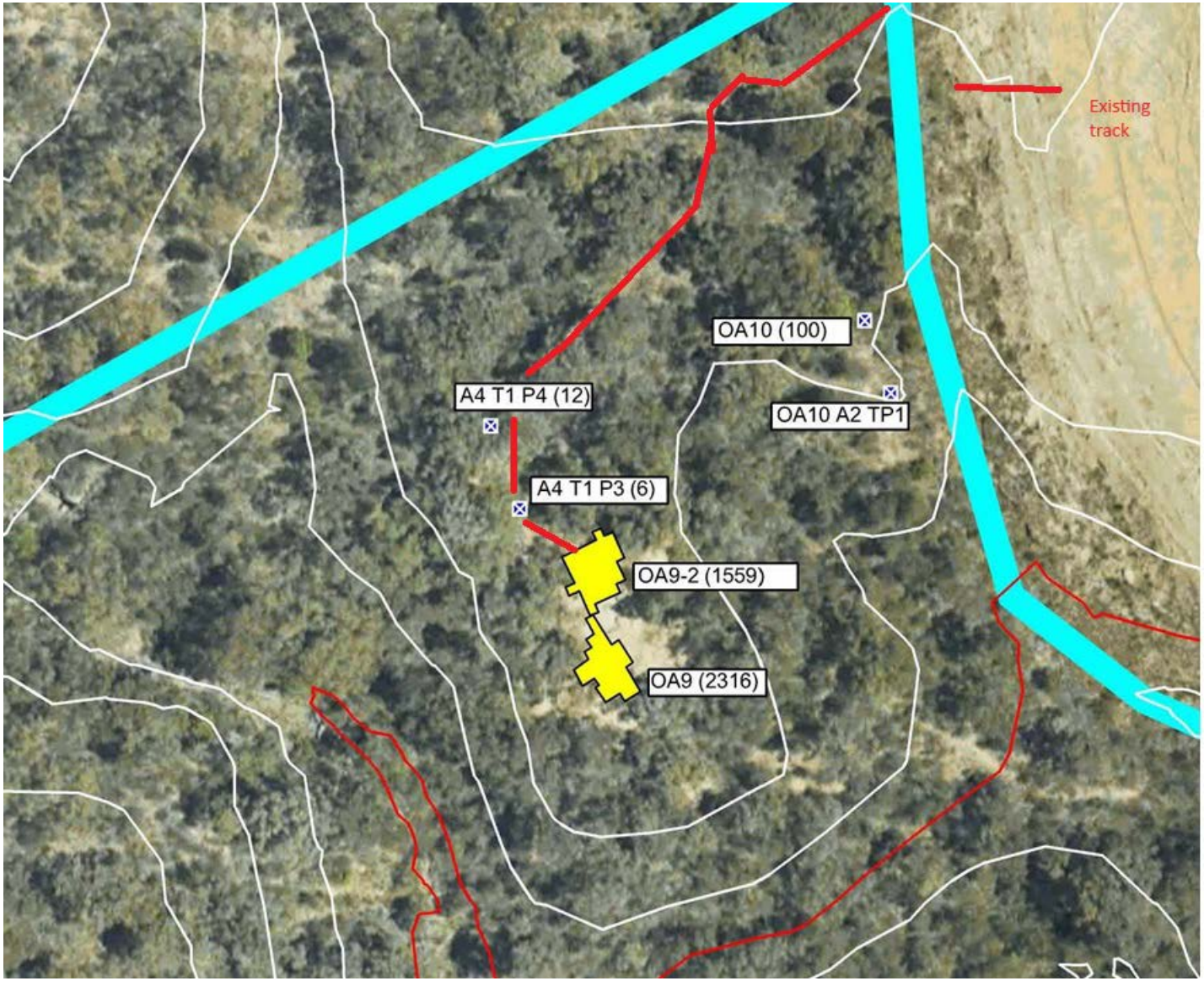

Figure 6 Open area 9 - accessed via existing track from the drill pad to excavation area.

Figure 7 View north in area to the right in Figure 2 – showing test pits and typical regrowth post logging over the BC54 site– access will be by weaving through the trees subject to ecologists inspection for nesting habitat.

Boggabri Coal Site BC54 Cultural Salvage Excavation 2023

In-Field Artefact Documentation Method

Neville Baker 19 October 2023

This document describes the process for documenting Aboriginal stone artefacts recovered in the course of archaeological excavations. A general schema for the cultural salvage is provided as context for the records management and artefact analysis. This may be amended by the Field Director.

Objective: create physical and digital records of all squares excavated and Aboriginal stone artefacts retrieved from the sieve.

Three key fieldwork locations and personnel include:

1. Excavation location: *Field Director* liaises with Aboriginal community fieldworkers to identify excavation locations, *Coordinating archaeologist* ensures precise excavation and records, Aboriginal fieldworkers liaise with artefact recorder to track artefact numbers and make decisions regarding where to expand excavation; fieldworkers transfer excavated soil to sieving station
2. Sieving station: *Sieve coordinator* ensures orderly system of sieving crew, square soils storage and retention of square bags until transfer to Recorder.
3. Records station: *Recorder* coordinates retention of all physical records (excavation forms and all square bags) in an organised and accessible manner. All excavation bags from sieve are inspected, artefacts counted, and non-artefactual stone discarded. Provenance details are entered into a database. Basic attributes are recorded: Artefact type, raw material, Maximum length, weight, cortex, observations. Records and artefacts and kept in recorder's vehicle

Definitions

Excavation square: One square metre excavation unit – also referred to as "square"

Excavation form: Form recording each completed excavation square

Square bag: snap-lock plastic bag labelled in accordance with direction on excavation form and prepared for each completed excavation square

Test pit: Excavation square dug in isolation for exploratory purposes

Area: Discrete subdivision of site BC54 for purpose of spatial orientation

Square (label): Alpha-numeric label allocated according to a grid plan for each Area

Spit: discrete layer of soil dug as a single unit either in arbitrary depths or as a single layer to the surface of the B unit clay. Spit 0 (zero) is labelled for surface collected material

PROCESS

Excavation location

- *Field Director* works with Aboriginal representatives to identify test pit and open area excavation locations
- *Field Director* establishes excavation grid with provenance labelling convention (Area, 1 m^2 alpha-numeric square label, spit)
- Prior to excavation *Field Director* assigns *Coordinating archaeologist* for each square
- *Coordinating archaeologist* prepares excavation form and labelled plastic bag for square
- *Coordinating archaeologist* marks out square for excavation in accordance with separate procedure
- Excavation crew conducts square excavation by machine and finishing by hand tools
- Excavation crew transfers excavated soil to sieve ensuring that the soil is transferred and stored in discrete areas to avoid mixing with other squares' soil

Records Transfer - Coordinating archaeologist places labelled plastic bag with soil at sieve in a manner that can be identified by sieving crew

Coordinating archaeologist transfers excavation form to designated "Completed Forms" folder at records station

Sieving station

- Under supervision of *Sieving coordinator* sieving crew tips all soil into sieve, recovers square bag and keeps plastic bag in designated secure location until completion of sieving all square soil
- All artefacts are placed in square bag during sieving
- At conclusion of sieving each square all excavation bags are retained – including bags where no artefacts have been found in the soil
- *Sieving coordinator* transfers excavation bag to designated container at sieving station

Records transfer – *Recorder* retrieves excavation bag from designated container and transfers to records station

- *Recorder* empties excavation bag into fine sieve for inspection of each object in turn looking for signs of artefactual conchoidal fracture or abrasion or other artefactual markers
- Non-artefactual material is discarded
- Artefacts are recorded into computer database and bag is annotated as recorded
- Basic cataloguing attributes include
    - technological type,
    - implement type (if applicable),

    - raw material,
    - length (by digital calipers),
    - weight
    - cortex (estimated percentage class)
    - other notable features such as macroscopically visible usewear
- Artefacts are returned to square bag
- Recorded excavation bags are transferred into “Recorded bags” container

Records transfer – At the end of each day all records will be transferred to *Recorder’s* vehicle (red Ford Ranger 4WD

- Relational database entries are made to link excavation records with artefact records, enabling tracking of spatial patterning of artefacts.
- *Recorder* will create QGIS map features in field if time allows.
- *Recorder* will communicate results of artefact spatial patterning to *Field Director* at regular intervals during each day
- *Field Director* will communicate salvage progress to all fieldwork team.