

Appendix 9 Aboriginal Cultural Heritage Assessment Report

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View across the central portion of the study area.

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

MODIFICATION TO THE BARINA QUARRY

COLLECTOR, NSW

JANUARY 2025

Report prepared by
OzArk Environment & Heritage
for Collector Resources Pty Limited

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ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT COVER SHEET

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Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

ABBREVIATIONS AND GLOSSARY

ACHAR	Aboriginal Cultural Heritage Assessment Report. As set out in the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i> , all developments where harm to Aboriginal objects is likely must be assessed in an ACHAR.
ACHCRs	<i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> . Guidelines for conducting Aboriginal community consultation for developments where harm to Aboriginal objects is likely.
ACHMP	Aboriginal Cultural Heritage Management Plan. A requirement of SSDs. An ACHMP both manages impacts to Aboriginal cultural heritage within approved disturbance areas (AHIPs are not required), as well as management of Aboriginal cultural heritage sites and values outside of approved impact areas but within land able to be managed by a proponent.
AHIMS	Aboriginal Heritage Information Management System. Administered by the DCCEEW, AHIMS is the central register of all Aboriginal sites within NSW.
AHIP	Aboriginal Heritage Impact Permit. Issued by Heritage NSW to allow harm to Aboriginal objects.
ASIRF	Aboriginal Site Impact Recording Form. A standardised form for recording authorised impacts to Aboriginal sites. Only with a completed ASIRF can a site be listed as 'destroyed' on the AHIMS.
Code of Practice	<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i> under Part 6 NPW Act. Issued by DECCW in 2010, the Code of Practice is a set of guidelines that allows limited test excavation without the need to apply for an AHIP.
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water. DCCEEW contains the Environment and Heritage Group including Heritage NSW.
DPHI	NSW Department of Planning, Housing and Infrastructure. DPHI contains the Planning agency.
GSE	Ground surface exposure. A measure of factors that may reveal surface artefacts such as erosion scalds.
GSV	Ground surface visibility. A measure of factors that may obscure the detection of surface artefacts such as leaf litter.

Heritage NSW	Government department tasked with ensuring compliance with the NPW Act. Heritage NSW is advised by the Aboriginal Cultural Heritage Advisory Committee (ACHAC).
NPW Act	<i>National Parks and Wildlife Act 1974</i> . Primary legislation governing Aboriginal cultural heritage within NSW.
RAP	Registered Aboriginal Party. An individual or group who have indicated through the ACHCR process that they wish to be consulted regarding the project.
SSD	State Significant Development

EXECUTIVE SUMMARY

Collector Resources (the Applicant) owns and operates the Barina Quarry, located on Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, Collector Road, Collector NSW, within the Queanbeyan-Palerang Regional Council (QPRC) Local Government Area (LGA).

The operations are approved under a State Significant Development (SSD) consent approved by Orders of the Land & Environment Court on 28 May 2001 (DA1-01-2000). The Applicant now intends to submit a development application to modify DA1-01-2000 under Section 4.56 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to extend the duration of the development consent referenced in Condition 1.3(a) by 15 years.

OzArk Environment & Heritage (OzArk) has been engaged by Irwin Environmental Management Pty Limited on behalf of the Applicant to complete an *Aboriginal Cultural Heritage Assessment Report* (ACHAR) for the proposed modification.

The *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010a) commenced in 2022 and were reinitiated in 2024 for the project.

A search of the Aboriginal Heritage Information Management System (AHIMS) database returned 23 records for Aboriginal heritage sites within the designated search area. One previously recorded site, 51-5-0063 (CL1), is located approximately 95 metres (m) from the northern part of the study area.

The field survey was undertaken by OzArk on 19 January 2023. No Aboriginal sites were recorded during the assessment. Further, due to the sloping nature of the landform, the observed thin soils and the levels of previous disturbance across parts of the study area, it is assessed that there is a low probability for there to be further, undetected, subsurface sites.

Recommendations concerning Aboriginal cultural values within the study area are as follows:

1. Following development consent of the project, the proposed work may proceed with caution. In the unlikely event that unexpected Aboriginal heritage items are encountered during work, the *Unanticipated Finds Protocol* in **Appendix 3** must be implemented. **Appendix 4** provides the appropriate procedure to be undertaken in the unlikely event that human remains are encountered.
2. This ACHAR concludes that the project may proceed without further archaeological investigation under the following conditions:
 - a. All land and ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to potential Aboriginal objects in adjacent landforms. Should the parameters of the project extend beyond the assessed study area, then further archaeological assessment may be required.

- b. All staff and contractors involved in the proposed work should undergo a cultural heritage induction to ensure they can recognise Aboriginal artefacts (see **Appendix 5**), and are aware of the legislative protection requirements for all Aboriginal sites and objects under the *National Parks and Wildlife Act 1974* and are familiar with the *Unanticipated Finds Protocol* and the skeletal remains protocol.

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1 INTRODUCTION

1.1 APPROVED DEVELOPMENT

Collector Resources (the Applicant) owns and operates the Barina Quarry (the Quarry), located on Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, Collector Road, Collector NSW, within the Queanbeyan-Palerang Regional Council (QPRC) Local Government Area (LGA) (refer to **Figure 1-1**).

The operations are approved under a State Significant Development (SSD) consent approved by Orders of the Land & Environment Court on 28 May 2001 (DA1-01-2000). The approval permits a production of up to 300,000 tonnes per annum (tpa) with a maximum monthly production of 40,000 tonnes.

The approved activities are summarised as follows.

- Completion of extraction from an initial open cut (Pit 1) to a floor elevation of 716 metres (m) Australian Height Datum (AHD) and floor area of 1.5 hectares (ha)
- Extraction by drill and blast methods from a second open cut (Pit 2) to a maximum depth of 714 mAHD.
- Delivery and disposal of overburden to emplacements north of Pit 1 and 2.
- In-pit crushing and screening operations utilising a primary jaw crusher, one or more cone crushers and a variety of stationary and vibrating screens.
- Transport from the Quarry of up to 134 vehicle movements per day and 20 vehicle movements per hour.
- Hours of operation commencing at 7.00 am to 6.00 pm Monday to Saturday.

The approved disturbance area of the Quarry incorporates additional features in the form of stripped and excavated land, drainage lines, dams, bunds and cut batters associated with the operations on the existing Quarry site preceding DA 1-01-2000. These areas have been included within the approved disturbance footprint of the Quarry (refer to **Figure 1-2**).

1.2 OPERATIONAL HISTORY AND CURRENT STATUS

Operations under DA 1-01-2000 commenced in 2005, with extraction in Pit 1 completed before transitioning to Pit 2 from which extraction was undertaken intermittently for several years. Crushing and screening was undertaken within Pit 1 with products stockpiled within Pit 1 and on lands to the immediate north of Pit 1. Extraction and other operations effectively ceased in 2008, with Pit 2 approximately 2 ha in area and maximum depth of 778 mAHD, and the Quarry was placed into care & maintenance since. The extents of disturbance compared to the approved disturbance footprint are identified on **Figure 1-2**.

Collector Resources acquired the property and DA 1-01-2000 in 2016, however, operational control only reverted to the Applicant in 2019. While initially intending to recommence extraction operations in 2020, these plans were postponed pending the completion of further feasibility and quarry planning work.

A modification to DA 1-01-2000 was approved in November 2023 under Section 4.56 of the *Environmental Planning & Assessment Act 1979* for a 12-month extension to operations. DA 1-01-2000 (MOD 2) made no change to the overall operations of the Quarry, however, introduced conditions requiring satisfactory completion of road upgrades and an independent environmental audit prior to recommencement.

1.3 THE PROPOSED MODIFICATION

A second modification (the project) is proposed to allow for continuation of operations. These modifications, which are identified on **Figure 1-3**, are as follows.

- An extension to operations for 15 years (excluding rehabilitation which could be completed beyond the term of extended operations).
- Establishment of additional stockpiling areas.
 - o South Stockpile Area. A new stockpiling area between Pits 1 and 2. This area has been the subject of ancillary activities associated with the Quarry (by a previous owner and operator) and ongoing property management. The area is considered modified and of low biodiversity value.
 - o North Stockpile Area. Conversion of an area allocated to overburden emplacement (to the north of Pit 1) along with a small extension to the north and east.
 - o Overburden Emplacement Stockpile Area. Modification to the Pit 2 Overburden Emplacement to allow for supplementary stockpiling of Quarry product.
- Importation of clean fill materials for use as engineered fill for the construction of internal roads and stockpiling areas, and possible backfill of the extraction areas.
- Relocation of mobile and modular crushing and screening operations to either Pit 2 (preferred option) or the new Stockpile area (secondary option). It is also proposed to add a small washing circuit for the production of manufactured sand products.
- Removal of the distinction between laden and unladen movements (allowing for laden trucks to enter the Quarry site with clean fill and leave with quarry products).
- Relocation of the Quarry office, weighbridge and amenities onto the South Stockpile Area, inclusion of workshops and a small laydown area on Lot A DP86342, and realignment of some internal roads between the Quarry entrance, relocated facilities and stockpile areas.

1.4 STUDY AREA

The study area describes the area of additional impacts (to those approved by DA 1-01-2000) associated with the proposed modification (**Figure 1-4**). The study area is located at the Quarry, off Collector Road and includes approximately 7 ha of land.

1.5 PURPOSE OF THIS ASSESSMENT AND BACKGROUND

OzArk Environment & Heritage (OzArk) has been engaged by Irwin Environmental Management Pty Limited on behalf of the Applicant to complete an *Aboriginal Cultural Heritage Assessment Report* (ACHAR) for the proposed modification.

OzArk was previously engaged in 2022/2023 to undertake the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010a) and prepare an ACHAR for the project. In 2022, the ACHCRs were initiated. Survey across the current study area was completed on 19 January 2023. No Aboriginal sites were recorded during the assessment. Following the field assessment and prior to the preparation of the ACHAR, the project was placed on hold. OzArk also previously completed the ACHCRs for another project on the property in 2018 before that proposal was placed on hold.

Irwin Environmental Management Pty Limited has now been commissioned by the Applicant to prepare a Modification Report and has engaged OzArk to provide the assessment of Aboriginal cultural heritage impacts through the preparation of an ACHAR, utilising the results of the previous 2023 survey.

Figure 1-1: Map showing the location of the project.

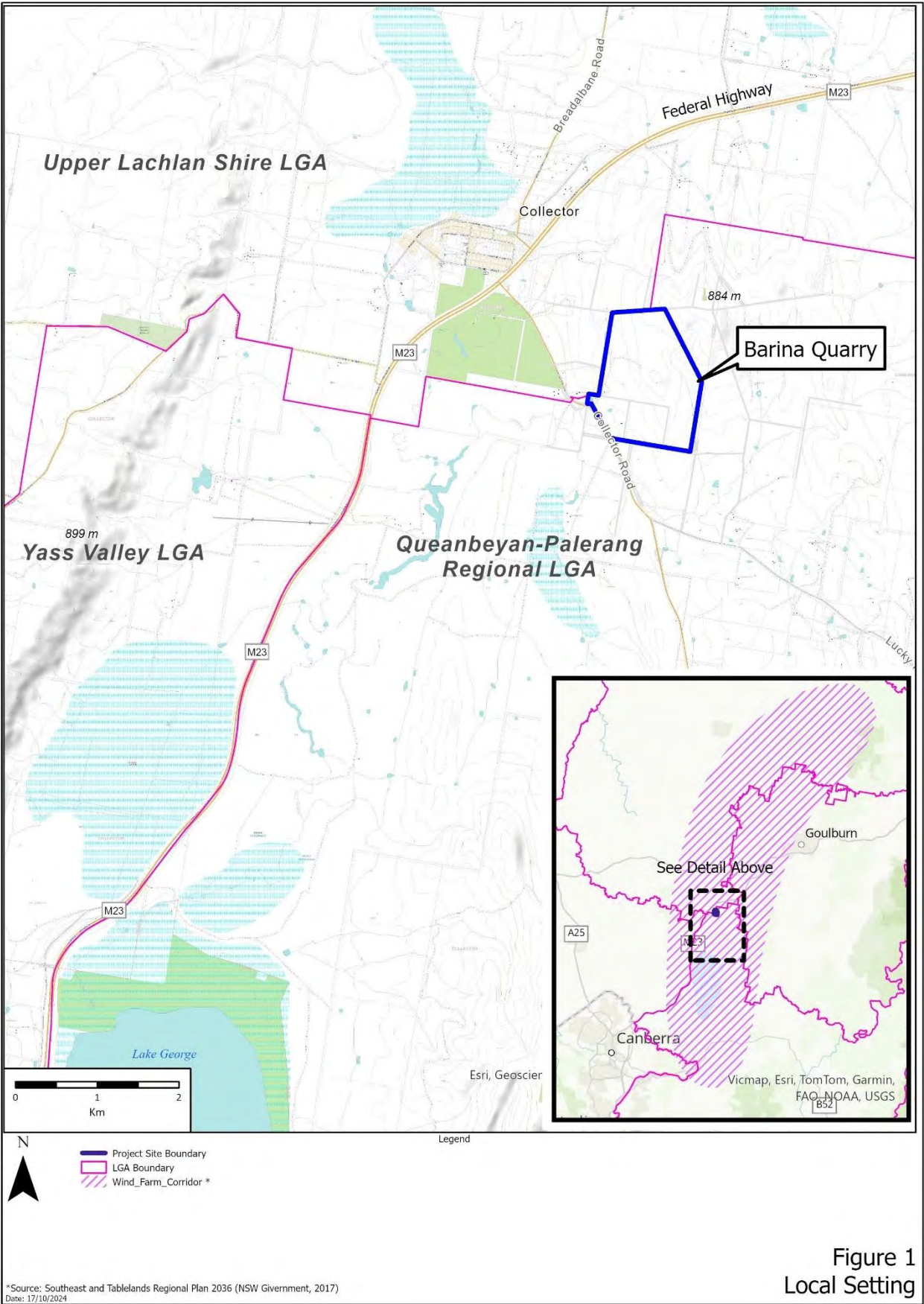


Figure 1-2. Approved quarry layout.

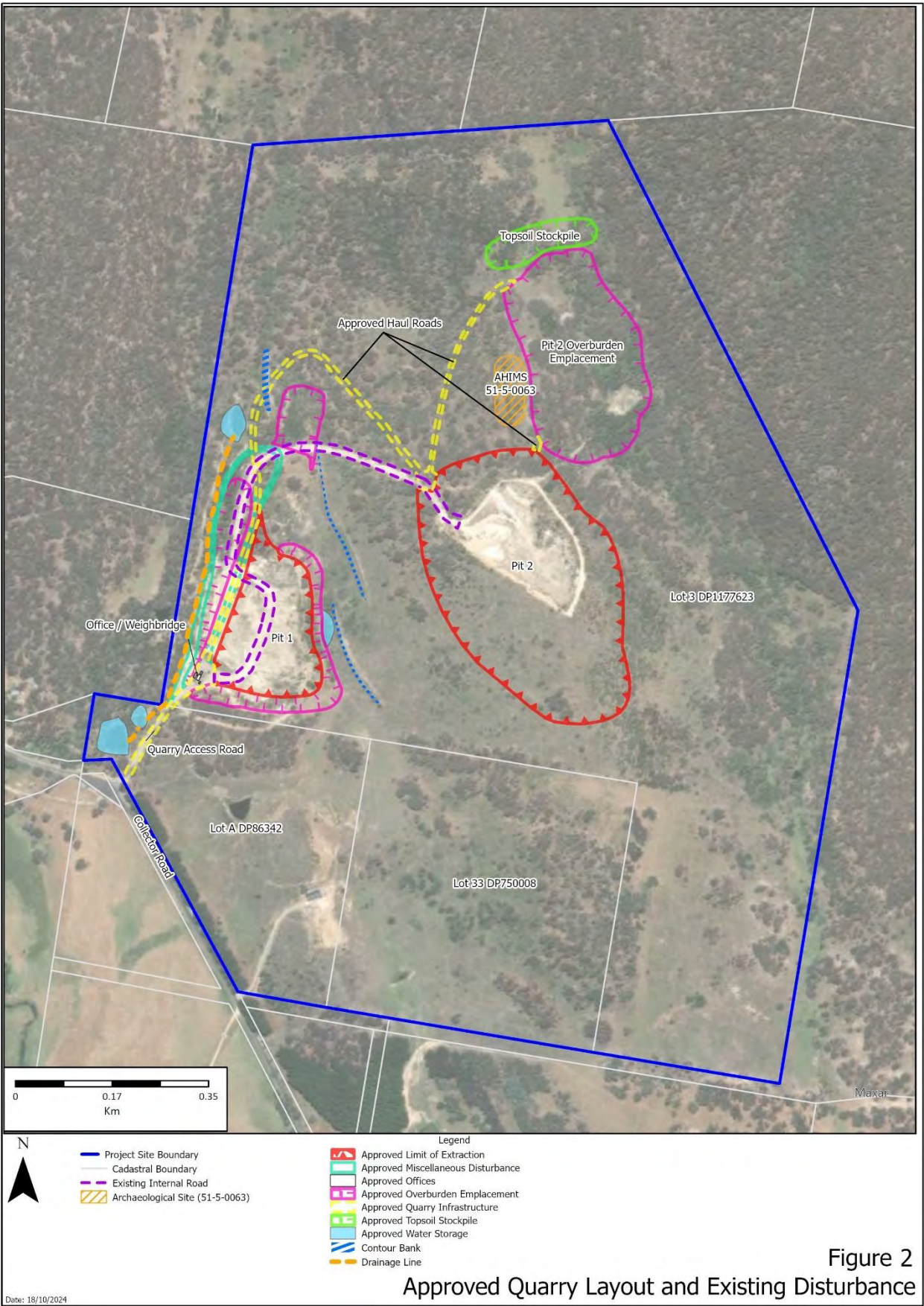


Figure 1-3. Proposed impact footprint.

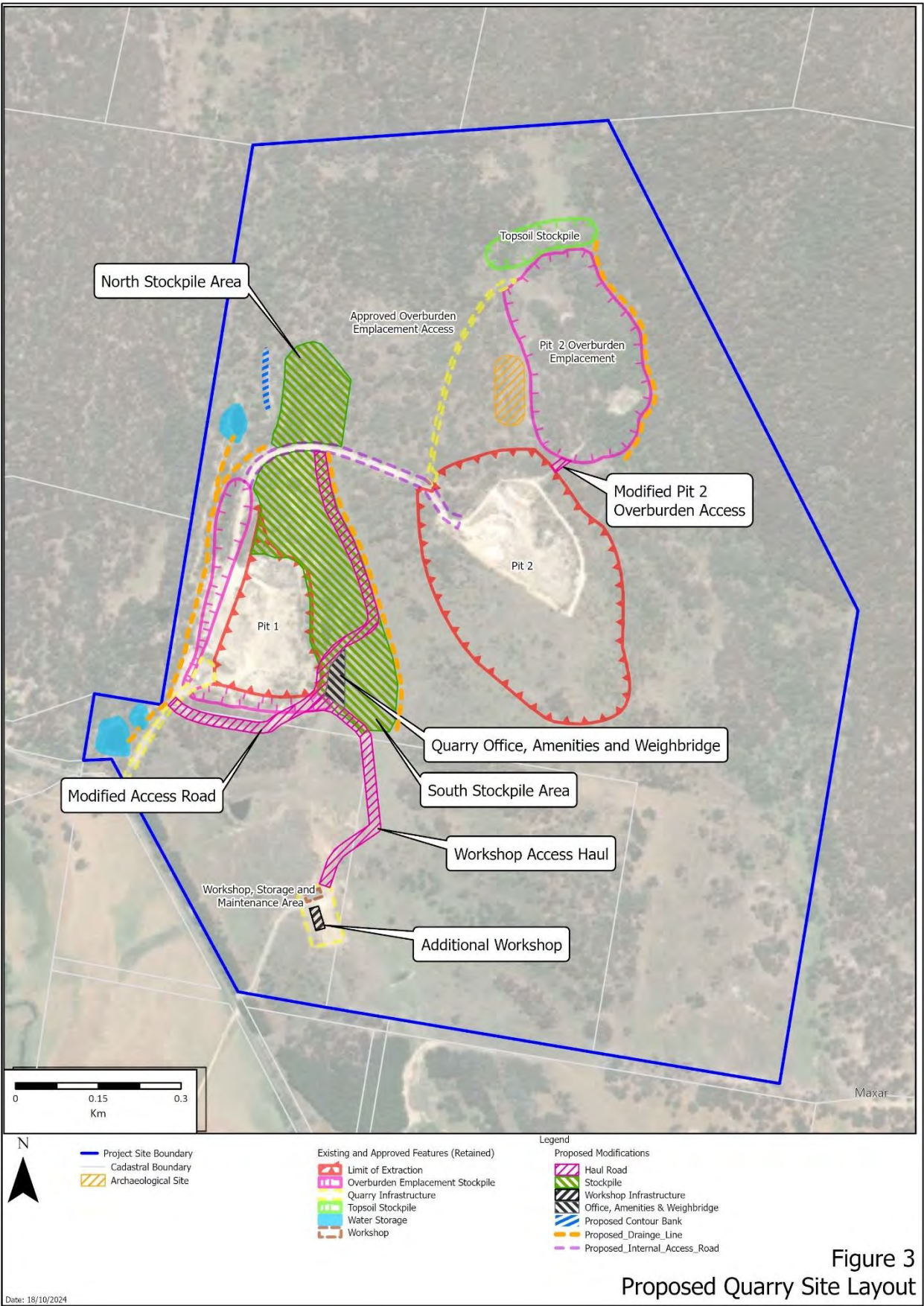
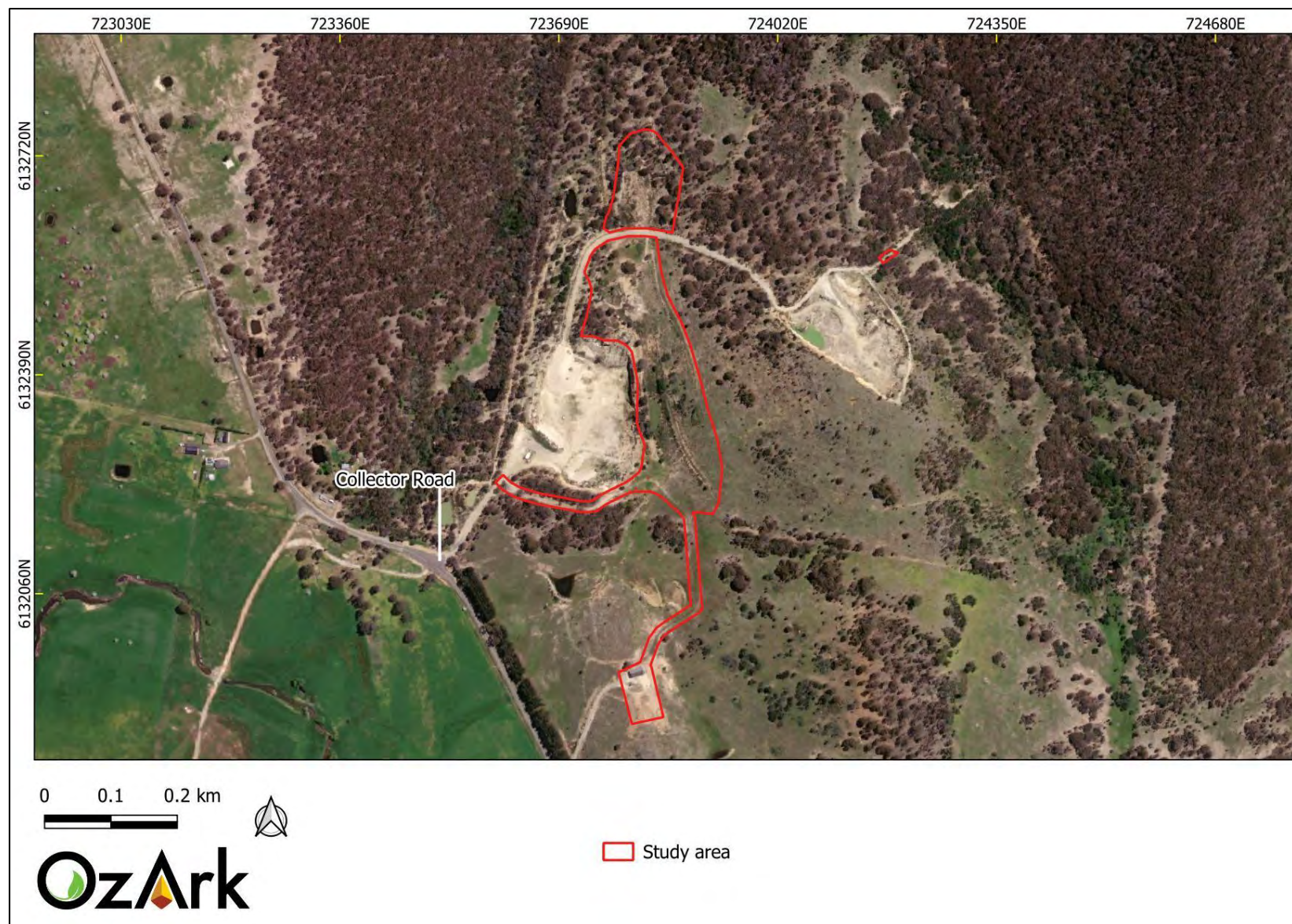


Figure 1-4. Aerial of the study area.



2 THE ABORIGINAL CULTURAL HERITAGE ASSESSMENT

2.1 RELEVANT LEGISLATION

Cultural heritage is managed by several state and national Acts. Baseline principles for the conservation of heritage places and relics can be found in the *Burra Charter* (Burra Charter). The *Burra Charter* has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The *Burra Charter* generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a state level.

Several Acts of parliament provide for the protection of heritage at various levels of government.

2.1.1 Commonwealth legislation

2.1.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water, provides a framework to protect nationally significant flora, fauna, ecological communities, and heritage places. The EPBC Act establishes both a National Heritage List and Commonwealth Heritage List of protected places. These lists may include Aboriginal cultural sites or sites in which Aboriginal people have interests. The assessment and permitting processes of the EPBC Act are triggered when a proposed activity or development could potentially have an impact on one of the matters of national environment significance listed by the Act. Ministerial approval is required under the EPBC Act for proposals involving significant impacts to national/commonwealth heritage places.

Applicability to the project

It is noted there are no Commonwealth or National heritage listed places within the study area, and as such, the heritage provisions of the EPBC Act and other Commonwealth Acts do not apply.

2.1.2 State legislation

2.1.2.1 *Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) established requirements relating to land use and planning. The main parts of the EP&A Act that relate to development assessment and approval are Part 4 (development assessment) and Part 5 (environmental assessment). The purpose of the Part 5 assessment system is to ensure public authorities fully

consider environmental issues before they undertake or approve activities that do not require development consent from a council or the Minister. The Minister responsible for the Act is the Minister for Planning and Public Spaces.

The EP&A Act currently provides the primary legislative basis for planning and environmental assessment in NSW. The objects of the EP&A Act include encouragement of:

- The proper management, development, and conservation of natural resources
- The provision and coordination of the orderly and economic use and development of land
- Protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats
- Ecologically sustainable development.

The objects also provide for increased opportunity for public involvement and participation in environmental planning and assessment.

The EP&A Act includes provisions to ensure that the potential environmental impacts of a development or activity are rigorously assessed and considered in the decision-making process.

The framework governing environmental and heritage assessment in NSW is contained within the following parts of the EP&A Act:

- Part 4: Local government development assessments, including heritage. May include schedules of heritage items
 - o Division 4.56: Modification by consent authorities of consents granted by the Court.

Applicability to the project

The current project will be assessed under Part 4 Division 4.56 of the EP&A Act.

As the project is a modification to an SSD, if approved, Section 4.41 of the EP&A Act would apply and therefore an AHIP under section 90 of the NPW Act to harm Aboriginal objects would not be required. Instead, all management related to Aboriginal cultural heritage within the study area would be governed by the policies within an approved *Aboriginal Cultural Heritage Management Plan* (ACHMP). However, neither will be necessary due to the lack of Aboriginal objects and values identified during survey (see **Section 6.3**).

2.1.2.2 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the protection of Aboriginal objects (sites, objects, and cultural material) and Aboriginal places. Under the Act (Part 6), an Aboriginal object is defined as: any deposit, object, or material evidence (not being a handicraft

for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction and includes Aboriginal remains.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

It is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86, such as:

- The harm was authorised by and conducted in accordance with the requirements of an *Aboriginal Heritage Impact Permit* (AHIP) under Section 90 of the Act
- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the Secretary of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) of the location of an Aboriginal object. Identified Aboriginal items and sites are registered on Aboriginal Heritage Information Management System (AHIMS) that is administered by Heritage NSW.

Applicability to the project

Any Aboriginal sites within the study area are afforded legislative protection under the NPW Act.

The Secretary of DCCEEW will be notified of the location of an Aboriginal object recorded by sending the relevant details to the AHIMS register.

2.2 ASSESSMENT APPROACH

The archaeological assessment followed the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice; DECCW 2010b).

The Aboriginal cultural heritage assessment followed the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (the Guide; OEH 2011) and the ACHCRs.

2.3 PURPOSE AND OBJECTIVES

The purpose of this study is to identify and assess heritage constraints relevant to the project.

The study will apply the Code of Practice, the Guide, and the ACHCRs in the completion of the Aboriginal cultural heritage assessment to meet the following objectives:

Objective One: Undertake background research on the study area to formulate a predicative model for site location within the study area

Objective Two: Identify and record Aboriginal cultural heritage values within the survey areas. This includes intangible cultural values, Aboriginal objects, and any landforms likely to contain further archaeological deposits

Objective Three: To assess the significance of any recorded Aboriginal cultural values, Aboriginal objects, or sites in consultation with Registered Aboriginal Parties (RAPs)

Objective Four: Assess the likely impacts of the proposed work to Aboriginal cultural heritage values and provide management recommendations.

2.4 REPORT COMPLIANCE WITH THE CODE OF PRACTICE

The Code of Practice establishes requirements that should be followed by all archaeological investigations where harm to Aboriginal objects may be possible. **Table 2-1** tabulates the compliance of this report with the requirements established by the Code of Practice.

Table 2-1: Report compliance with the Code of Practice.

Code of Practice Requirement	Context of the Requirement	Concordance in this report
Requirement 1a	Review previous archaeological work	Section 5.3.2
Requirement 1b	Review AHIMS searches	Section 5.3.1
Requirement 2	Review the landscape context	Section 4
Requirement 3	Summarise and discuss the local and regional character of Aboriginal land use and its material traces	Section 0
Requirement 4a	Develop predictive model	Section 5.4
Requirement 4b	Present predictive model results	Section 5.4.3
Requirement 5a	Archaeological survey sampling strategy	Section 6.1
Requirement 5b	Archaeological survey requirements	This Requirement was fulfilled during the undertaking of the survey
Requirement 5c	Archaeological survey units	Section 6.1
Requirement 6	Site definition	Sections 5.4.1 and 5.4.2
Requirement 7a	Site recording information to be recorded	Not applicable to this report as no new sites were recorded.
Requirement 7b	Site recording: scales for photography	Not applicable to this report as no new sites were recorded.
Requirement 8a	Geospatial information	Not applicable to this report as no new sites were recorded.
Requirement 8b	Datum and grid coordinates	All coordinates are provided in GDA Zone 55.
Requirement 9	Record survey coverage data	Section 6.1
Requirement 10	Analyse survey coverage	Section 6.2
Requirement 11	Archaeological Report content and format	This report adheres to this Requirement.
Requirement 12	Records	OzArk undertakes to maintain all survey records for at least five years.

Code of Practice Requirement	Context of the Requirement	Concordance in this report
Requirement 13a	Notifying Heritage NSW of breaches	Not applicable
Requirement 13b	Providing Heritage NSW with information	Not applicable
Requirement 14	Test excavation which is not excluded from the definition of harm	The test excavation did not take place in any of the landforms identified in Requirement 14.
Requirement 15a	Consultation regarding test excavation	Not applicable to this report as no test excavation necessary
Requirement 15b	Developing a test excavation sampling strategy	Not applicable to this report as no test excavation necessary
Requirement 15c	Providing Heritage NSW with notification of the test excavation	Not applicable to this report as no test excavation necessary
Requirement 16a	Test excavation that can be carried out in accordance with the Code of Practice	Not applicable to this report as no test excavation necessary
Requirement 16b	Objects recovered during test excavations	Not applicable to this report as no test excavation necessary
Requirement 17	When to stop test excavations	Not applicable to this report as no test excavation necessary
Requirement 18–20	Artefact recording	The procedures for artefact recording were adhered to during the investigation.

2.5 DATE OF ARCHAEOLOGICAL ASSESSMENT

The field survey was undertaken by OzArk on the 19 January 2023.

2.6 OZARK INVOLVEMENT

2.6.1 Field survey

The fieldwork survey was undertaken by:

- Senior Archaeologist: Stephanie Rusden (BA Archaeology, University of New England, BSc Land and Heritage Management, University of Wollongong).

2.6.2 Reporting

The reporting component of the heritage assessment was undertaken by:

- Report author: Kelsey Bennett (OzArk Project Archaeologist, MA Classical Archaeology, BA (Hons) Classical Archaeology, The University of Kent).
- Reviewer: Stephanie Rusden.

3 ABORIGINAL COMMUNITY CONSULTATION

3.1 INTRODUCTION TO CULTURAL VALUES

No matter who you are, we all have culture. Each person's culture is important; it's part of what makes us who we are.

australianstogether.org.au

Many Aboriginal people in Australia have a unique view of the world that's distinct from the mainstream. Land, family, law, ceremony, and language are five key interconnected elements of Aboriginal culture. For example, families are connected to the land through the kinship system, and this connection to land comes with specific roles and responsibilities which are enshrined in the law and observed through ceremony. In this way, the five elements combine to create a way of seeing and being in the world that is distinctly Aboriginal.

Aboriginal and Torres Strait Islander peoples are connected to Country through lines of descent (paternal and maternal), as well as clan and language groups. Territory is defined by spiritual as well as physical links. Landforms have deep meaning, recorded in art, stories, songs, and dance. Songlines or Dreaming Tracks as well as kinship structures link Aboriginal peoples to the territories of other groups. In the past, these links were also used for trade.

Living on this land for more than 50,000 years, Aboriginal and Torres Strait Islanders established effective ways to use and sustain resources. One important aspect is the right of certain people to control the use of resources in a particular area, as well as cultural and spiritual values like totemism that were fundamental in resource management. There was a wide range of traditional methods for gathering food including fish traps, subsistence agriculture, hunting and harvesting a wide range of natural fruits and vegetables. Some groups of people would stay in one place, while others moved around the land according to the seasons, to ensure sustainable and rich food supplies, and to fulfil their spiritual and cultural obligations.

In much of eastern Australia, Aboriginal communities live their lives like most Australians. However, in certain crucial areas, particularly associated with family, leadership roles and caring for Country, Aboriginal lore continues, even in the most urbanised communities.

3.2 ABORIGINAL COMMUNITY CONSULTATION

A major aim of this assessment is to identify any cultural values within the landscape in which the project is located so that those values can be recognised and incorporated into the project's management recommendations.

The Aboriginal cultural heritage assessment of the project has followed the ACHCRs (DECCW 2010a). As noted in **Section 1.5**, the ACHCRs for the project were originally initiated in 2022, but were placed on hold in early 2023 following the completion Stage 2/3. Given the time that had lapsed, the ACHCRs for this ACHAR have recommenced at Stage 1.

A log and copies of correspondence with Aboriginal community stakeholders is presented in **Appendix 1 Figure 1**.

The ACHCRs include four main stages, and these will be detailed in the following sections.

3.2.1 ACHCRs Stage 1

3.2.1.1 Round 1

The aim of Stage 1 is to identify the RAPs who wish to be consulted about the project.

On 20 and 21 September 2022 an advertisement was placed in the Goulburn Post and Queanbeyan Age by Umwelt Australia Pty Ltd (Umwelt) requesting expressions of interest in being consulted about the project (**Appendix 1 Figure 2**). In addition, the following agencies were contacted by Umwelt to identify potential stakeholders for the area: Gulgunya Ngunawal Heritage Aboriginal Consultancy; Local Land Services – Southeast; National Native Title Tribunal; Native Title Services Corporation Limited (NTSCORP); Onerwal Local Aboriginal Land Council (LALC); Pejar LALC and Office of the Registrar, *Aboriginal Land Rights Act 1983* (**Appendix 1 Figure 3**).

Letters were sent to the listed on the Heritage NSW stakeholder list on 6 October 2022 (**Appendix 1 Figure 4**).

As a result, the following individuals/groups registered to be consulted:

- Shayne Dickson
- Robert Young
- Dean Delponte
- Jesse Carroll Johnson
- Ryan Johnson
- Tyronne Bell & Bronwyn
- Steven Johnson
- Merekai Bell
- Rebecca Ingram
- Lavinus Ingram
- Lavina Singleton.

In addition, Pejar LALC, Onerwal LALC, Thunderstone Aboriginal Culture and Land Management Services Aboriginal Corporation and Gulgunya Ngunawal Heritage Aboriginal Consultancy were added to the RAPs as they constituted the RAPs identified following ACHCRs completed in 2018.

3.2.1.2 Round 2

As noted in **Section 1.2** and **3.2**, the project went on hold in 2023. Given the lapse in time since RAPs were contacted regarding the project, the ACHCRs recommenced with an advertisement placed in the *Goulburn Post* on 18 September 2024 (**Appendix 1 Figure 5**) and the statutory government agencies contacted (**Appendix 1 Figure 6**). Letters were sent to the listed on the Heritage NSW stakeholder list on 2 October 2024 (**Appendix 1 Figure 4**).

All previous RAPs were contacted, with the option provided to no longer be consulted regarding the project (**Appendix 1 Figure 8**).

Following this, an additional ten individuals/groups have registered to be consulted over the project.

The following individuals/groups form the RAP group for the project:

- Adrian Brown
- Brindabella Dreaming
- Dean Delponte
- Didge Ngunawal Clan
- Djirringanj Elders Federation
- Ginninderra Aboriginal Corporation
- Gulgunya Ngunawal Heritage Aboriginal Consultancy
- Gundungurra Tribal Council Aboriginal Corporation
- Gunjeewong Aboriginal Corporation
- Guntawang Aboriginal Resources Incorporated
- Konanggo Aboriginal Cultural Heritage Services
- Lavina Singleton
- Lavinus Ingram
- Merekai Bell (Yurwang Gundana Cultural Heritage Services)
- Mura Culture services
- Muragadi Heritage Indigenous Corporation
- Murra Bidgee Mullangari
- Onerwal Local Aboriginal Land Council
- PD Ngunawal Consultancy

- Pejar Local Aboriginal Land Council
- Rebecca Ingram
- Sonione Wakabut Rogers
- Stakeholder 1¹
- Tyronne & Bronwyn Bell
- Woka Aboriginal Corporation.

3.2.2 ACHCRs Stage 2

The aim of Stage 2 is to provide information about the project to the RAPs.

3.2.2.1 *Round 1*

Detailed project information for the initial proposed works was provided in the assessment methodology that was issued to the initial fifteen RAPs for their consideration on 13 December 2022 (**Appendix 1 Figure 9**).

3.2.2.2 *Round 2*

The assessment methodology outlining the current proposed project was provided to all RAPs on 21 October 2024 (**Appendix 1 Figure 12** and **Appendix 2**).

3.2.3 ACHCRs Stage 3

The aim of Stage 3 is to acquire information regarding Aboriginal cultural values associated with the project through RAP consultation and field work.

3.2.3.1 *Round 1*

To inform the RAPs of the assessment, an assessment methodology was issued to the initial fifteen RAPs for their consideration on 13 December 2022 with comments requested by 13 January 2023 (**Appendix 1 Figure 9**). This document provided the archaeological context of the study area, outlined the proposed sampling strategy for the survey, and asked whether there were any cultural values that should be considered in the assessment.

Two responses were received from Muragadi Heritage Indigenous Corporation on 13 December 2022 and Dean Delponte on 21 December 2022 advising that they had reviewed and supported the methodology (**Appendix 1 Figure 10**).

¹ Group has requested their details not be disclosed.

3.2.3.1.1 Aboriginal Focus Group Meeting

During the initial round of the ACHCRs, the initial 15 RAPs were invited to attend an Aboriginal Focus Group Meeting held on 20 December 2022 (**Appendix 1 Figure 11**). None of the RAPs attended the AFGM.

3.2.3.2 Round 2

The assessment methodology outlining the current project was provided to all RAPs on 21 October 2024 with comments requested by 18 November 2024 (**Appendix 1 Figure 12** and **Appendix 2**). This document provided the archaeological context of the study area, a summary of the survey previously undertaken, and asked whether there were any cultural values that should be considered in the assessment.

One response was received from Murra Bidgee Mullangari on 21 October 2024 advising that they had reviewed and supported the methodology (**Appendix 1 Figure 13**).

3.2.4 ACHCRs Stage 4

Stage 4 involves the production of a draft ACHAR that is issued to all RAPs for their consideration. The ACHAR will document the results of the assessment, outline opportunities for the conservation of Aboriginal cultural values, and suggest recommendations for the management of Aboriginal objects should impacts to these objects be unavoidable.

A copy of the draft ACHAR was distributed to the RAPs for review on 19 December 2024 (**Appendix 1 Figure 14**). The review period closed on the 21 January 2025.

Responses were received from Yurwang Gundana Cultural Heritage Services and Guntawang Aboriginal Resources Incorporated advising that they support the recommendations in the ACHAR (**Appendix 1 Figure 15**).

3.3 CULTURAL VALUES IDENTIFIED THROUGHOUT THE ACHCR PROCESS

No specific cultural values were identified by the RAPs regarding the study area to date, however, the strong cultural values of Aboriginal communities towards landscapes and cultural heritage sites are recognised.

4 LANDSCAPE CONTEXT

An understanding of the environmental context of a study area is requisite in any Aboriginal archaeological investigation (DECCW 2010b). It is a particularly important consideration in the development and implementation of survey strategies for the detection of archaeological sites. In addition, natural geomorphic processes of erosion and/or deposition, as well as human-activated landscape processes, influence the degree to which the remains of material culture are retained in the landscape as archaeological sites; and the degree to which they are preserved, revealed and/or conserved in present environmental settings.

4.1 TOPOGRAPHY AND GEOLOGY

The study area is located in the South East Highlands Bioregion, specifically, within the Monaro sub-bioregion. The study area is within the Gundary Plains landscape as characterised by Mitchell (2002). This landscape type is characterised by wide open valleys with abandoned terraces and quaternary lakebeds on lower Devonian siltstone sandstone, andesite and quartz felspar porphyry.

The topography of the study area itself is primarily undulating lower slope landforms that rise eastwards towards a locally prominent hill (850 m above sea level), located 930 m northeast of the study area (see **Figure 4-1**).

Figure 4-1: Topography and drainage of the study area.



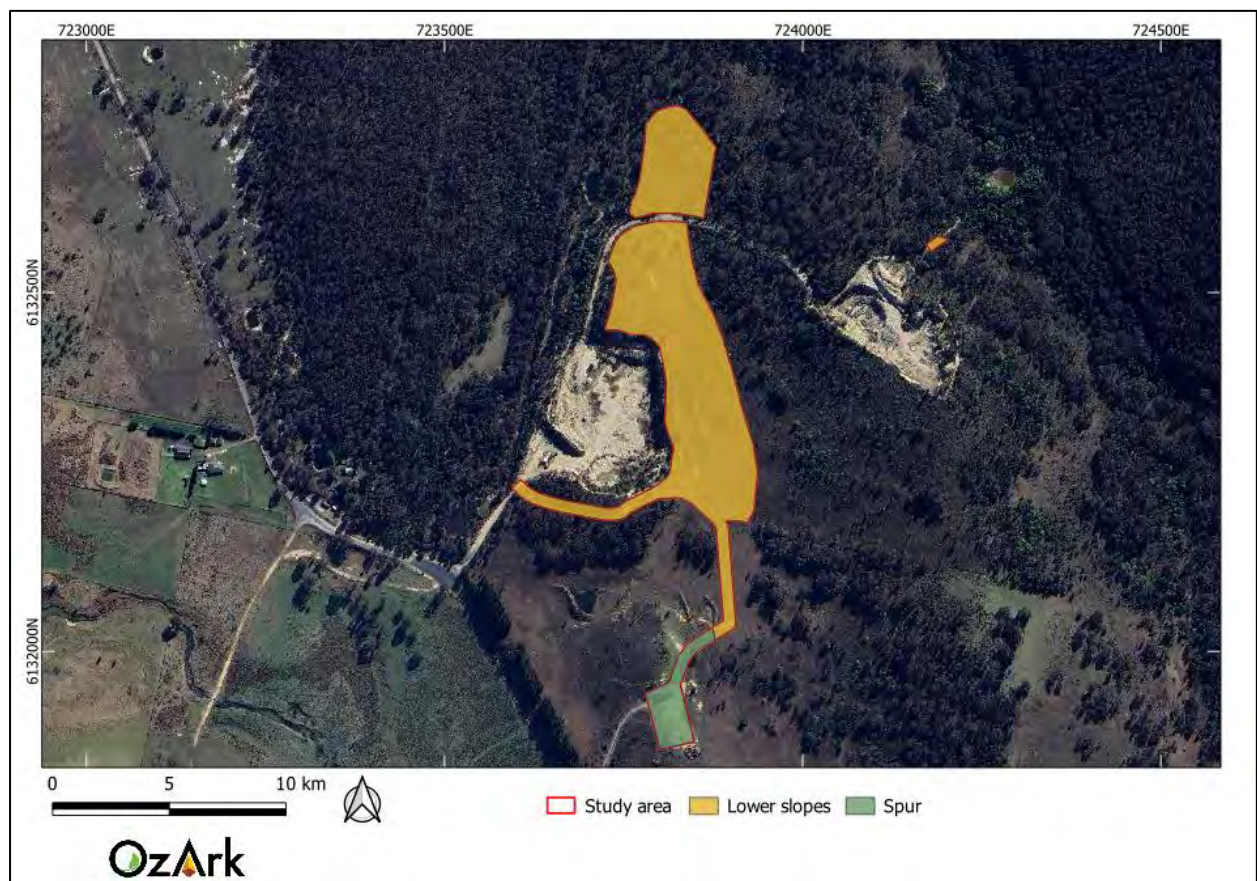
4.1.1 Survey units

Based on the topography of the study area, survey units were identified to capture the major topographical features of the study area. The designation of survey units will allow a comparison of the archaeological potential of each major topographical feature within the project area to understand whether certain landform types are more likely to contain Aboriginal objects than others.

Description of the survey units (**Figure 4-2**):

- Survey Unit 1: undulating lower slopes
- Survey Unit 2: spur.

Figure 4-2: Aerial of the study area showing the location of survey units.



4.2 SOILS

Soil analysis has important ramifications for archaeological research through the potential impact of different soils on human activity (such as agricultural exploitation) and the impact of the soils on archaeological evidence (such as post-depositional movement).

In the Soil Landscapes of the Goulburn 1:250,000 Sheet (Hird 1991), there are two Soil Landscapes within the study area. The Midgee soil landscape covers most of the study area and includes stony and acid yellow earths and yellow podzolic soils. The Collector Creek soil

landscape occurs in the southwest of the study area and includes soils consisting of moderately deep, grey and yellow mottled duplex soils with bleached A2 horizons. Yellow podzolic soils are found on higher ground (Hird 1991).

4.3 HYDROLOGY

Currawang Creek is the closest semi-permanent watercourse and is located approximately 465 m southwest of the study area at the closest point, with most of the study area being over 500 m away. An ephemeral drainage feature is located immediately west of the study area which drains into Currawang Creek to the south, although it would only flow during significant rain events (see **Figure 4-1**).

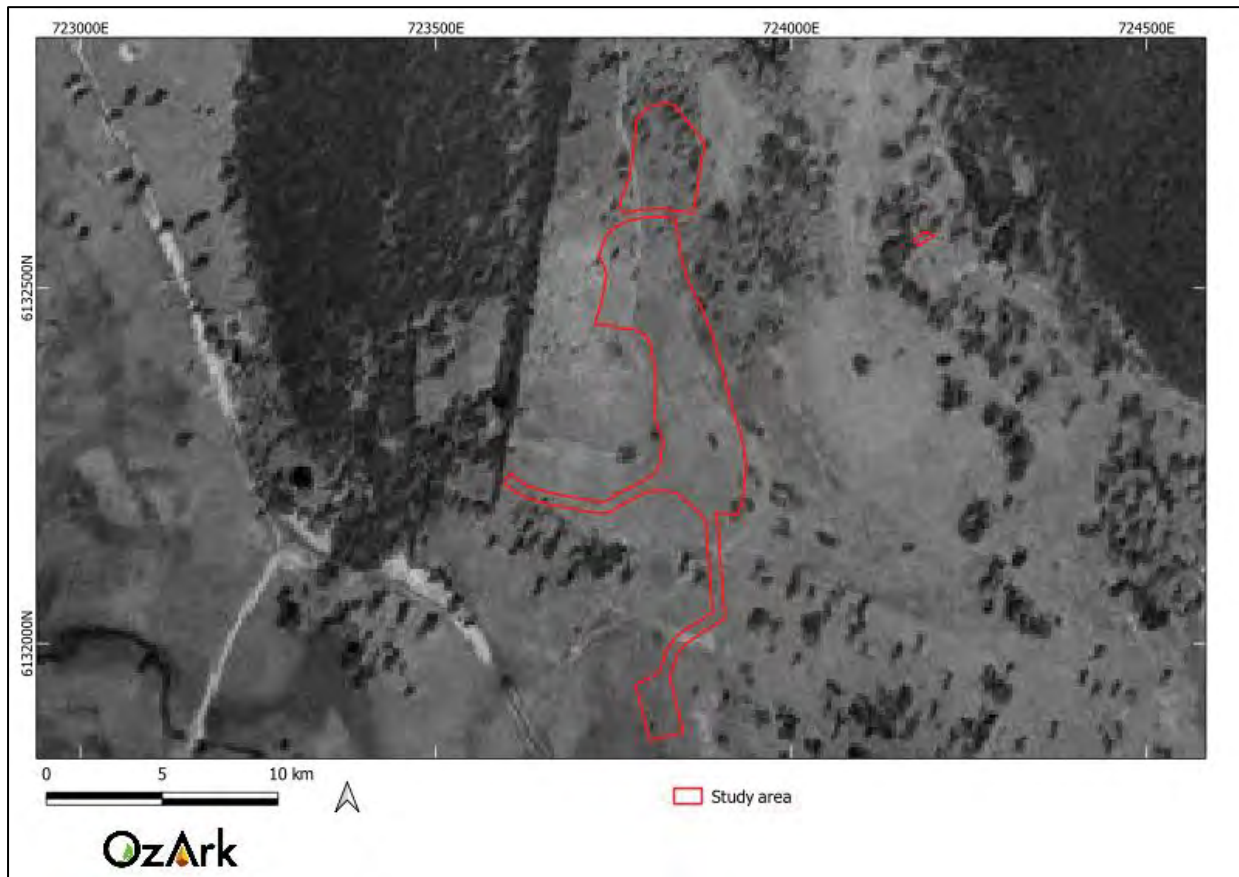
4.4 VEGETATION

Mitchell (2002) notes that Gundary Plains landscapes would have once supported grasslands of *Stipa* sp. and kangaroo grass with small clumps of sparse snow gum on rounded rocky hills and sandy lunettes of former lakes.

4.5 LAND USE HISTORY AND EXISTING LEVELS OF DISTURBANCE

Historic aerial imagery from 1977 (**Figure 4-3**) shows the original vegetation cover of eucalypt forest has been mostly cleared. Inspection of modern aerial imagery shows areas of sparse regrowth cover parts of the study area.

The southwest of the study area has undergone surface disturbance because of the approved quarry operations. Notably, the excavated void of Pit 1 has zero potential for Aboriginal sites, but it can also be maintained that the amount of ground surface disturbance around the void, which includes partially constructed bund walls and overburden stockpiles, will also have impacted significantly on the potential for this land to contain extant Aboriginal sites, should they have existed here in the first place.

Figure 4-3: 1977 aerial with overlay of study area (source: SS 2022).

4.6 CONCLUSION

With the study area being made up primarily of slopes, a degrading landform prone to erosion, the potential for intact archaeological deposits is low. Artefactual material may have eroded out of the slopes and could therefore be present at the base of slopes, or along benches and spurs, however much of the once forested landscape has been historically cleared and disturbance within the study area is high. Most of the study area is over 500 m away from semi-permanent water, no permanent water remains nearby, and there are no instances of outcropping rock so it is unlikely that this area would have been suitable for long term Aboriginal occupation.

5 ARCHAEOLOGICAL CONTEXT

5.1 ETHNO-HISTORIC SOURCES OF REGIONAL ABORIGINAL CULTURE

Tindale (1974) loosely assigns the area demarcated by the towns Tumut to the southwest, Boorowa to the northwest, Queanbeyan to the southeast and Goulburn in the northeast corner to the Ngunnawal people. This assignation is given support by the work of the earlier anthropologist R.H. Mathews who describes the same area as belonging to the Ngunnawal; in his account he uses the term Ngunnawal to describe both a “tribe” and a language (Mathews in Flood 1996: 5). Gillespie (1984; 1992) and Flood (1996) also consider this area to have been occupied by the Ngunnawal. Juxtaposed to this is Jackson-Nakano’s (2001: 4) reading of historical sources that suggests that several specific groups using Gundungurra or dialects thereof (though also speaking Ngunnawal) occupied and shared the lands on the eastern bank and to the southeast of Lake George. These included the Gundungurra-speaking Parramarragoo and Mulwaree, the Walgalu speaking Kamberri and the Ngarigo-speaking Moolinggoolah.

It is important to exercise caution in using the above sources yet the close correlation between Tindale’s and Mathews’ accounts combined with the fact that Mathews was drawing information directly from local Aboriginal groups (Flood 1996: 5) means that anthropological sources form a firm basis of evidence.

5.2 REGIONAL ARCHAEOLOGICAL CONTEXT

Regional studies indicate that the most encountered archaeological sites in the region are open campsites represented by scatters of stone artefacts (Paton 1998).

Based on an assessment of site size, context and location, a model of site patterning is suggested for the area by Paton (1998):

- Large sites (containing several thousand artefacts over several hectares) will be found on alluvial flats along major water courses or water bodies, particularly on sandy deposits near water. These sites are large, comparatively dense and close to permanent water sources. It is thought that they represent focal points for Aboriginal activity and would have been camped at regularly, and probably by larger groups than average.
- Smaller sites are found on undulating hills. These comprise most sites in the region. The largest of them (and the majority) are found close to water sources. Sites become fewer in number and smaller away from water, and where ground is steeply sloping, such as hillsides. These sites probably represent small camps occupied when ephemeral water sources are full, and only used for short periods.
- A small number of sites are located on hilltops. Some of these sites are larger than those found on undulating hills, but smaller than those on the alluvial flats. These camps may represent ephemeral camps like those described above, although there is some historical evidence to suggest they may be associated with ceremonial activities.

The Goulbourn-Mulwaree LGA lies approximately 6 km to the east of the study area. In 2012, Australian Museum Business Services (AMBS 2012) undertook an Aboriginal heritage study for the Goulbourn Mulwaree Council that highlighted the following relevant regional trends:

- Alluvial flats and lower slopes adjacent to watercourses are both likely to have high archaeological sensitivity, whilst gently undulating land, hills and plains are likely to have low archaeological sensitivity.
- Artefact scatters were the most common type of site identified in the region, found in all environmental contexts but most likely to occur on lower slopes within 100 m of water. Types of stone used in the area includes chert, silcrete, quartz, quartzite and fine-grained volcanic rocks.
- Both modified trees and bora grounds are rare at a regional level.

5.3 LOCAL ARCHAEOLOGICAL CONTEXT

5.3.1 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any previously recorded heritage within the study area. The results of this search are summarised in **Table 5-1**.

Table 5-1: Aboriginal cultural heritage: desktop-database search results.

Name of Database Searched	Date of Search	Type of Search	Comment
Commonwealth Heritage Listings	25/11/24	Queanbeyan-Palerang Regional LGA Upper Lachlan Shire LGA	No places listed on either the National or Commonwealth heritage lists are located within the study area
National Native Title Claims Search	25/11/24	NSW	No Native Title Claims cover the study area.
AHIMS	1/11/24	10 x 10 km centred on the study area	23 AHIMS sites within the search area, but none within the study area.
Local Environmental Plan (LEP)	25/11/24	Queanbeyan-Palerang Regional LEP 2022 Upper Lachlan LEP 2010	None of the Aboriginal places noted occur near the study area.

A search of the AHIMS database returned 23 records for Aboriginal heritage sites within the designated search area.

Table 5-2 lists the site types and frequencies of the search result and **Figure 5-1** shows the location of previously recorded sites in the vicinity of the study area.

Stone artefact sites (isolated finds, artefact scatters and areas of potential archaeological deposit (PAD) are the most frequently recorded site types in the vicinity of the study area (**Table 5-2**). One other site type, quarry, is recorded in the region but to a lesser extent and in association with PAD.

Artefact scatters are a relatively stable indicator of past Aboriginal occupation. Sites in this category are less ambiguous to recognise and can remain close to their original deposition context despite disturbances.

Table 5-2: AHIMS site types and frequencies

Site Type	Number	% Frequency
Artefact scatter	15	65.22
Isolated find	5	21.74
Isolated find & PAD	1	4.35
Artefact scatter & PAD	1	4.35
Quarry & artefact scatter	1	4.35
Total	23	100

Figure 3-1 shows that one site, 51-5-0063 (CL1), is located near the northern part of the study area. Site 51-5-0063 was recorded by Paton (1998) during his assessment for an expansion of the existing Barina Quarry. The site is described as consisting of three stone artefacts across a 50 m by 150 m area. Artefact materials consist of quartz and silcrete.

There remains some confusion over the location of 51-5-0073. As shown on **Figure 5-2**, the AHIMS location, when converted from AGD to GDA, places the site to the east of Pit 2. This location somewhat conforms to Paton's observation that the site is "about 500 m east of the existing hard rock quarry", i.e. Barina Quarry Pit 1 (see **Figure 5-3**). However, the site description of it being located on a track, and where it is shown on Paton 1998 Figure 2, places the site to the north of Barina Quarry Pit 2. This area is also fenced to prevent impact to the site (OzArk 2018). On the balance of the evidence, the fenced location is considered to be where the site is located.

Figure 5-1: Location of previously recorded AHIMS sites in relation to the study area.

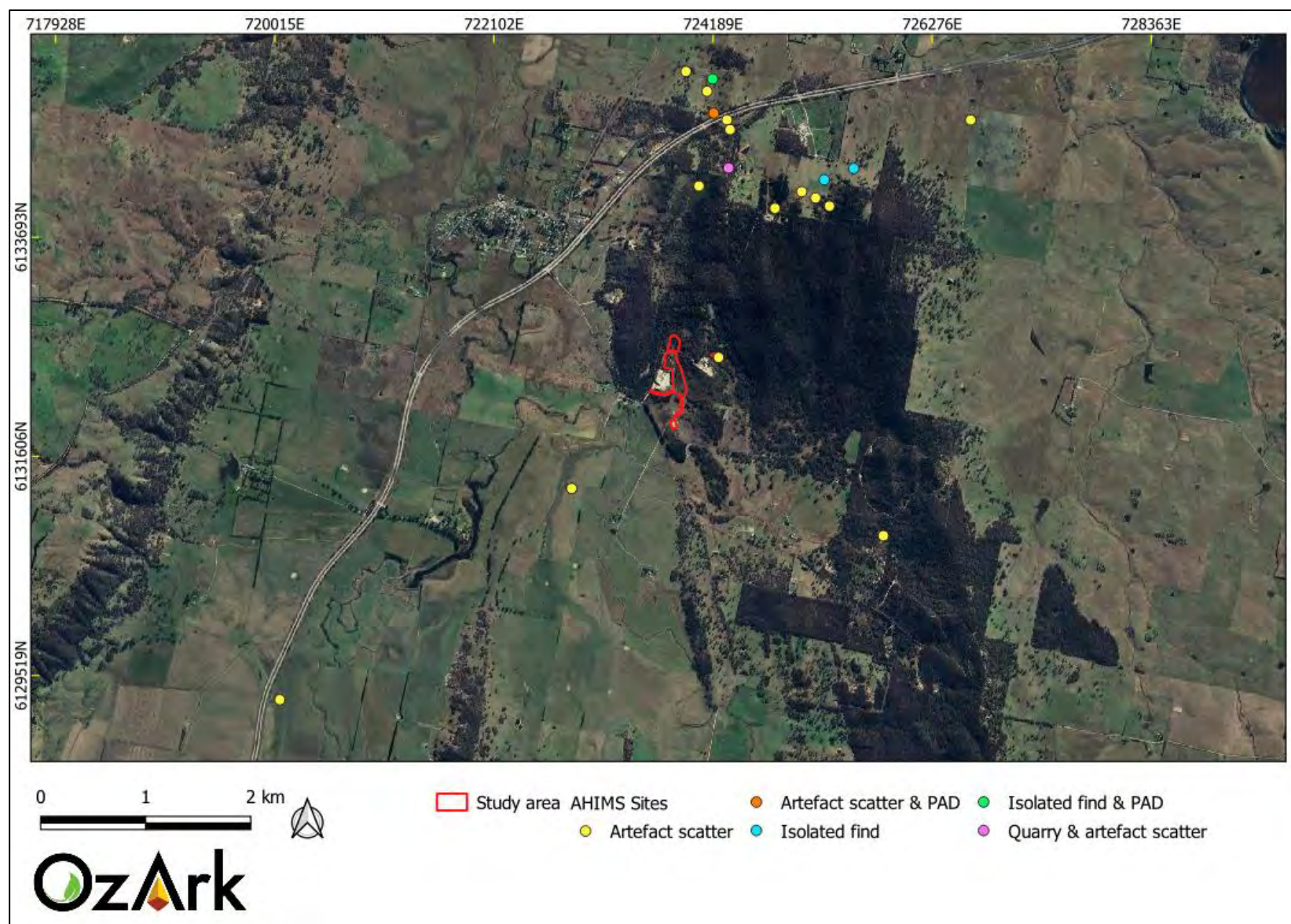
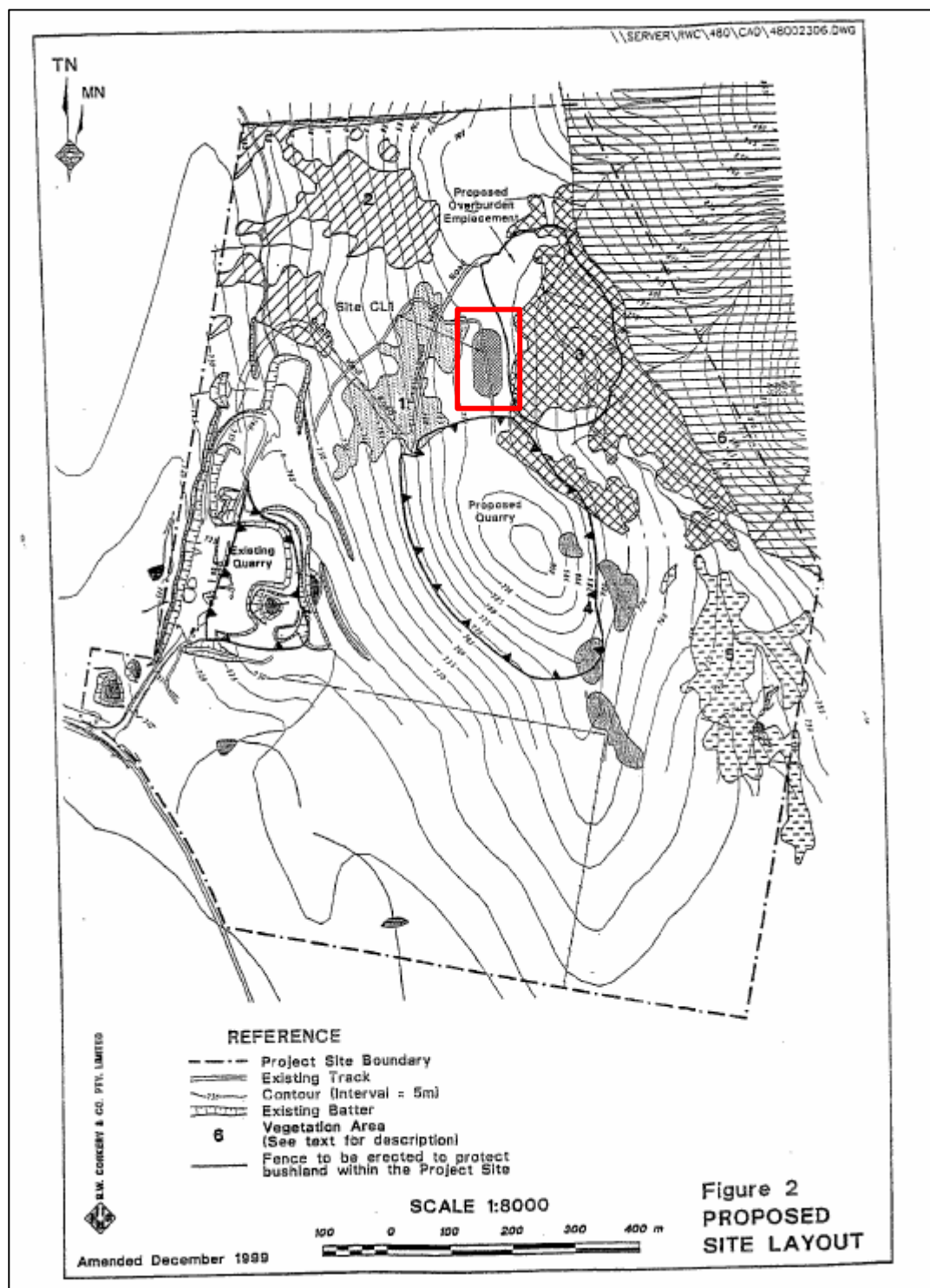


Figure 5-2: Aerial of the study area showing the various locations for site 51-5-0073.



Figure 5-3: Site location of 51-5-0063 (CL1) (red square) from the original assessment in original EIS.



5.3.2 Archaeological investigations within and near the study area

In 1998, Paton assessed 117 ha of land for the expansion of the Barina Quarry including most of the current study area. One Aboriginal archaeological site (51-5-0073) was recorded during the assessment (see **Figure 5-2** and **Figure 5-3**). Site 51-5-0073 was recorded as an artefact scatter consisting of three stone artefacts (one quartz and two silcrete flakes) exposed over an area of approximately 150 by 50 m. Paton found site 51-5-0073 to be of low to moderate scientific significance.

In 2004, Biosis assessed heritage and archaeological impacts of the proposed Woodlawn wind farm located 17 km southeast of the study area (Biosis as reported in URS 2004). The assessment covered approximately 5 ha and found 15 previously unrecorded Aboriginal sites, all artefact scatters. Thirteen of the 15 sites were found to have low archaeological significance and possess low archaeological potential.

New South Wales Archaeology (2012) undertook an Aboriginal cultural heritage assessment of modifications to the proposed Collector Wind Farm in 2012, located 5.5 km northwest of the study area. During the assessment, three Aboriginal sites were recorded which all consisted of isolated finds. The three isolated finds consisted of three silcrete flakes and one quartz flake. All three sites were assessed to be of low archaeological significance. NSW Archaeology concluded the landscape is comprised of very large amorphous landforms which are not archaeologically sensitive and do not contain micro-topographic features likely to have been targeted by Aboriginal people for activities other than low intensity use such as hunting and gathering and travel etc.

In 2018, OzArk prepared an ACHAR for the Collector Waste Resource Facility which included 10.8 ha of land and partly overlapped with the current study area. No Aboriginal sites were recorded during the assessment due to high levels of disturbance.

In 2017, Way undertook a test pit sample program in two areas approximately 30 km southeast of the study area. Digging 57 test pits of 0.25 m², Way noted how artefact densities in subsurface deposits are often misrepresented in test-pit data from excavations where test pits are spaced more than 5-20 m apart. Most artefacts excavated were flakes, followed by cores. Quartz was by far the predominant raw material, which seems to follow the pattern of raw materials across the region. Way's excavation took place near to Lake George and its tributary creeks, being much closer to water than the current study area.

In 2022, EMM prepared an ACHAR for the Veolia Woodlawn Advanced Energy Recovery Centre, located approximately 16 km southeast of the current study area. Field survey was undertaken in late 2021 and archaeologists noted the significant ground disturbance from prior mining and water management activity across their entire study area. As such no Aboriginal objects or areas of potential were identified.

In 2024, Artefact prepared an ACHAR for the Veolia Woodlawn Bio Reactor expansion. Artefact undertook a sample survey, noting certain areas of heavy disturbance caused by historic mining activity. In these areas, no Aboriginal archaeological potential was determined. The assessment area consisted of grass plains that hosted a few rocky outcrops. Two ephemeral creeks passed through the study area. One PAD was identified on a ridgeline between two minor creeks during the survey which was noted as having moderate research significance.

5.4 PREDICTIVE MODEL FOR SITE LOCATION

Across Australia, numerous archaeological studies in widely varying environmental zones and contexts have demonstrated a high correlation between the permanence of a water source and the permanence and/or complexity of Aboriginal occupation. Site location is also affected by the availability of and/or accessibility to a range of other natural resources including plant and animal foods, stone and ochre resources and rock shelters, as well as by their general proximity to other sites/places of cultural/mythological significance. Consequently, sites tend to be found along permanent and ephemeral water sources, along access or trade routes, or in areas that have good flora/fauna resources and appropriate shelter.

In formulating a predictive model for Aboriginal archaeological site location within any landscape it is also necessary to consider post-depositional influences on Aboriginal material culture. In all but the best preservation conditions very little of the organic material culture remains of ancestral Aboriginal communities survives to the present. Generally, it is the more durable materials such as stone artefacts, stone hearths, shells, and some bones that remain preserved in the current landscape. Even these, however, may not be found in their original depositional context since these may be subject to either (a) the effects of wind and water erosion/transport, both over short- and long-time scales, or (b) the historical impacts associated with the introduction of European farming practices including grazing and cropping, land degradation, and farm related infrastructure. Scarred trees, due to their nature, may survive for up to several hundred years but rarely beyond.

5.4.1 Site types in the region of the study area

The site types listed in **Table 5-3** are present in the region of the study area. The likelihood of these sites being present in the study area is discussed in **Section 5.4.3**.

Table 5-3: Site types recorded in the region of the study area.

Site type	Site description
Isolated finds	May be indicative of random loss or deliberate discard of a single artefact, the remnant of a now dispersed and disturbed artefact scatter, or an otherwise obscured or subsurface artefact scatter. They may occur anywhere within the landscape but are more likely to occur in topographies where open artefact scatters typically occur.
Open artefact scatters	Artefact scatters are defined as two or more artefacts, not located within a rock shelter, and located no more than 50 m away from any other constituent artefact. This site type may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting and gathering activities, short- or long-term camps, and the manufacture and maintenance of stone tools. Artefact

Site type	Site description
	scatters typically consist of surface scatters or sub-surface distributions of flaked stone discarded during the manufacture of tools but may also include other artefactual rock types such as hearth and anvil stones. Less commonly, artefact scatters may include archaeological stratigraphic features such as hearths and artefact concentrations which relate to activity areas. Artefact density can vary considerably between and across individual sites. Small ground exposures revealing low density scatters may be indicative of a background scatter rather than a spatially or temporally distinct artefact assemblage. These sites are classed as 'open', that is, occurring on the land surface unprotected by rock overhangs, and are sometimes referred to as 'open camp sites'. Artefact scatters are most likely to occur on level or low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands. Larger sites may be expected in association with permanent water sources. Topographies which afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and the valleys of creeks, will tend to contain more and larger sites, mostly camp sites evidenced by open artefact scatters.
Quarry sites	Typically consist of exposures of stone material where evidence for human collection, extraction and/or preliminary processing has survived. Typically, these involve the extraction of siliceous or fine grained igneous and meta-sedimentary rock types for the manufacture of artefacts. The presence of quarry/extraction sites is dependent on the availability of suitable rock formations.
Bora/Ceremonial sites	Places which have ceremonial or spiritual connections. Ceremonial sites may comprise of natural landscapes or have archaeological material. Bora sites are ceremonial sites which consist of a cleared area and earthen rings.

5.4.2 Landform modelling of archaeological potential

Previous studies across the study area (Patton 1998, OzArk 2018) indicate that stone artefact sites are the most likely site type to be recorded in the study area, however, approved activities associated with the operation of the Barina Quarry may have removed any evidence of past Aboriginal occupation. An ephemeral watercourse, Currawang Creek is located 465 m southwest of the study area. This suggests the landform of the study area would not have been suitable to Aboriginal occupation, but more likely utilised by smaller groups for short periods of time.

Crucial for the preservation of archaeological deposits is the history of past land use in an area. Most of the study area has been cleared of native vegetation prior to any quarrying activities. This has resulted in the widespread disturbance of the ground surface which accelerates soil loss. Erosional processes within the study area would be exacerbated by the large clearing of vegetation. The consequence of this is that artefact scatters are generally located within secondary contexts.

5.4.3 Conclusion

Based on knowledge of the environmental contexts of the study area and a desktop review of the known local and regional archaeological record, the following predictions are made concerning what types of sites may be present within the study area (**Table 5-4**).

Table 5-4: Likelihood of certain site types being present in the study area.

Site type	Likelihood of being present in the study area
Isolated finds	As isolated finds can occur anywhere, particularly within disturbed contexts, it is predicted that this site type could be recorded within the study area.
Open artefact scatters	As most of the study area is within sloping landforms distant to permanent water, this site type is not predicted to be common. It is likely that any sites associated with the landform present will be low density scatters and is a displaced context.

Site type	Likelihood of being present in the study area
Quarry sites	This site type could be recorded within the study area should suitable materials be available however previous assessments across the study area (Paton 1998 and OzArk 2018) indicate that outcropping rock consists of granite which is not suitable for manufacturing stone tools.
Bora/Ceremonial sites	This site type does not necessarily follow landform predictability and are, overall, a rare site type with a low likelihood of being present and remaining extant. These sites are generally identified through consultation with the RAPs.

6 RESULTS OF ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

6.1 SAMPLING STRATEGY AND FIELD METHODS

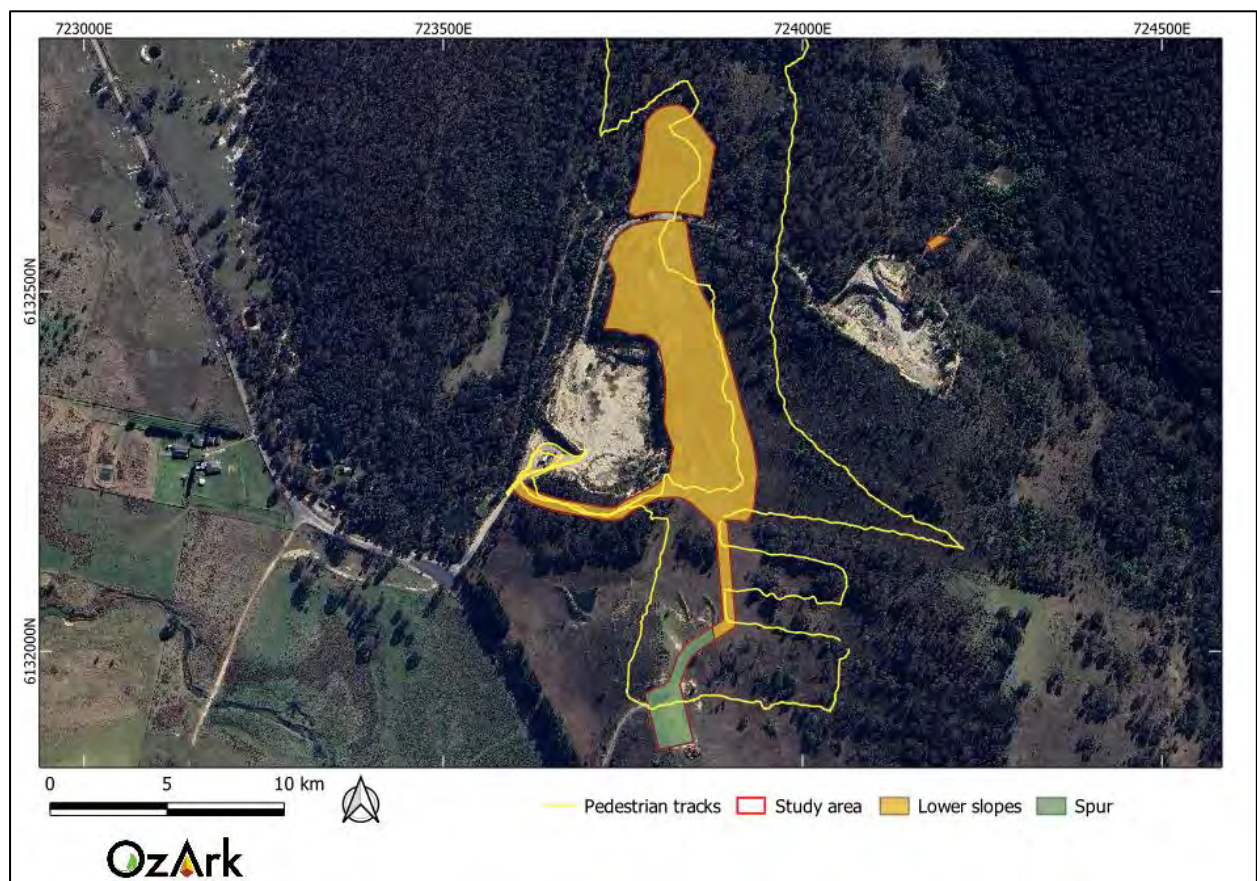
The archaeological methods utilised in the Aboriginal archaeological assessment followed the Code of Practice. Standard archaeological field survey and recording methods were employed (Burke and Smith 2004). The aims of the survey were to:

- Conduct pedestrian transects across all landforms so that their archaeological potential could be determined
- Evaluate whether the predictive model set out in **Section 5.4** is valid
- Determine if any portions of the study area require test excavation to understand the archaeological potential at a particular location.

Sample survey was completed across the study area (**Figure 6-1**). Both survey units 1 and 2 were surveyed selectively as to best understand the archaeological potential of the study area. 'Sample survey' refers to transects walked by surveyors spaced approximately 20 m apart that will not cover the entire area but instead will focus on understanding the archaeological potential of the sloping landforms within the study area.

Survey was completed by an OzArk Archaeologist and a representative of two RAPs.

Figure 6-1: Pedestrian tracks across the study area.



6.2 EFFECTIVE SURVEY COVERAGE

Two of the key factors influencing the effectiveness of archaeological survey are ground surface visibility (GSV) and ground surface exposure (GSE). These factors are quantified to ensure that the survey data provides adequate evidence for the evaluation of the archaeological materials across the landscape. For the purposes of the current assessment, these terms are used in accordance with the definitions provided in the Code of Practice.

GSV is defined as:

... the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like vegetation, plant or leaf litter, loose sand, stone ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals' (DECCWb 2010: 39).

GSE is defined as:

... different to visibility because it estimates the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals' (DECCWb 2010: 37).

Table 6-1 calculates the effective survey coverage within the study area. In general, **Table 6-1** presents an approximation of the amount of ground surface able to be seen at any location within specific landform units. Exposures present across the lower slopes were afforded by sheet wash erosion and previous disturbances associated with the existing quarry. In areas of exposure, GSV was generally hampered by the amount of gravels formed from weathered bedrock, as well as leaf litter. The spur landform displayed much greater areas of exposure, averaging 40 with GSV averaging 70%.

Table 6-1: Effective survey coverage within the study area.

Survey Unit	Landform	Survey Unit Area (sq m)	Visibility %	Exposure %	Effective Coverage Area (sq m)	Effective Coverage %
1	Lower slopes	65483 m ²	60	20	7858	12
2	Spur	5674 m ²	70	40	3242	57

Table 6-2 records that despite the reasonably effective survey coverage, no Aboriginal sites were recorded.

Table 6-2: Effective survey coverage and incidences of site recording.

Landform	Landform area (sq m)	Area Effectively Surveyed	% of Landform Effectively Surveyed	Number of Sites	Number of Artefacts or Features
Lower slopes	65483 m ²	7858	12	0	0
Spur	5674 m ²	3242	57	0	0

6.3 SURVEY RESULTS

No Aboriginal sites were recorded during the assessment. Quartz fragments were frequent across areas of exposure but did not contain attributes characteristic of flaking. There were several outcrops of quartzite in the study area, and these were inspected for evidence of quarrying, but no indication of past quarrying activities was noted.

Due to the sloping nature of much of the study area, the observed thin soils and the high degree of disturbance, it is assessed that there is a low probability for there to be further, undetected, subsurface sites within the study area.

6.4 DISCUSSION

The predictive model set out in **Section 5.4**, indicated that stone artefact sites would be the most likely site type recorded in the study area and that, of these, isolated finds would be the most likely site type. However, due to the relatively small amount of unmodified land within the study area, it is not surprising that no Aboriginal sites were recorded. If such sites had ever existed in the study area, recent activities associated with the operation of the hard rock quarry have undoubtedly removed any evidence of past Aboriginal occupation.

7 SIGNIFICANCE ASSESSMENT

7.1 INTRODUCTION TO SIGNIFICANCE ASSESSMENT

7.1.1 Identifying cultural significance

The concept of cultural significance is used in Australian heritage practice and legislation to encompass all the cultural values and meanings that might be recognised in a place. The Burra Charter's definition of cultural significance is broad and encompasses places that are significant to Indigenous cultures.

The Burra Charter definition of 'place' is also broad and encompasses Indigenous places of cultural significance. 'Place' includes locations that embody spiritual value (such as Dreaming places, sacred landscapes, and stone arrangements), social and historical value (such as massacre sites), as well as scientific value (such as archaeological sites). In fact, one place may be all these things or may embody all these values at the same time.

In some cases, the find-spot of a single artefact may constitute a 'place'. Equally, a suite of related locations may together comprise a single 'place', such as the many individual elements that make up a Songline. These more complex places are sometimes called a cultural landscape or cultural route.

The Guide notes that cultural significance is comprised of an assessment of social values, scientific values, aesthetic values, and historic values. These values are described below.

7.1.1.1 *Social or cultural value*

Social or cultural value refers to the spiritual, traditional, historical, or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural value is how people express their connection with a place and the meaning that place has for them (Articles 1.1, 1.2, 1.12, 5, and 8–11: Burra Charter).

Places of social or cultural value have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods, or events. Communities can experience a sense of loss should a place of social or cultural value be damaged or destroyed.

There is not always consensus about a place's social or cultural value. Because people experience places and events differently, expressions of social or cultural value do vary and, in some instances, will be in direct conflict. When identifying values, it is not necessary to agree with or acknowledge the validity of each other's values, but it is necessary to document the range of values identified.

Social or cultural value can only be identified through consultation with Aboriginal people. This could involve a range of methodologies, such as cultural mapping, oral histories, archival

documentation, and specific information provided by Aboriginal people specifically for the investigation.

Cultural value involves both traditional links with specific areas, as well as an overall concern by Aboriginal people for their sites generally and the continued protection of these. This type of value may not be in accord with interpretations made by the archaeologist: a site may have low archaeological value but high social value, or vice versa.

7.1.1.2 *Scientific (archaeological) value*

This refers to the importance of a landscape, area, place or object because of its rarity, representativeness, and the extent to which it may contribute to further understanding and information (Articles 1.2, 5, and 8: Burra Charter).

Assessing a site in this context involves placing it into a broader regional framework, as well as assessing the site's individual merits in view of current archaeological discourse. This type of value relates to the ability of a site to answer current research questions and is also based on a site's condition (integrity), content and representativeness.

The overriding aim of cultural heritage management is to preserve a representative sample of the archaeological resource. This will ensure that future research within the discipline can be based on a valid sample of the past. Establishing whether a site can contribute to current research also involves defining 'research potential'. Questions regularly asked when determining significance are: can this site contribute information that no other site can? Is this site representative of other sites in the region?

Information about scientific values will be gathered through any archaeological investigation undertaken. Archaeological investigations must be carried out according to Heritage NSW's Code of Practice.

Often scientific values are informed by social values that allow a contemporary understanding of the archaeological data to be understood.

7.1.1.3 *Aesthetic value*

This refers to the sensory, scenic, architectural, and creative aspects of the place (Articles 1.12 and 8: Burra Charter). It is often closely linked with the social values. It may consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use.

7.1.1.4 *Historic value*

Historic value refers to the associations of a place with a historically important person, event, phase, or activity in an Aboriginal community. Historic places do not always have physical

evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have 'shared' historic values with other (non-Aboriginal) communities (Articles 1.12–1.16: Burra Charter).

Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage. Consequently, the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives. This means it is often necessary to collect oral histories along with archival or documentary research to gain enough understanding of historic values.

7.2 ASSESSED SIGNIFICANCE

No Aboriginal sites or cultural values have been identified within the study area, as such, the significance assessment completed assesses the values of the study area.

Social or Cultural Value

There may be places with intangible cultural significance within the study area, although no specific locations have so far been identified by the Aboriginal community.

Archaeological/Scientific Value

No Aboriginal sites have been identified in the study area therefore there are no known places with archaeological significance.

Aesthetic Value

There are no known places with identified aesthetic values identified in the study area.

Historic Value

There are no known places with identified historic values identified in the study area.

8 ASSESSING HARM

8.1 AVOIDING AND MINIMISING HARM

8.1.1 Conserving significant Aboriginal cultural heritage

An object of the NPW Act is the '*conservation of objects places and features... of cultural value within the landscape, including... places, objects and features of significance to Aboriginal people*' (s.2A(1(b)(i))).

As heritage professionals, OzArk, strives for good conservation outcomes. In particular, OzArk is primarily concerned with the conservation and protection of Aboriginal cultural heritage that is of significance to Aboriginal people.

Two primary objectives when managing harm to an Aboriginal object are:

- Impacts to significant Aboriginal objects and places should always be avoided wherever possible
- Where impacts to Aboriginal objects and places cannot be avoided, projects should be amended to reduce the extent and severity of impacts to significant Aboriginal objects and places using reasonable and feasible measures.

8.1.2 Opportunities to conserve Aboriginal cultural heritage values

No Aboriginal sites or cultural values have been identified in the study area.

Only one previously site is listed as nearby, approximately 95 m from the study area, which is fenced (OzArk 2018) and will not be harmed by the project.

8.2 ECOLOGICALLY SUSTAINABLE DEVELOPMENT PRINCIPLES

Ecologically sustainable development principles (ESD) (defined in s.6 of the *Protection of the Environment Administration Act 1991*) requires the integration of economic and environmental considerations (including cultural heritage) in the decision-making process. Regarding Aboriginal cultural heritage, ESD can be achieved by applying the principle of intergenerational equity and the precautionary principle.

8.2.1 Intergenerational equity

Intergenerational equity is the principle whereby the present generation should ensure the health, diversity, and productivity of the environment for the benefit of future generations.

In terms of Aboriginal heritage, intergenerational equity can be considered in terms of the cumulative impacts to Aboriginal objects and places in a region. If few Aboriginal objects and places remain in a region (for example, because of impacts under previous permits), fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places.

Information about the integrity, rarity or representativeness of the Aboriginal objects and places proposed to be impacted, and how they illustrate the occupation and use of land by Aboriginal people across the region, will be relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of the project.

Where there is uncertainty, the precautionary principle should also be followed.

8.2.2 The precautionary principle

The precautionary principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

In relation to Aboriginal cultural heritage values, the precautionary principle should be applied if:

- The project involves a risk of serious or irreversible damage to Aboriginal objects or places or to the value of those objects or places
- There is uncertainty about the Aboriginal cultural heritage values or scientific or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted.

8.2.3 Principle of Integration

The Plan of Implementation of the World Summit on Sustainable Development held in Johannesburg, 2002, noted the need to “*promote the integration of the three components of sustainable development- economic development, social development and environmental protection- as interdependent and mutually reinforcing pillars*”.

The principle of integration ensures mutual respect and reciprocity between economic and environmental considerations:

- Environmental considerations are to be integrated into economic and other development plans, programs, and projects
- Development needs are to be considered in applying environmental objectives.

8.2.4 Applicability to the project

There is no impact to Aboriginal cultural heritage values as no Aboriginal sites were recorded, and no intangible heritage values have been identified within the study area. The results of the surface survey indicate that significant Aboriginal cultural heritage values will not be harmed within the study area.

Table 8-1 examines the application of ESD principles to the project.

Table 8-1: Application of ESD principles to the project.

ESD principle	Response
Avoiding and minimising harm	Section 9 sets out mechanisms by which to avoid and minimise harm. As no Aboriginal sites are present, these mechanisms will not be employed.
The integration principle	The project presents a strong case for the broader environmental benefits arising from environmentally responsible development. The environmental consequences of the project have been carefully assessed.
The precautionary principle	The Aboriginal cultural heritage investigation has followed the precautionary principle though undertaking a robust Aboriginal cultural heritage assessment to ensure that harm to Aboriginal objects and values is minimised. The survey adopted a precautionary principle when it came to describing and assessing landforms within the study area.
The intergenerational equity principle	It is assessed that the project will not harm significant Aboriginal cultural heritage values and that there will be a manageable diminution of intergenerational equity.

9 MANAGEMENT OF ABORIGINAL CULTURAL HERITAGE SITES

9.1 GENERAL MANAGEMENT PRINCIPLES

Appropriate management of cultural heritage items is primarily determined based on their assessed significance as well as the likely impacts of the project. The following management options are general principles, in terms of best practice and desired outcomes, rather than mitigation measures against individual site disturbance.

- Avoid impact by altering the project to avoid impact to a recorded Aboriginal site. If this can be done, then a suitable curtilage around the site must be provided to ensure its protection both during the short-term construction phase of development and in the long-term use of the area. If plans are altered, care must be taken to ensure that impacts do not occur to areas not previously assessed.

As no Aboriginal cultural heritage values have been identified within the study area, alteration to the proposed project design is unnecessary in terms of Aboriginal cultural heritage.

- If impact is unavoidable then approval to disturb sites/cultural values under the authority of an ACHMP must be sought from DPHI. Normally the management recommendations contained in the ACHAR become policies of the ACHMP.

As no Aboriginal cultural heritage values have been identified within the study area, an ACHMP is not warranted. Instead, the management of any unanticipated finds can be managed by an unanticipated finds protocol and a skeletal remains protocol.

9.2 MANAGEMENT AND MITIGATION OF RECORDED ABORIGINAL SITES

There is no specific management to be applied to the project as no Aboriginal sites or values have been identified.

In the unlikely event that Aboriginal objects are noted during construction or operation of the project, the *Unanticipated Finds Protocol* in **Appendix 3** will be an appropriate management protocol. If human remains were to be encountered, then the procedure in **Appendix 4** is an example of a human skeletal remains protocol that would be followed.

10 RECOMMENDATIONS

Under Section 89A of the NPW Act it is mandatory that all newly recorded Aboriginal sites be registered with AHIMS. As a professional in the field of cultural heritage management it is the responsibility of OzArk to ensure this process is undertaken.

To this end it is noted that no Aboriginal sites were recorded during the assessment.

The following recommendations are made based on these impacts and with regard to:

- Legal requirements under the terms of the NPW Act whereby it is illegal to damage, deface or destroy an Aboriginal place or object without an approved ACHMP.
- The findings of the current investigations undertaken within the study area
- The interests of the Aboriginal community.

Recommendations concerning Aboriginal cultural values within the study area are as follows:

1. Following approval of the project modification, the proposed work may proceed with caution. In the unlikely event that unexpected Aboriginal heritage items are encountered during work, the *Unanticipated Finds Protocol* in **Appendix 3** must be implemented. **Appendix 4** provides the appropriate procedure to be undertaken in the unlikely event that human remains are encountered.
2. This ACHAR concludes that the project may proceed without further archaeological investigation under the following conditions:
 - a. All land and ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to potential Aboriginal objects in adjacent landforms. Should the parameters of the project extend beyond the assessed study area, then further archaeological assessment may be required.
 - b. All staff and contractors involved in the proposed work should undergo a cultural heritage induction to ensure they can recognise Aboriginal artefacts (see **Appendix 5**), and are aware of the legislative protection requirements for all Aboriginal sites and objects under the NPW Act and are familiar with the *Unanticipated Finds Protocol* and the skeletal remains protocol.

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OEH 2011	<i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> . Office of Environment and Heritage 2011.
OzArk 2018	OzArk Environment & Heritage Management. 2018. <i>Aboriginal Cultural Heritage Assessment Report, Collector Waste Resource Facility</i> . A report to RW Corkery and Co. Pty Limited.
Paton 1998	Paton, R. 1998. <i>An Archaeological Investigation of a Proposed Quarry Extension near Collector, New South Wales</i> . A Report to RW Corkery and Co. Pty Limited.
Tindale 1974	Tindale N.1974. <i>Aboriginal Tribes of Australia</i> . ANU Press, Canberra.
URS 2004	URS 2004. <i>Environmental Impact Statement – Woodlawn Wind Farm</i> . A report to Woodlawn Wind Energy.
Way 2017	Way, A.M. (2017) 'Test-pitting and the detection of sub-surface sites: an example from Lake George, NSW, <i>Australian Archaeology</i> .

APPENDIX 1: ABORIGINAL COMMUNITY CONSULTATION

Appendix 1 Figure 1: Aboriginal Consultation Log

Date	Organisation	Comment	Method
17.9.22	Umwelt	Goulburn Post and the Queanbeyan Age ad published 20.9.22 and 21.9.22 closing date 5.10.22	Email
21.9.22	Gulgunya Ngunawal Heritage Aboriginal Consultancy	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	Local Land Services - Southeast	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	National Native Title Tribunal	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	NTSCORP Limited	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	Onerwal Local Aboriginal Land Council	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	Office of the Registrar, Aboriginal Land Rights Act 1983 (NSW)	Umwelt sent agency letters closing date 5.10.22	Email
21.9.22	Pejar Local Aboriginal Land Council	Umwelt sent agency letters closing date 5.10.22	Email
6.10.22	Little Gudenby River Tribal Council	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Lyndsay Urquhart	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Maree Moore	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Maria Williams	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Matilda House (on behalf of Williams, Freeman and Simpson-Wedge families)	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Oak Hill Enterprises	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Merrigarn Indigenous Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Mundawari Heritage Consultants	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Munyunga	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Mura Indigenous Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Muragadi Heritage Indigenous Corporation	Umwelt sent community letters closing date 21.10.22	Email

Date	Organisation	Comment	Method
6.10.22	Murri Bidgee Mullangari Aboriginal Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Murrumbul	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngambri Local Aboriginal Land Council	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngunawal Consultancy	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngunawal Heritage Aboriginal Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngunnawal Elders Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngunnawal Pajong Wallabalooa Descendants	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Ngurambang	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Noel Butler	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Nundagurri Aboriginal Corporation	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Pemulwuy	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Thomas Brown	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Thoorga Nura	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Thunderstone Aboriginal Cultural and Land Management Services Aboriginal	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Tina Brown	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Walbunja	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Walgau	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Wingikara	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Wullung	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Yerramurra	Umwelt sent community letters closing date 21.10.22	Email
6.10.22	Yurwang Gundana Consultancy Cultural Heritage Services	Umwelt sent community letters closing date 21.10.22	Email

Date	Organisation	Comment	Method
24.10.22	David McQueeney - Umwelt	SB received email advising advertising and ACHA commenced with notification letters, community and publishing ad on 20.9.22 & 21.9.22.	Email
7.10.22	Shayne Dickson	Umwelt were advised to register RAP for the project	
8.10.22	Robert Young	Umwelt were advised to register RAP for the project	
10.10.22	Dean Delponte	Umwelt were advised to register RAP for the project	
7.10.22	Jesse Carroll Johnson	Umwelt were advised to register RAP for the project	
7.10.22	Ryan Johnson	Umwelt were advised to register RAP for the project	
27.9.22	Tyrone Bell & Bronwyn	Umwelt were advised to register RAP for the project	
11.10.22	Steven Johnson	Umwelt were advised to register RAP for the project	
7.10.22	Merekai Bell	Umwelt were advised to register RAP for the project	
7.10.22	Rebecca Ingram	Umwelt were advised to register RAP for the project	
7.10.22	Lavinus Ingram	Umwelt were advised to register RAP for the project	
7.10.22	Lavina Singleton	Umwelt were advised to register RAP for the project	
13.12.2022	Lavina Singleton	Imogen Crome (IC) called as no email or home address on file and OzArk wanting to email Barina Quarry & Collector Waste Facility. Left voicemail to email us or call us back	Mobile
13.12.2022	Shayne Dickson	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Robert Young	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Dean Delponte	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Jesse Carroll Johnson	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Ryan Johnson	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Tyrone Bell & Bronwyn	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Steven Johnson	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Merekai Bell	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email

Date	Organisation	Comment	Method
13.12.2022	Rebecca Ingram	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Lavinus Ingram	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Lavina Singleton	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Pejar Local Aboriginal Land Council	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Onerwal Local Aboriginal Land Council	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Gundungurra Tribal Council Aboriginal Corporation	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
13.12.2022	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	IC emailed all RAPS the Stage 2/3 assessment methodology and invitation to the AFGM	Email
14.12.2022	Jesse Carroll Johnson	IC received email stating agreement with the assessment methodology	email
19.12.2022	Shayne Dickson	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Robert Young	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Dean Delponte	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Jesse Carroll Johnson	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Ryan Johnson	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Tyrone Bell & Bronwyn	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Steven Johnson	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Merekai Bell	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Rebecca Ingram	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Lavinus Ingram	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Lavina Singleton	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Pejar Local Aboriginal Land Council	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Onerwal Local Aboriginal Land Council	IC followed up for RSVPs to the AFGM	Email

Date	Organisation	Comment	Method
19.12.2022	Gundungurra Tribal Council Aboriginal Corporation	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	IC followed up for RSVPs to the AFGM	Email
19.12.2022	Jesse Carroll Johnson	IC called to follow up AFGM email. Went to voicemail	Mobile
19.12.2022	Ryan Johnson	IC called follow up AFGM email. Directed to call office (Darlene) and reforwarded email to email.	Mobile
19.12.2022	Steven Johnson	IC called to follow up AFGM email. Going to see if anyone is able to attend but Steven himself will not	Mobile
19.12.2022	Rebecca Ingram	IC called to follow up AFGM email, voicemail	Mobile
19.12.2022	Pejar Local Aboriginal Land Council	IC called to follow up AFGM email, voicemail	landline
19.12.2022	Gundungurra Tribal Council Aboriginal Corporation	IC called. Not in service	mobile
19.12.2022	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	IC called. Not in service	mobile
19.12.2022	Ryan Johnson	IC received email stating no one would be able to attend AFGM	email
19.12.2022	Pejar Local Aboriginal Land Council	IC received email stating no one would be able to attend AFGM as LALC is on leave	email
21.12.22	Dean Delponte	IC received email -After review we support the survey aims and methodology for the Barina Quarry and Collector Waste Facility.	Email
11.1.23	Thunderstone Aboriginal Cultural and Land Management Services Aboriginal Corporation	CB sent fieldwork invite closing date 16.1.23	Email
11.1.23	Pejar Local Aboriginal Land Council	CB sent fieldwork invite closing date 16.1.23	Email
1.2.23	Heritage NSW	IC sent letter advising of registered RAPs for the project	Email
1.2.23	Pejar Local Aboriginal Land Council	IC sent letter advising of registered RAPs for the project	Email
5.6.23	Shayne Dickson	CB emailed project update	Email
5.6.23	Robert Young	CB emailed project update	Email
5.6.23	Dean Delponte	CB emailed project update	Email
5.6.23	Jesse Carroll Johnson	CB emailed project update	Email
5.6.23	Ryan Johnson	CB emailed project update	Email
5.6.23	Tyronne Bell & Bronwyn	CB emailed project update	Email

Date	Organisation	Comment	Method
5.6.23	Steven Johnson	CB emailed project update	Email
5.6.23	Merekai Bell	CB emailed project update	Email
5.6.23	Rebecca Ingram	CB emailed project update	Email
5.6.23	Lavinus Ingram	CB emailed project update	Email
5.6.23	Lavina Singleton	CB called and left voicemail update	Phone
5.6.23	Pejar Local Aboriginal Land Council	CB emailed project update	Email
5.6.23	Onerwal Local Aboriginal Land Council	CB emailed project update	Email
5.6.23	Gundungurra Tribal Council Aboriginal Corporation	CB emailed project update	Email
5.6.23	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	CB emailed project update	Email
11.9.24	Paper	CB emailed classifieds.southern@austcommunitymedia.com.au requesting correct paper to advertise near Collector NSW	Email
12.9.24	Goulburn Post	Catherine Burrowes (CB) had confirmation - newspaper will be published on 18 September 2024 Closing Date 2 October 2024.	phone/email
17.9.24	Heritage NSW	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	Pejar LALC	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	Office of The Registrar, ALRA	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	National Native Title Tribunal	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	NTSCORP	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	Queanbeyan Palerang Regional Council	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	Upper Lachlan Shire Council	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
17.9.24	South East Local Land Services	CB sent stage 1 agency letter requesting potential stakeholders. Closing Date 2 October 2024.	Email
2.10.24	Shayne Dickson	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Robert Young	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Dean Delponte	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Jesse Carroll Johnson	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Ryan Johnson	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email

Date	Organisation	Comment	Method
2.10.24	Tyrone Bell & Bronwyn	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Steven Johnson	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Merekai Bell	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Rebecca Ingram	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Lavinus Ingram	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Pejar Local Aboriginal Land Council	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Onerwal Local Aboriginal Land Council	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Gundungurra Tribal Council Aboriginal Corporation	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	CB emailed project update to existing RAPs for project - Closing date 17.10.24	Email
2.10.24	Adrian Brown	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Badu (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Batemans Bay Local Aboriginal Land Council	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Bilinga (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Buru Ngunawal Aboriginal Corporation (BNAC)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Clive Freeman	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Clorine Lyons	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Stakeholder 1	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Didge Ngunawal Clan	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Djirringanj Elders Federation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ellen Mundy	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Gadhu Dreaming	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ginninderra Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Goobah Development PTY LTD (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Goodradigbee Cultural & Heritage Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Guntawang Aboriginal Resources Incorporated	CB emailed community letter - Closing date 17.10.24	Email

Date	Organisation	Comment	Method
2.10.24	Gunyuu (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Iris White	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Janine Thompson	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Jason Davison	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Jerringong (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Kamilaroi Yankuntjatjara Working Group	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Karrial (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Little Gudgenby River Tribal Council	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Lyndsay Urquhart	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Maria Williams	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Merrigarn Indigenous Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Munyunga (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Mura Indigenous Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Murrumbul (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngambri Local Aboriginal Land Council	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngunawal Consultancy	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngunawal Heritage Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngunnawal Elders Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngunnawal Pajong Wallabalooa Descendants	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Ngurambang	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Noel Butler	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Nundagurri Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Oak Hill Enterprises	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Pemulwuy (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Thomas Dahlstrom	CB emailed community letter - Closing date 17.10.24	Email

Date	Organisation	Comment	Method
2.10.24	Thoorga Nura	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Tina Brown	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Walbunja (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Walgalu (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Wingikara (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Wullung (Murrin Clan/Peoples)	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Yerramurra (Murrin Clan/Peoples) and Taste of Tradition Native Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Yukumbruk	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Bradley Bell	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Mura Culture Services	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Sonione Wakabut Rogers	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Girragirra Murun Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Wingarra Wilay Aboriginal Corporation	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	MAH	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Gadu chts	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Mirriwarr Holdings PTY Ltd	CB emailed community letter - Closing date 17.10.24	Email
2.10.24	Matilda House (on behalf of Williams, Freeman and Simpson-Wedge families)	CB emailed community letter - Closing date 17.10.24	Post
2.10.24	Thomas Brown	CB emailed community letter - Closing date 17.10.24	Post
2.10.24	Adrian Brown	CB received email registering for the project	Email
2.10.24	Didge Ngunawal Clan	CB received email registering for the project	Email
2.10.24	Sonione Wakabut Rogers	CB received email registering for the project	Email
2.10.24	Stakeholder 1	CB received email registering for the project	Email
3.10.24	Djirringanj Elders Federation	CB received email registering for the project	Email
3.10.24	Pejar LALC	CB received email registering for the project	Email

Date	Organisation	Comment	Method
3.10.24	Konanggo Aboriginal Cultural Heritage Services	CB received email registering for the project	Email
3.10.24	Konanggo Aboriginal Cultural Heritage Services	CB replied with thanks	Email
3.10.24	Pejar LALC	CB replied with thanks	Email
3.10.24	Djirringanj Elders Federation	CB replied with thanks	Email
3.10.24	Didge Ngunawal Clan	CB replied with thanks	Email
3.10.24	Adrian Brown	CB replied with thanks	Email
3.10.24	Sonione Wakabut Rogers	CB replied with thanks	Email
3.10.24	Stakeholder 1	CB replied with thanks	Email
3.10.24	Mura Indigenous Corporation	CB received email registering for the project	Email
9.10.24	Mura Indigenous Corporation	CB replied with thanks	Email
9.10.24	PD Ngunawal Consultancy	CB received email registering for the project	Email
9.10.24	PD Ngunawal Consultancy	CB replied with thanks	Email
11.10.24	Guntawang Aboriginal Resources Incorporated	CB received email registering for the project	Email
15.10.24	Guntawang Aboriginal Resources Incorporated	CB replied with thanks	Email
16.10.24	Brindabella Dreaming	CB received email registering for the project	Email
16.10.24	Ginninderra Aboriginal Corporation	CB received email registering for the project	Email
17.10.24	Brindabella Dreaming	CB replied with thanks	Email
17.10.24	Ginninderra Aboriginal Corporation	CB replied with thanks	Email
21.10.24	Adrian Brown	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Brindabella Dreaming	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Dean Delponte	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Didge Ngunawal Clan	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Djirringanj Elders Federation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Ginninderra Aboriginal Corporation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email

Date	Organisation	Comment	Method
21.10.24	Gundungurra Tribal Council Aboriginal Corporation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Gunjeewong Aboriginal Corporation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Guntawang Aboriginal Resources Incorporated	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Konanggo Aboriginal Cultural Heritage Services	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Lavina Singleton	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Lavinus Ingram	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Merekai Bell	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Mura Culture services	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Muragadi Heritage Indigenous Corporation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Murra Bidgee Mullangari	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Onerwal Local Aboriginal Land Council	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	PD Ngunawal Consultancy	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Pejar Local Aboriginal Land Council	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Rebecca Ingram	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Sonione Wakabut Rogers	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Stakeholder 1	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Tyronne Bell & Bronwyn	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
21.10.24	Woka Aboriginal Corporation	CB emailed draft Stage 2-3 methodology - closing date 18.11.24	Email
6.11.24	Murra Bidgee Mullangari	CB received email - I have read the project information and draft methodology for the above project, and I endorse the recommendations	Email
7.11.24	Murra Bidgee Mullangari	CB replied with thanks	Email
19.12.24	Adrian Brown	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Brindabella Dreaming	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Dean Delponte	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Didge Ngunawal Clan	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Djirringanj Elders Federation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email

Date	Organisation	Comment	Method
19.12.24	Ginninderra Aboriginal Corporation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Gulgunya Ngunawal Heritage Aboriginal Consultancy.	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Gundungurra Tribal Council Aboriginal Corporation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Gunjeewong Aboriginal Corporation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Guntawang Aboriginal Resources Incorporated	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Konanggo Aboriginal Cultural Heritage Services	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Lavina Singleton	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Lavinus Ingram	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Merekai Bell	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Mura Culture services	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Muragadi Heritage Indigenous Corporation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Murra Bidgee Mullangari	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Onerwal Local Aboriginal Land Council	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	PD Ngunawal Consultancy	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Pejar Local Aboriginal Land Council	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Rebecca Ingram	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Sonione Wakabut Rogers	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Stakeholder 1	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Tyronne Bell & Bronwyn	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
19.12.24	Woka Aboriginal Corporation	CB emailed Stage 4 Draft ACHAR - Closing date 21.1.2025	Email
28.12.24	Yurwang Gundana	CB received email - We agree with the report and have no issues with it	Email
7.1.25	Yurwang Gundana	CB replied with thanks	Email
22.1.25	Guntawang Aboriginal Resources Incorporated	CB received email - Guntawang Aboriginal Resources Incorporated agrees and supports the Draft ACHA methodology for Stage 4 of Barina Hard Rock Quarry.	Email
29.1.25	Guntawang Aboriginal Resources Incorporated	CB replied with thanks	Email

Appendix 1 Figure 2: Stage 1 Round 1 advertisement

Advertisement placed in the Goulburn Post and Queanbeyan Age placed by Umwelt Australia Pty Ltd (Umwelt) on 20 and 21 September 2022.

**Notification for Registration of Interest
and Commencement of Aboriginal Party
Consultation for Barina Quarry**

Collector Resources Pty Limited has engaged Umwelt to commence consultation for an Aboriginal Cultural Heritage Assessment in relation to a proposed modification to operations at Barina Quarry, located on Collector Road, approximately 1.5km southwest of the township of Collector. The proposed modification comprises new disturbance in the form of new processing and stockpiling areas (involving the importation of clean engineered fill materials).

Umwelt invite Aboriginal people or groups who hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the Project Area to register an interest in being consulted as part of the preparation of the ACHA for the Project. Consultation will assist Heritage NSW in its review of the assessment.

Stakeholders are asked to register their interest to be consulted by 5 October 2022 to:

Alex Irwin
E: airwin@umwelt.com.au
P: 0436 606 529

If you are registering an interest your contact details will be forwarded to NSW Heritage and Local Aboriginal Land Council unless you specify otherwise.

Appendix 1 Figure 3: Stage 1 Round 1 agency letter (sample)



21 September 2022

To Whom it May Concern,

RE: Notification of commencement of Aboriginal party consultation for an

Aboriginal Cultural Heritage Assessment for a proposed Modification to operations at Barina Quarry, near Collector, NSW

Umwelt (Australia) Pty Limited (Umwelt) has been engaged by Collector Resources Pty Limited (the Proponent) to commence the consultation process for an Aboriginal Cultural Heritage Assessment (ACHA) in relation to a proposed modification to operations at Barina Quarry, located on Lot 3 DP1177623 of Collector Road, Collector NSW (see **Figure 1.1**). The Project falls within the Queanbeyan Palerang Regional Local Government Area, immediately east of the LGA boundary with Upper Lachlan Shire (see **Figure 1.1**).

The Aboriginal Cultural Heritage Assessment will address the requirements of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010) (Consultation Requirements), *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

The ACHA will support the preparation of an EIS for the proposed modification of Barina Quarry, a quartzite mining operation, for the following (see also **Figure 1.2**):

1. an extension to the approved period of operations of 4 years (to approximately 2027)
2. an increase in the production rate from 300,000 to 400,000 tpa
3. establishment of additional processing and stockpiling areas
4. importation of up to 400,000 tonnes of clean fill to construct the new processing and stockpiling areas
5. realignment of the Site Access Road between Collector Road and the new processing area, and
6. minor changes to traffic operations to allow for an increase in the number of laden truck movements to and from the Quarry.

Inspired People.
Dedicated Team.
Quality Outcomes.

**Umwelt (Australia)
Pty Limited**

ABN 18 059 519 041

T | 1 300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

20257_BarinaQuarry_GulgurnyaNHACNnotification_itr

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Notably, no changes to the size or design of the approved open cut or overburden emplacement are proposed.

The Aboriginal Cultural Heritage Assessment will address the requirements of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010), *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

It is intended that the ACHA will inform the EIS along with project design and construction. In preparing the ACHA, Umwelt (on behalf of the proponent, Collector Resources) will be undertaking Aboriginal community consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010). This consultation will inform the ACHA and will assist Heritage NSW in consideration of the Project.

In accordance with Section 4.1.2 of Consultation Requirements, Umwelt is seeking to identify Aboriginal people or groups who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the project area. If your organisation is aware of Aboriginal people or groups who may hold such cultural knowledge, please forward the relevant contact details by no later than 14 days from date of correspondence, **5 October 2022** to:

Alex Irwin
Umwelt (Australia) Pty Ltd
Office 4, 3 Hampden Avenue
Orange NSW 2800
E: airwin@umwelt.com.au.

In compliance with the Consultation Requirements, the contact details for the proponent are as follows:

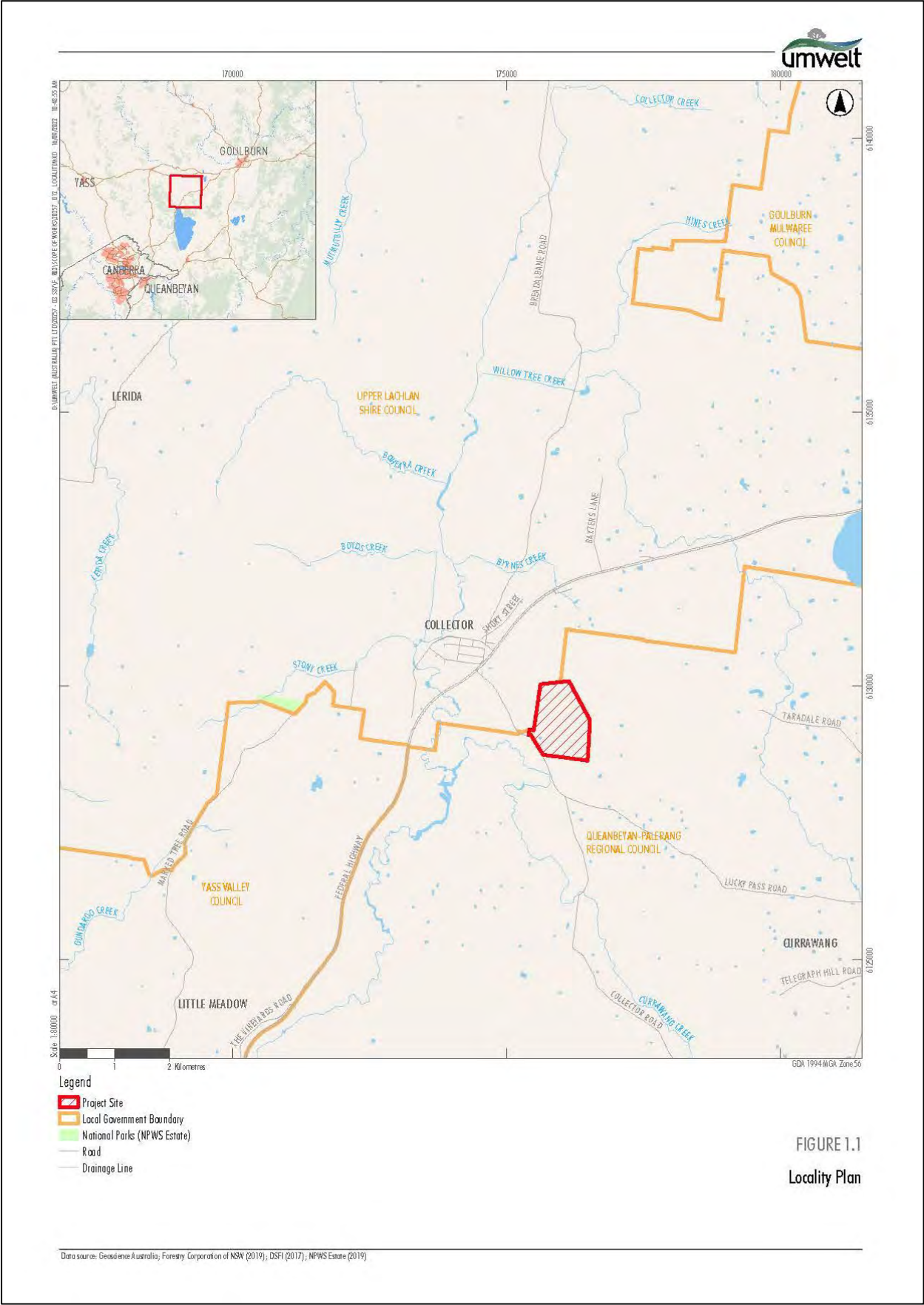
Lisa Polley
12 Common Street
Goulburn NSW 2580
P: 0419 483 273
E: admin@collectorresources.com.au.

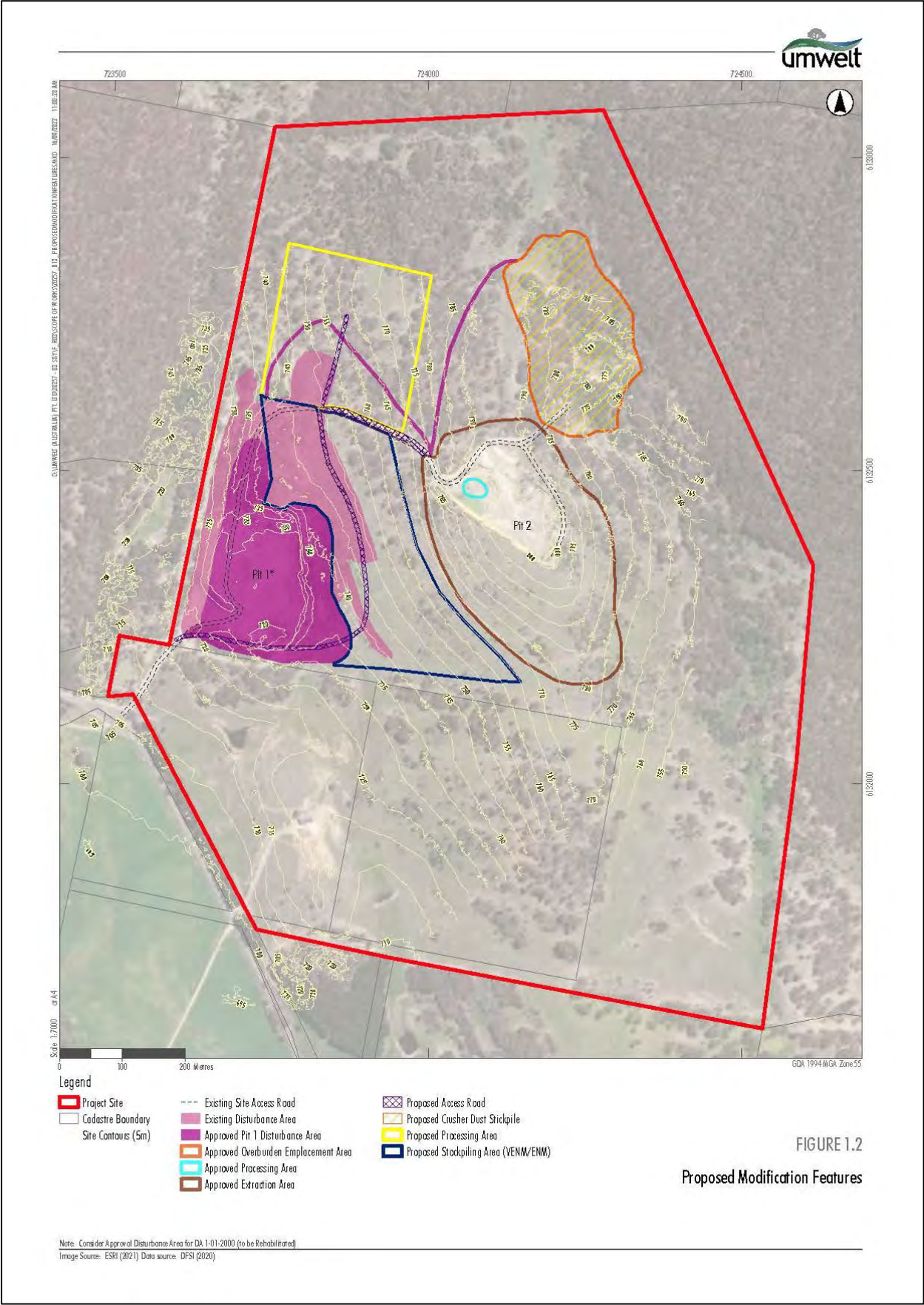
Umwelt will use these contact details to provide opportunity for the relevant Aboriginal parties to register an interest in a process of community consultation for the proposed modification.

If you have any questions regarding this correspondence or wish to discuss the project further, please do not hesitate to contact myself via email dmccqueeney@umwelt.com.au or on 1300 793 267.

Kind regards,

David McQueeney
Environmental Consultant
E| dmccqueeney@umwelt.com.au
M| 0432 719 213





Appendix 1 Figure 4: Stage 1 Round 1 community letter (sample)



6 October 2022

To Whom it May Concern,

RE: Notification of commencement of Aboriginal party consultation for an Aboriginal Cultural Heritage Assessment for a proposed Modification to operations at Barina Quarry, near Collector, NSW

Umwelt (Australia) Pty Limited (Umwelt) has been engaged by Collector Resources Pty Limited (the Proponent) to commence the consultation process for an Aboriginal Cultural Heritage Assessment (ACHA) in relation to a proposed modification to operations at Barina Quarry, located on Lot 3 DP1177623 of Collector Road, Collector NSW (see **Figure 1.1**). The Project falls within the Queanbeyan Palerang Regional Local Government Area, immediately east of the LGA boundary with Upper Lachlan Shire (see Figure 1.1).

The ACHA will support the preparation of an EIS for the proposed modification of Barina Quarry, a quartzite mining operation, for the following (see also **Figure 1.2**):

1. an extension to the approved period of operations of 4 years (to approximately 2027)
2. an increase in the production rate from 300,000 to 400,000 tpa
3. establishment of additional processing and stockpiling areas
4. importation of up to 400,000 tonnes of clean fill to construct the new processing and stockpiling areas
5. realignment of the Site Access Road between Collector Road and the new processing area, and
6. minor changes to traffic operations to allow for an increase in the number of laden truck movements to and from the Quarry.

The ACHA will address the requirements of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010) (Consultation Requirements), *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).



**Umwelt (Australia)
Pty Limited**
ABN 18 059 519 041

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

20257_BarinaQuarry_Notification R3_template_ltr

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In accordance with *Section 4.1.2 of Consultation Requirements*, Umwelt is seeking to identify Aboriginal people or groups who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the project area. After consulting with Heritage NSW of the Department of Planning and Environment, Maria Williams was identified as one who may hold such cultural knowledge.

If Maria Williams is aware of Aboriginal people or groups who may hold such cultural knowledge, please forward the relevant contact details by no later than 14 days from date of correspondence, **21 October 2022** to:

Alex Irwin
Umwelt (Australia) Pty Ltd
Office 4, 3 Hampden Avenue
Orange NSW 2800
E: airwin@umwelt.com.au.

In compliance with the Consultation Requirements, the contact details for the proponent are as follows:

Lisa Polley
12 Common Street
Goulburn NSW 2580
P: 0419 483 273
E: admin@collectorresources.com.au.

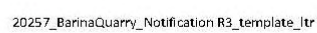
Umwelt will use these contact details to provide opportunity for the relevant Aboriginal parties to register an interest in a process of community consultation for the proposed modification.

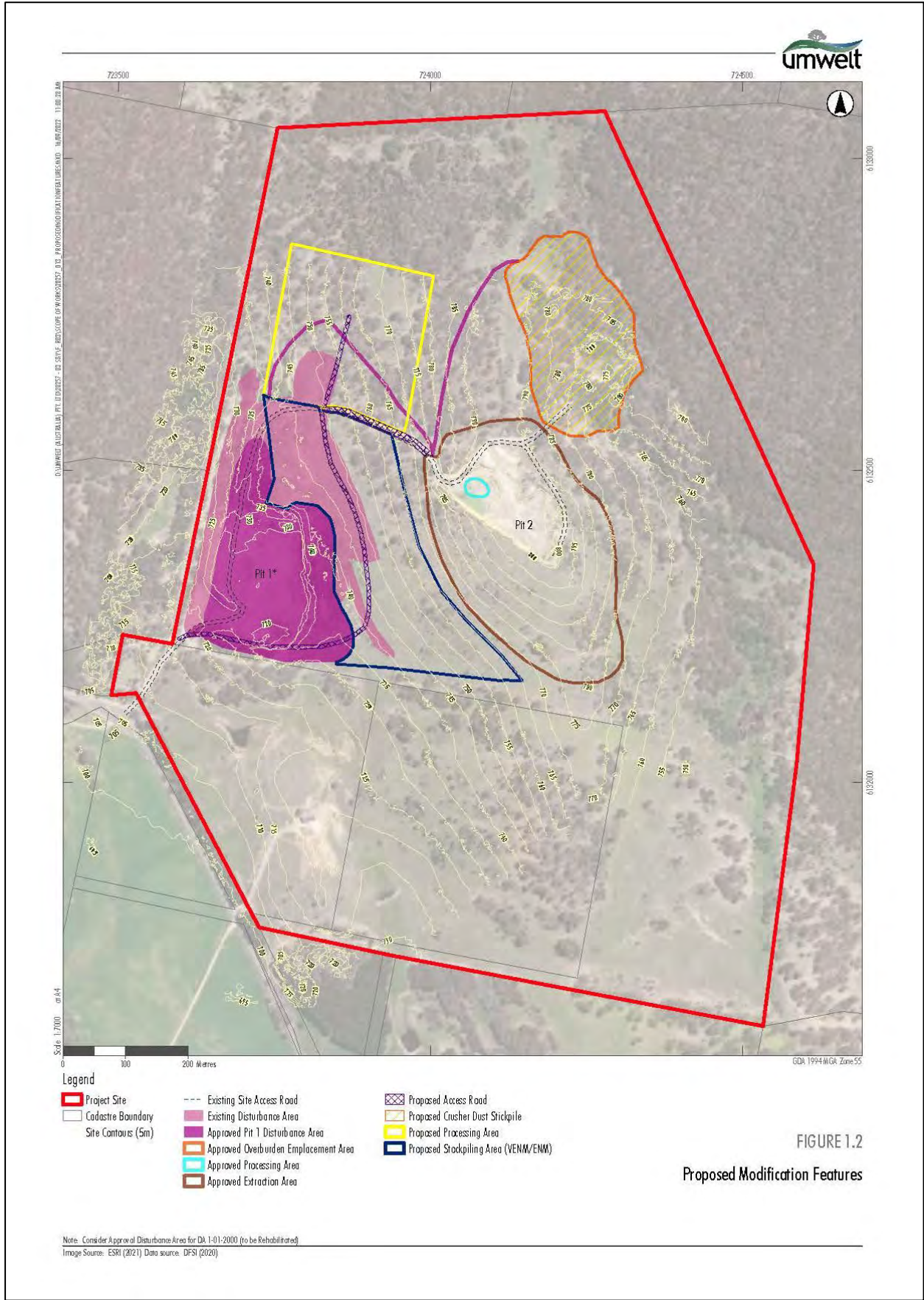
If you have any questions regarding this correspondence or wish to discuss the project further, please do not hesitate to contact myself via email dmcqueeney@umwelt.com.au or on 1300 793 267.

Kind regards,

A handwritten signature in dark ink, appearing to read 'David McQueeney'.

David McQueeney
Environmental Consultant
E| dmcqueeney@umwelt.com.au
M| 0432 719 213





Appendix 1 Figure 5: Stage 1 Round 2 advertisement

Advertisement placed in the Goulburn Post on 18 September 2024 by OzArk.

**Expression of Interest
Cultural Heritage Management**

OzArk Environment & Heritage has been engaged by Collector Resources (the proponent) to complete an Aboriginal cultural heritage assessment for the proposed modification to operations at Barina Quarry (the project), located on Collector Road, approximately 1.5 kilometres (km) southeast of the township of Collector. The project is in the Queanbeyan Palerang Regional Local Government Area (LGA), immediately east of the boundary of Upper Lachlan LGA.

OzArk is seeking Aboriginal persons and / or groups who wish to be consulted about the project. This consultation group will assist OzArk and the proponent in the preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR). The ACHAR will assist Heritage NSW and the Department of Planning, Housing and Infrastructure and in their consideration and determination of the project.

If you hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects or places in the project area, please register your interest to be consulted.

Registrations can be made by post: OzArk PO Box 2069 Dubbo NSW 2830; email: catherine@ozarkehm.com.au or by phoning OzArk on 02 6882 0118. All submissions should be received no later than **2 October 2024**.

Appendix 1 Figure 6: Stage 1 Round 2 agency letter (sample)



Figure 1: Location map.



Appendix 1 Figure 7: Stage 1 Round 2 community letter

	OzArk Environment & Heritage Dubbo Queanbeyan T: 02 6882 0118 Wollongong Newcastle enquiry@ozarkehm.com.au Katoomba www.ozarkehm.com.au	ABN 29 675 720 564 145 Wingewarra St PO Box 2069 DUBBO NSW 2830
---	---	---

2 October 2024

ABORIGINAL CULTURAL HERITAGE ASSESSMENT

MODIFICATION TO BARINA QUARRY, NEAR COLLECTOR NSW

Dear Sir/Madam,

OzArk Environment & Heritage (OzArk) has been engaged by Irwin Environmental Management Pty Limited on behalf of Collector Resources (the proponent) to undertake Aboriginal community consultation as per the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010).

The proponent is proposing a modification to operations at Barina Quarry (the project), located on Lot 3 DP1177623 of Collector Road, approximately 1.5 kilometres (km) southeast of Collector NSW (**Figure 1**). The project falls within the Queanbeyan Palerang Regional Local Government Area (LGA), immediately east of the LGA boundary with Upper Lachlan Shire.

Accordingly, we are seeking Expressions of Interest from relevant Aboriginal groups and individuals in the Collector area, to form a consultation group. This consultation group will assist OzArk in preparing the Aboriginal Cultural Heritage Assessment Report (ACHAR) to assist Heritage NSW and the Department of Planning, Housing and Infrastructure in their consideration and determination of the project.

If you hold cultural knowledge relevant to determining the impacts to the cultural significance of this project area, should you wish to register for the project please provide the following information:

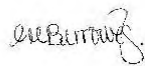
- Group or individual name
- Contact name (if registering as a group)
- Email or postal address
- Contact number

Please do this by contacting our office on (02) 6882 0118 or responding to this email catherine@ozarkehm.com.au. The closing date for expressions of interest is **17 October 2024**.

If you wish to register interest it is noteworthy that as per the Heritage NSW guidelines, we are required to provide your details to Heritage NSW and the Local Aboriginal Lands Council unless we are advised that you do not wish your details to be released.

Once relevant groups and individuals have been identified, they will form part of the formal consultation process for the project.

Kind regards,



Catherine Burrowes
Office Manager/ Community Liaison

Figure 1: Location map.



Appendix 1 Figure 8: Letter to existing RAPs



OzArk Environment & Heritage

Dubbo | Queanbeyan T: 02 6882 0118
Wollongong | Newcastle enquiry@ozarkehm.com.au
Katoomba www.ozarkehm.com.au

ABN 29 675 720 564

145 Wingewarra St
PO Box 2069
DUBBO NSW 2830

2 October 2024

ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE

BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW

Dear Members,

We wish to apologise for the delay in correspondence and thank you for your continued interest and participation as a Registered Aboriginal Party (RAP) for the proposed modification to the Barina Quarry (the Project), located on Lot 3 DP1177623 of Collector Road, approximately 1.5 kilometres (km) southeast of Collector NSW (**Figure 1**).

The purpose of this letter is to update you in relation to the progress of this Project.

Since June 2023 the Project has been placed on hold, however the Proponent (Collector Resources) is now progressing with the Project.

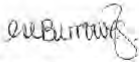
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In accordance with Stages 2 and 3 of the ACHCRs, the next stage of consultation will involve OzArk preparing an assessment methodology which will be distributed for review once complete.

Should you have any queries in relation to the enclosed information please do not hesitate to contact our office on (02) 6882 0118 or catherine@ozarkehm.com.au.

Kind regards,



Catherine Burrows
Office Manager/ Community Liaison

Figure 1: Location map.



ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: en@eddyneumann.com.au

Wed 2/10/2024 2:43 PM

Gundungurra Tribal Council Aboriginal Corporation

en@eddyneumann.com.au

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

Catherine Burrowes

Office Manager/ Community Liaison

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: onerwal1@gmail.com

Wed 2/10/2024 2:43 PM

2 October 2024

Onerwal Local Aboriginal Land Council

onerwal1@gmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: pejar1@bigpond.com

Reply

Reply All

Forward

...

Wed 2/10/2024 2:43 PM

2 October 2024

Pejar Local Aboriginal Land Council

pejar1@bigpond.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

Catherine Burrowes

Office Manager/ Community Liaison

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: ringram6033@gmail.com

Reply

Reply All

Forward

...

Wed 2/10/2024 2:43 PM

2 October 2024

Lavinus Ingram

ringram6033@gmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

Catherine Burrowes

ACHA Update - Barina Quarry Modification

 Catherine Burrowes
To: ringram6033@gmail.com

Wed 2/10/2024 2:43 PM

2 October 2024

Rebecca Ingram

ringram6033@gmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,



ACHA Update - Barina Quarry Modification

 Catherine Burrowes
To: Yunwang.Gundana.C.H.S@outlook.com

Wed 2/10/2024 2:43 PM

2 October 2024

Merekai Bell

Yunwang.Gundana.C.H.S@outlook.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,



Catherine Burrowes
Office Manager/ Community Liaison

ACHA Update - Barina Quarry Modification



Catherine Burrowes
To: wokacorp@yahoo.com

Reply Reply All Forward

Wed 2/10/2024 2:43 PM

2 October 2024

Steven Johnson

wokacorp@yahoo.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

Catherine Burrowes

ACHA Update - Barina Quarry Modification



Catherine Burrowes
To: thunderstonemg@gmail.com

Reply Reply All Forward

Wed 2/10/2024 2:43 PM

2 October 2024

Tyronne Bell & Bronwyn

thunderstonemg@gmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: murrabidgeemullangari@yahoo.com.au
[Reply](#)
[Reply All](#)
[Forward](#)
[...](#)

Wed 2/10/2024 2:43 PM

2 October 2024

Ryan Johnson

murrabidgeemullangari@yahoo.com.au

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: muragadi@yahoo.com.au
[Reply](#)
[Reply All](#)
[Forward](#)
[...](#)

Wed 2/10/2024 2:43 PM

2 October 2024

Jesse Carroll Johnson

muragadi@yahoo.com.au

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: mundawari.hc@gmail.com

Reply Reply All Forward ...

Wed 2/10/2024 2:43 PM

2 October 2024

Dean Delponte

mundawari.hc@gmail.com**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: konanggo_consultancy@hotmail.com

Reply Reply All Forward ...

Wed 2/10/2024 2:43 PM

2 October 2024

Robert Young

konanggo_consultancy@hotmail.com**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: Gunjeewongculturalheritage21@hotmail.com

Reply

Reply All

Forward

...

Wed 2/10/2024 2:43 PM

2 October 2024

Shayne Dickson

Gunjeewongculturalheritage21@hotmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

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Kind regards,

ACHA Update - Barina Quarry Modification



Catherine Burrowes

To: 'GulgunyaNHAC@hotmail.com'

Reply

Reply All

Forward

...

Wed 2/10/2024 2:43 PM

2 October 2024

Gulgunya Ngunawal Heritage Aboriginal Consultancy

GulgunyaNHAC@hotmail.com

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT UPDATE
BARINA QUARRY MODIFICATION, NEAR COLLECTOR, NSW**

Dear Members,

We wish to apologise for the delay in correspondence and thank you for your continued interest and participation as a Registered Aboriginal Party (RAP) for the proposed modification to the Barina Quarry (the Project), located on Lot 3 DP1177623 of Collector Road, approximately 1.5 kilometres (km) southeast of Collector NSW (**Figure 1**).

The purpose of this letter is to update you in relation to the progress of this Project.

Since June 2023 the Project has been placed on hold, however the Proponent (Collector Resources) is now progressing with the Project.

OzArk Environment & Heritage (OzArk) has been engaged by the Proponent to undertake Aboriginal community consultation as per the *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRs; DECCW 2010) and complete the Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project.

As an existing RAP for this Project, unless your interest in this Project has changed and you no longer wish to be registered, there is no action for you, and you will remain listed as a RAP. Should you wish to de-register your interest as a RAP, however, please notify us by **17 October 2024**.

In accordance with Stages 2 and 3 of the ACHCRs, the next stage of consultation will involve OzArk preparing an assessment methodology which will be distributed for review once complete.

Should you have any queries in relation to the enclosed information please do not hesitate to contact our office on (02) 6882 0118 or catherine@ozarkehm.com.au.

Kind regards,

Catherine Burrowes
Office Manager/ Community Liaison

Appendix 1 Figure 9: Stage 2/3 Round 1 cover letter



Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: Yurwang.Gundana.C.H.S@outlook.com

Bcc: Catherine Burrowes

Reply

Reply All

Forward



Tue 13/12/2022 1:34 PM

Barina Quarry & Collector Waste facility- Invitation to AFGM.docx
360 KBStage 2 Cover Letter.docx
102 KB

V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

Good Afternoon Members,

Thank you for your registration as a RAP for the Barina Quarry Modification. We'd like to advise you that we have also registered you for the Collector Waste Management Facility which is proposed at the same location.

Please find attached Stage 2 information package for the Barina Quarry & Collector Waste facility project.

If you have any questions or feedback please email our Office Manager, Catherine Burrowes (catherine@ozarkehm.com.au).

Kind regards,

Imogen Crome

Archaeologist



OzArk Environment & Heritage

PO Box 2069 DUBBO 2830

02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.auISO 9001
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ManagementISO 45001
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Management

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Stage 2 - methodology - Barina Quarry & Collector Waste facility

Imogen Crome <Imogen@ozarkehm.com.au>

To: thunderstonemg@gmail.com

Bcc: Catherine Burrowes

Reply

Reply All

Forward



Tue 13/12/2022 1:38 PM

Barina Quarry & Collector Waste facility- Invitation to AFGM.docx
357 KBStage 2 Cover Letter.docx
99 KB

V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

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Kind regards,

Imogen Crome

Archaeologist



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imogen@ozarkehm.com.au; www.ozarkehm.com.auISO 9001
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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome <Imogen@ozarkehm.com.au>

To: en@eddyneumann.com.au; shaun@gundungurra.org.au

Bcc: Catherine Burrowes

Reply

Reply All

Forward



Tue 13/12/2022 1:21 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

357 KB



Stage 2 Cover Letter.docx

99 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

Good Afternoon Members,

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Kind regards,

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Archaeologist

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imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: onerwall1@gmail.com

Bcc: Catherine Burrowes

Reply

Reply All

Forward



Tue 13/12/2022 1:20 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

Good Afternoon Members,

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Kind regards,

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Archaeologist

OzArk Environment & Heritage

PO Box 2069 DUBBO 2830

02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: GulgunyaNHAC@hotmail.com

Bcc: Catherine Burrowes

Reply Reply All Forward ...

Tue 13/12/2022 1:22 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

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Kind regards,

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Archaeologist

OzArk Environment & Heritage

PO Box 2069 DUBBO 2830

02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: shaun@gundungurra.org.a

Reply Reply All Forward ...

Tue 13/12/2022 1:24 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

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Kind regards,

Imogen Crome
Archaeologist

OzArk Environment & Heritage

PO Box 2069 DUBBO 2830

02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: mundawari.hc@gmail.com

Bcc: Catherine Burrowes

Reply

Reply All

Forward

Tue 13/12/2022 1:31 PM



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

361 KB

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Kind regards,

Imogen Crome

Archaeologist



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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: muragadi@yahoo.com.au

Reply

Reply All

Forward

Tue 13/12/2022 1:33 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

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Kind regards,

Imogen Crome

Archaeologist



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02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.auISO 9001
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Stage 2 - methodology - Barina Quarry & Collector Waste facility

Imogen Crome
To: Yurwang.Gundana.C.H.S@outlook.com
Bcc: Catherine Burrowes

Tue 13/12/2022 1:34 PM

Barina Quarry & Collector Waste facility- Invitation to AFGM.docx 360 KB
Stage 2 Cover Letter.docx 102 KB
V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf 2 MB

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Kind regards,

Imogen Crome
Archaeologist

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PO Box 2069 DUBBO 2830
02 6882 0118
imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility

Imogen Crome
To: ringram6033@gmail.com
Bcc: Catherine Burrowes

Tue 13/12/2022 1:36 PM

Barina Quarry & Collector Waste facility- Invitation to AFGM.docx 360 KB
Stage 2 Cover Letter.docx 102 KB
V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf 2 MB

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Archaeologist

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PO Box 2069 DUBBO 2830
02 6882 0118
imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: konanggo_consultancy@hotmail.com

Bcc: Catherine Burrowes

Reply Reply All Forward

Tue 13/12/2022 1:36 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

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Kind regards,

Imogen Crome

Archaeologist



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02 6882 0118

imogen@ozarkehm.com.au; www.ozarkehm.com.au

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Stage 2 - methodology - Barina Quarry & Collector Waste facility



Imogen Crome

To: murrabidgeemullangari@yahoo.com.au

Bcc: Catherine Burrowes

Reply Reply All Forward

Tue 13/12/2022 1:37 PM



Barina Quarry & Collector Waste facility- Invitation to AFGM.docx

360 KB



Stage 2 Cover Letter.docx

102 KB



V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

2 MB

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Stage 2 - methodology - Barina Quarry & Collector Waste facility

 **Imogen Crome**
To:  Gunjeewongculturalheritage21@hotmail.com
Bcc:  Catherine Burrowes

Tue 13/12/2022 1:37 PM

 Barina Quarry & Collector Waste facility- Invitation to AFGM.docx
360 KB

 Stage 2 Cover Letter.docx
102 KB

 V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf
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02 6882 0118
imogen@ozarkehm.com.au; www.ozarkehm.com.au



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Stage 2 - methodology - Barina Quarry & Collector Waste facility

 **Imogen Crome**
To:  wokacorp@yahoo.com
Bcc:  Catherine Burrowes

Tue 13/12/2022 1:38 PM

 Stage 2 Cover Letter.docx
102 KB

 V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf
2 MB

 Barina Quarry & Collector Waste facility- Invitation to AFGM.docx
360 KB

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Kind regards,

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Archaeologist

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PO Box 2069 DUBBO 2830
02 6882 0118
imogen@ozarkehm.com.au; www.ozarkehm.com.au



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Appendix 1 Figure 10: Stage 2/3 Round 1 response

Re: Stage 2 - methodology - Barina Quarry & Collector Waste facility

 jesse johnson <muragadi@yahoo.com.au>
To: Imogen Crome
Wed 14/12/2022 9:41 AM

 This sender muragadi@yahoo.com.au is from outside your organization.

 Barina Quarry & Collector Waste facility- Invitation to AFGM.docx
.docx File

 Stage 2 Cover Letter.docx
.docx File

 V2.1 Barina Quarry and Collector Waste Assessment Methodology_2022.pdf

Hi Imogen
I have read the project information and methodology for the above project, I agree with the recommendations made.
Kind regards
Jesse Johnson
0418970389

Re: Stage 2 - methodology - Barina Quarry & Collector Waste facility

 Dean Delponte <mundawari.hc@gmail.c>
To: Imogen Crome
Cc: Catherine Burrowes
Wed 21/12/2022 8:22 AM

 This sender mundawari.hc@gmail.com is from outside your organization.

Hi Imogen,

Thank you for providing us with the stage 2 methodology.

After review we support the survey aims and methodology for the Barina Quarry and Collector Waste Facility.

Kind Regards
Dean Delponte
Director
0413186133
mundawari.hc@gmail.com

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Appendix 1 Figure 11: AFGM invitation



FIGURE 1.1
Locality Plan

Appendix 1 Figure 12: Stage 2/3 Round 2 cover letter



Stage 2-3 Barina Quarry Modification -Draft Methodology



Catherine Burrowes

To

Bcc adrianbrown.ngunnawal@hotmail.com; brindabelladreaming@outlook.com; Dean Delponte;
 lilly carroll; begadel@yahoo.com; Ginninderra Aboriginal Corporation; +18 others

Reply Reply All Forward

Mon 21/10/2024 3:47 PM

- Stage 2 Cover Letter.docx
.docx File
- V2.1 Barina Quarry Modification_Assessment Methodology_2024.pdf
.pdf File

Hello Members,

Please find attached stage 2 information package for the **Draft Methodology for the Barina Quarry Modification.**

I look forward to hearing from you with any feedback you may have by Monday 18 November 2024.

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Appendix 1 Figure 13: Stage 2/3 Round 2 responses

Re: Stage 2-3 Barina Quarry Modification -Draft Methodology

DJ

Darleen Johnson <murrabidgeemullangari@yahoo.com.au>
To Catherine Burrowes

Reply

Reply All

Forward

...

Wed 6/11/2024 4:49 PM

Hi Catherine

I have read the project information and draft methodology for the above project, and I endorse the recommendations

Thanks

Darleen

Appendix 1 Figure 14: Stage 4 cover letter



OzArk Environment & Heritage

Dubbo | Queanbeyan T: 02 6882 0118
 Wollongong | Newcastle enquiry@ozarkehm.com.au
 Katoomba www.ozarkehm.com.au

ABN 29 675 720 564

145 Wingewarra St
 PO Box 2069
 DUBBO NSW 2830

19 December 2024

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT
FOR THE MODIFICATION TO THE BARINA QUARRY**

Dear Members,

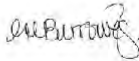
Thank-you for your continued participation as a Registered Aboriginal Party (RAP) and involvement in the above-mentioned project.

Collector Resources Pty Limited (the Proponent) would like to offer you the opportunity to provide feedback on the draft Aboriginal Cultural Heritage assessment Report (ACHAR) that has been undertaken in accordance with stage four (4) of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCR).

As per the ACHCRs we are required to give you twenty-eight (28) days to supply feedback on the attached draft ACHAR. This period closes on the **Tuesday 21 January 2025**. Should our office not be contacted within this time frame, we will presume that you are satisfied with the contents of the ACHAR as it stands.

If you need any help supplying feedback or have any queries, please do not hesitate to contact our office.

Kind regards,



Catherine Burrowes
Office Manager/ Community Liaison

Stage 4 Draft ACHAR Barina Quarry Modification

Catherine Burrowes

To

Bcc

adrianbrown.ngunnawal@hotmail.com; brindabelladreaming@outlook.com; mundawari.hc@gmail.com; didgengunawalclan@yahoo.com.au; +21 others

Reply

Reply All

Forward

Thu 19/12/2024 3:54 PM

W

Stage 4 Cover Letter.docx

.docx File

PDF

V2.1 Draft_Barina Hard Rock Quarry Modification_ACHAR_December2024.pdf

.pdf File

Hello Members,

Please find attached stage 4 information package for the Barina Quarry Modification.

I look forward to hearing from you with any feedback you may have by Tuesday 21 January 2025.

Regards, Catherine

Appendix 1 Figure 15: Stage 4 responses

Re: Stage 4 Draft ACHAR Barina Quarry Modification



yurwang gundana <Yurwang.Gundana.C.H.S@outlook.com>
To Catherine Burrowes

[Reply](#) [Reply All](#) [Forward](#) [...](#)

Sat 28/12/2024 11:49 AM

 You replied to this message on 7/01/2025 3:22 PM.

Yumalindi, I hope you are doing well

Yurwang Gundana loves the report and the Christmas photo.

We agree with the report and have no issues with it

Thanks
Merekai Bell
Yurwang Gundana Cultural heritage Services

Re: Stage 4 Draft ACHAR Barina Quarry Modification



Wendy Morgan <wenlissa01@hotmail.com>
To Catherine Burrowes

[Reply](#) [Reply All](#) [Forward](#) [...](#)

Wed 22/01/2025 4:34 PM

 Follow up. Completed on Wednesday, 29 January 2025.

Hi Catherine,

Guntawang Aboriginal Resources Incorporated agrees and supports the Draft ACHA methodology for Stage 4 of Barina Hard Rock Quarry.

kind regards

Wendy Morgan
CEO GARI
0414 964 657

APPENDIX 2: ASSESSMENT METHODOLOGY



View across the central portion of the study area.

ABORIGINAL CULTURAL HERITAGE ASSESSMENT METHODOLOGY

BARINA QUARRY MODIFICATION

COLLECTOR, NSW

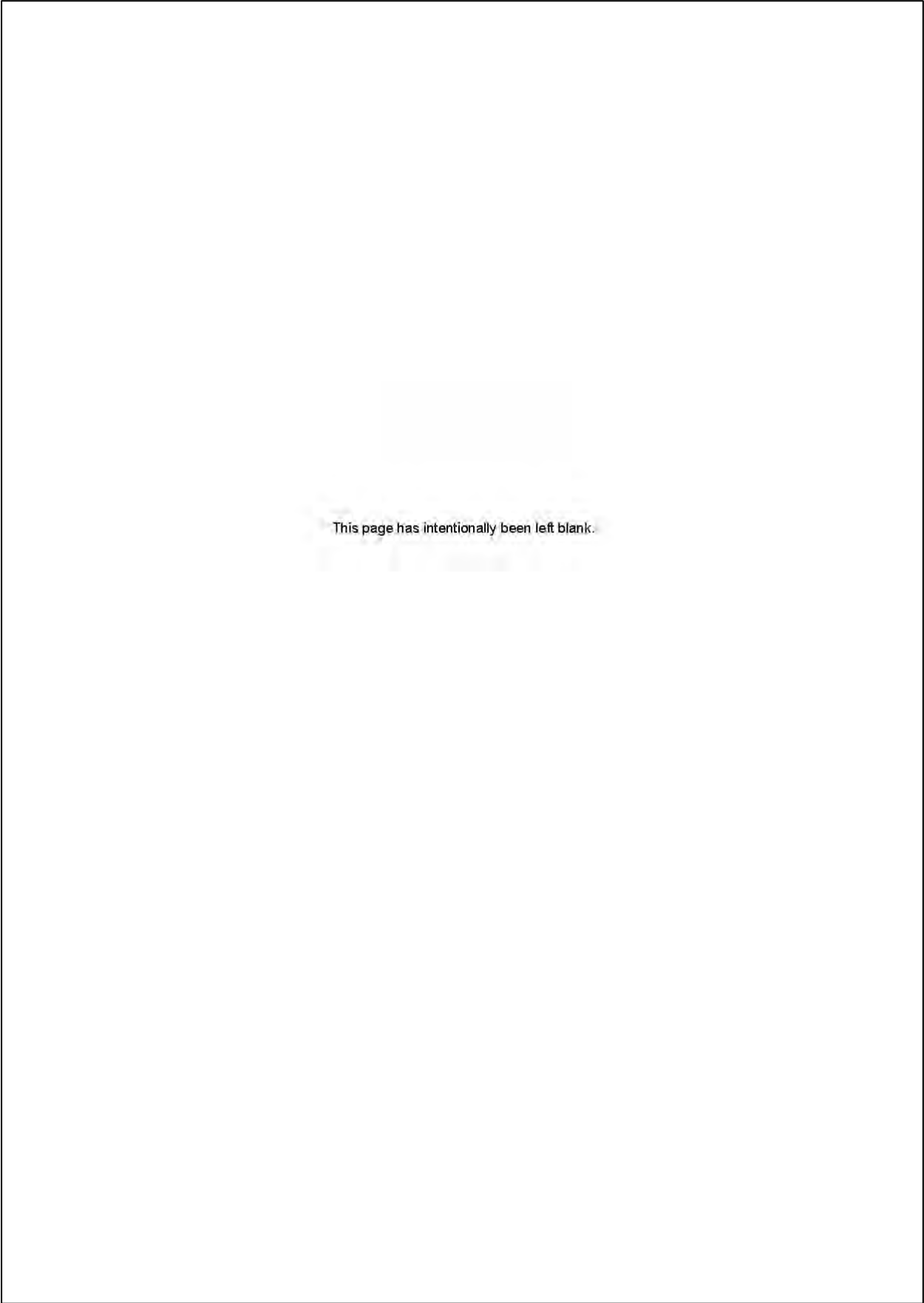
NOVEMBER 2024

Report prepared by
OzArk Environment & Heritage
for Collector Resources Pty Limited

OzArk

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DOCUMENT CONTROLS

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Client	Irwin Environmental Management Pty Limited	
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Enquiries should be addressed to OzArk Environment & Heritage.		

Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment will take place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

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1 INTRODUCTION

1.1 OVERVIEW

OzArk Environment & Heritage (OzArk) has been engaged by Irwin Environmental Management Pty Limited on behalf of Collector Resources Pty Limited (the Applicant) to prepare an assessment methodology for the proposed Barina Quarry Modification (the project).

The project is located 1.5 kilometres (km) southeast of Collector in the Queanbeyan Palerang Regional Local Government Area (LGA) and immediately adjacent to the Upper Lachlan Shire LGA (Figure 1-1).

This methodology is in accordance with Stage 3 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010a). The project information provided here also complies with Stage 2 of the ACHCRs.

The investigation set out in this methodology aims to identify Aboriginal cultural values, both tangible and intangible, that exist in the study area. The results of this investigation will be presented in an *Aboriginal Cultural Heritage Assessment Report* (ACHAR).

1.2 BACKGROUND

The Applicant received development consent from the Land and Environment Court in 2001 being DA 1-01-2000. Initially approved for a period of 20 years from the date of consent, i.e. to 28 March 2021, Condition 1.3(a) of DA 1-01-2000 was modified in November 2023 extending the term of the approval to 1 year from the date of determination of Modification 2, i.e. 2 November 2024.

DA 1-01-2000 approves the extraction (of quartzite) and rehabilitation of two pits.

- Pit 1: the extension of an existing pit to a depth of 716 m Australia Height Datum (mAHD) with an approximate area of 2.6 ha. Extraction of quartzite from Pit 1 has been completed and backfilled to a depth of between 720 and 725 mAHD.
- Pit 2: with an approximate area of 9.5 ha and depth to 714 mAHD containing an estimated quartzite resource of 9.4 million tonnes (Mt). The current extent of Pit 2 is approximately 2.0 ha to a maximum depth of between 780 and 785 mAHD. Of the initial resource of 9.4 Mt resource, less than 10% has been removed.

Processing operations, including crushing, separating, and blending of the hard rock materials to produce a variety of hard rock aggregates is approved within Pit 1.

Operations under DA 1-01-2000 commenced in 2005. Extraction was undertaken intermittently for several years, however, extraction operations effectively ceased in 2008 with the Quarry managed under care and maintenance since.

The Applicant intends to submit a development application to modify DA1-01-2000 under Section 4.56 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to extend the duration

of the development consent referenced in Condition 1.3(a) by 15 years, extend the disturbance footprint of the Quarry and incorporate other minor modifications to improve the efficiency and sustainability of operations (refer to Section 1.3).

OzArk was previously engaged in 2022/2023 to undertake the ACHCRs and prepare an ACHAR for the project. Survey across the assessment area (including the current study area) was completed on 19 January 2023. No Aboriginal sites were recorded during the assessment. Further, due to the sloping nature of the landform, the observed thin soils and the high degree of disturbance, it is assessed that there is a low probability for there to be further, undetected, subsurface sites within the assessment area. Following the field assessment and prior to the preparation of the ACHAR, the project was placed on hold.

Irwin Environmental Management Pty Limited has now been commissioned by the Applicant to prepare a Modification Report and has engaged OzArk to provide the assessment of Aboriginal cultural heritage impacts through the preparation of an ACHAR.

1.3 PROJECT OVERVIEW

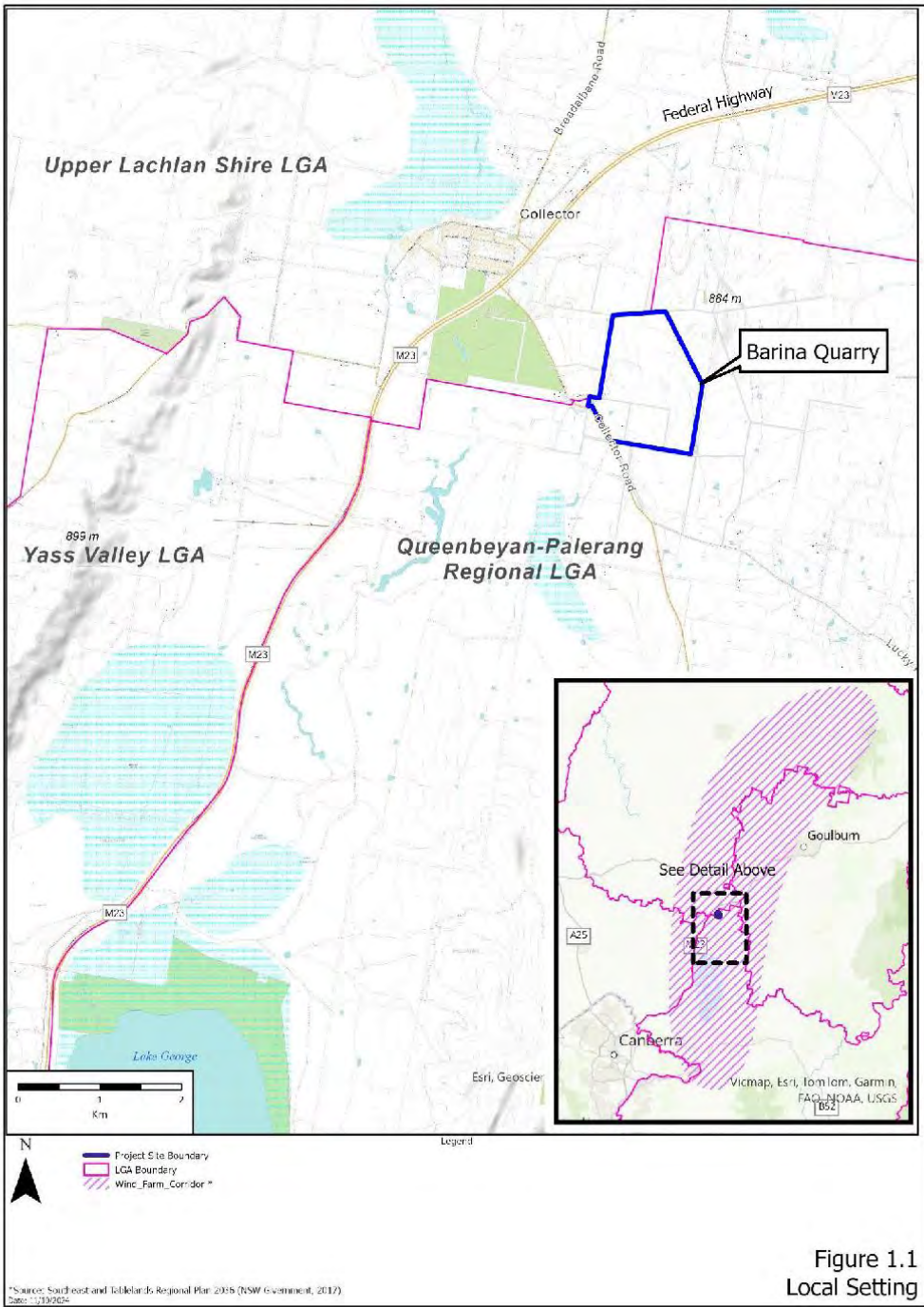
The modification includes modifications to operations at the quarry to improve efficiency of operations. The modification includes the following key components (**Figure 1-2**).

- Construction of additional stockpile areas between Pit 1 and Pit 2, and to the north of an existing haul road between Pit 1 and Pit 2, on land either approved for, or highly modified by Quarry related disturbance.
- Excavation and recovery of backfilled material from Pit 1, and importation of clean fill (Virgin Excavated Natural Materials or other material with an EPA approved Resource Recovery Exemption), for use as engineered fill in construction of the new stockpile areas.
- Relocation of processing operations from Pit 1, to Pit 2 or the new stockpile area, and incorporation of a washing circuit into the approved processing operations.
- Minor modifications to traffic operations to allow importation of additional laden trucks (no increase in truck movements)
- Realignment of internal roads and Quarry infrastructure, including the incorporation of a Workshop, Storage and Maintenance Area on cleared area to the southeast of Pit 1.

It is to be noted that there will be no changes to the extents of approved extraction areas or Pit 2 overburden emplacement.

The Applicant also intends on connecting of the Quarry to mains power by construction of an electricity transmission line (ETL) through a neighbouring property. This would be assessed and approved under Part 5 planning provisions of the EP&A Act.

Figure 1-1: Location of the project.



1.4 STUDY AREA

The study area describes the area of additional impacts (to those approved by DA 1-01-2000) associated with the proposed modification (**Figure 1-3**). The study area is located at the Barina Quarry, off Collector Road and includes approximately 7 hectares (ha) of land.

Figure 1-3. Aerial of the study area.



1.5 CONSULTATION ON THIS METHODOLOGY

Consultation has followed the guidelines established in the ACHCRs (DECCW 2010a) whereby an advertisement was placed in the local press and relevant agencies were contacted to ascertain if they were aware of groups or individuals who may have cultural knowledge of the region containing the modification.

On 20 and 21 September 2022 an advertisement was placed in the Goulburn Post and Queanbeyan Age by Umwelt requesting expressions of interest in being consulted about the project. In addition, the following agencies were contacted by Umwelt to identify potential stakeholders for the area: Gulgunya Ngunawal Heritage Aboriginal Consultancy; Local Land Services – Southeast; National Native Title Tribunal; Native Title Services Corporation Limited (NTSCORP); Onerwal Local Aboriginal Land Council (LALC); Pejar LALC and Office of the Registrar, *Aboriginal Land Rights Act 1983*. Fifteen individuals/groups registered to be consulted regarding the project.

As noted in **Section 1.2**, the project went on hold in 2023. Given the lapse in time since RAPs were contacted regarding the project, the ACHCRs recommenced with an advertisement placed in the Goulburn Post on 18 September 2024 and the statutory government agencies contacted. All previous RAPs were contacted, with the option provided to no longer be consulted regarding the project.

An additional ten individuals/groups have registered to be consulted over the project.

The following individuals/groups form the RAP group for the project:

- Adrian Brown
- Brindabella Dreaming
- Dean Delponde
- Didge Ngunawal Clan
- Djirringanj Elders Federation
- Ginninderra Aboriginal Corporation
- Gulgunya Ngunawal Heritage Aboriginal Consultancy
- Gundungurra Tribal Council Aboriginal Corporation
- Gunjeewong Aboriginal Corporation
- Guntawang Aboriginal Resources Incorporated
- Konanggo Aboriginal Cultural Heritage Services
- Lavina Singleton
- Lavinus Ingram
- Merekai Bell
- Mura Culture services
- Muragadi Heritage Indigenous Corporation
- Murra Bidgee Mullangari
- Onerwal Local Aboriginal Land Council
- PD Ngunawal Consultancy
- Pejar Local Aboriginal Land Council
- Rebecca Ingram
- Sonione Wakabut Rogers

- Stakeholder 1¹
- Tyrone & Bronwyn Bell
- Woka Aboriginal Corporation.

1.6 LANDSCAPE CHARACTERISTICS OF THE STUDY AREA

The study area is located in the South East Highlands Bioregion, specifically, within the Monaro sub-bioregion. The study area is within the Gundary Plains landscape as characterised by Mitchell (2002). This landscape type is characterised by wide open valleys with abandoned terraces and quaternary lakebeds on lower Devonian siltstone sandstone, andesite and quartz felspar porphyry.

The topography of the study area is primarily undulating lower slope landforms that rise eastwards towards a locally prominent hill (850 m above sea level), located 930 m northeast of the study area (see **Figure 1-4**).

In the Soil Landscapes of the Goulburn 1:250,000 Sheet (Hird 1991), there are two Soil Landscapes within the study area. The Midgee soil landscape covers most of the study area and includes stony and acid yellow earths and yellow podzolic soils. The Collector Creek soil landscape occurs in the southwest of the study area and includes soils consisting of moderately deep, grey and yellow mottled duplex soils with bleached A2 horizons. Yellow podzolic soils are found on higher ground (Hird 1991).

Mitchell (2002) notes that Gundary Plains landscapes would have once supported grasslands of *Stipa* sp. and kangaroo grass with small clumps of sparse snow gum on rounded rocky hills and sandy lunettes of former lakes. Historic aerial imagery from 1977 (**Figure 1-5**) shows the original vegetation cover of eucalypt forest has been mostly cleared. Inspection of modern aerial imagery shows areas of sparse regrowth cover parts of the study area.

Currawang Creek is the closest semi-permanent watercourse and is located approximately 465 m southwest of the study area at the closest point, with most of the study area being over 500 m away. An ephemeral drainage feature is located immediately west of the study area which drains into Currawang Creek to the south, although it would only flow during significant rain events (see **Figure 1-4**).

The southwest of the study area has undergone surface disturbance because of the approved quarry operations. Notably, the excavated void of Pit 1 has zero potential for Aboriginal sites, but it can also be maintained that the amount of ground surface disturbance around the void, which includes partially constructed bund walls and overburden stockpiles, will also have impacted

¹ Group has requested their details not be disclosed.

significantly on the potential for this land to contain extant Aboriginal sites, should they have existed here in the first place.

Figure 1-4: Topography and drainage of the study area.

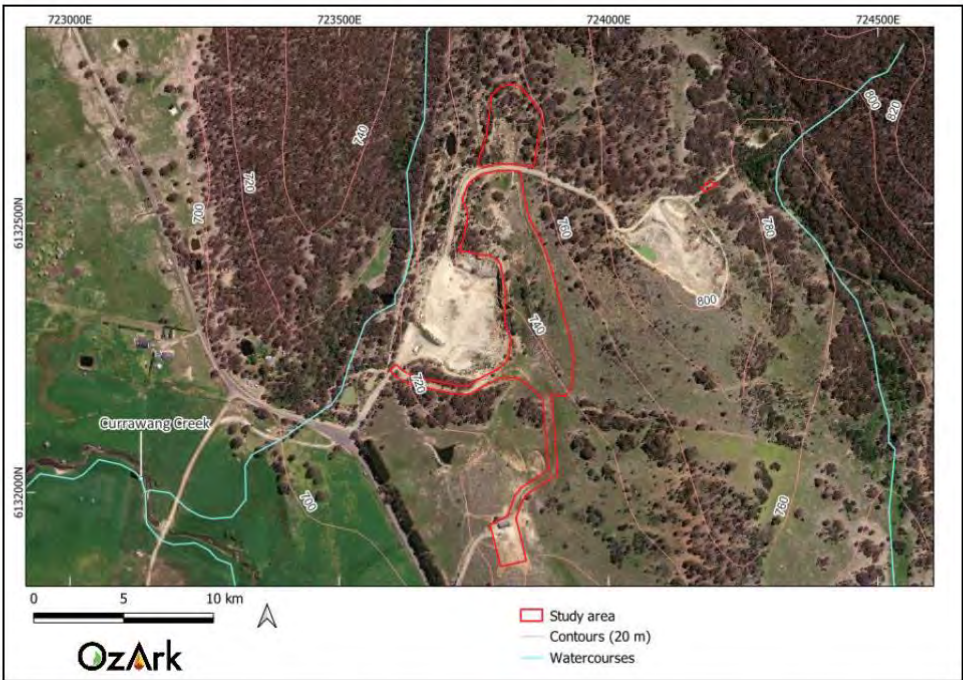
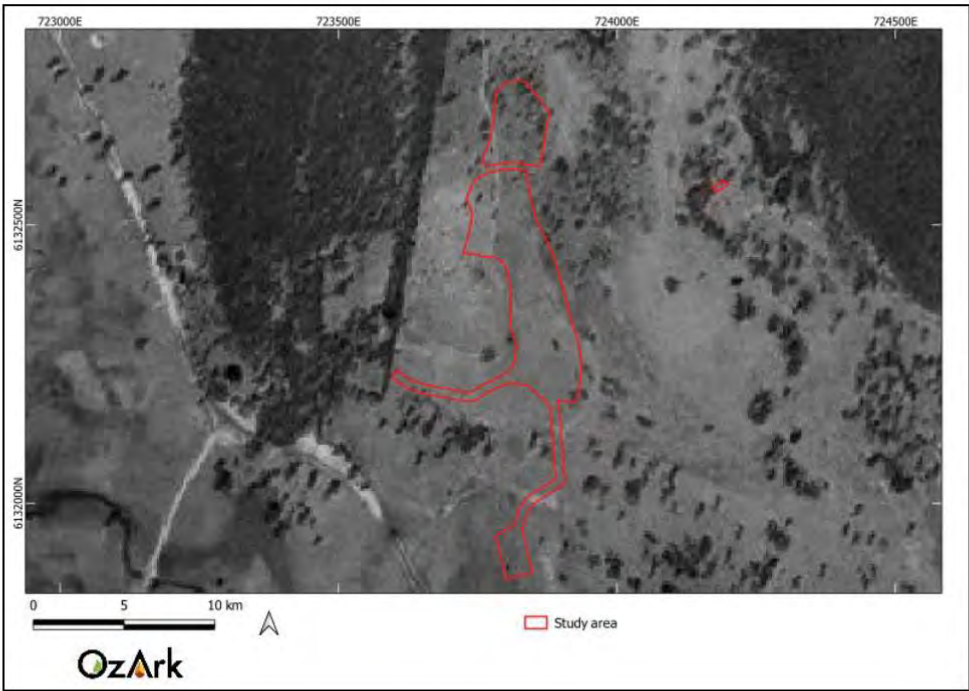


Figure 1-5: 1977 aerial with overlay of study area (source: SS 2022).



2 CULTURAL VALUES

2.1 INTRODUCTION TO CULTURAL VALUES

No matter who you are, we all have culture. Each person's culture is important; it's part of what makes us who we are.

Many Aboriginal people in Australia have a unique view of the world that's distinct from the mainstream. Land, family, law, ceremony and language are five key interconnected elements of Aboriginal culture. For example, families are connected to the land through the kinship system, and this connection to land comes with specific roles and responsibilities which are enshrined in the law and observed through ceremony. In this way, the five elements combine to create a way of seeing and being in the world that is distinctly Aboriginal.

Fundamentally, culture is living and is not static:

- Culture is acquired - we learn about culture from others in our community, including our parents
- Culture is shared - culture does not exist in a vacuum, it is shared amongst a group of people
- Culture defines core values - because we have been taught our culture and share it with our cultural group, we tend to form the same core values
- Cultures resist change but are not static - culture does and can change, but change is usually slow and gradual.

2.1.1 Connection to Country

Aboriginal and Torres Strait Islander peoples are connected to Country through lines of descent (paternal and maternal), as well as clan and language groups.

Although in the past (and sometimes into the present) there have been conflicts between different tribal groups, these were rarely over land. Aboriginal and Torres Strait Islander people have such a strong sense of belonging to country; they have no desire to own the land of others.

Territory is defined by spiritual as well as physical links. Landforms have deep meaning, recorded in art, stories, songs, and dance. Songlines or Dreaming Tracks as well as kinship structures link Aboriginal peoples to the territories of other groups. In the past, these links were also used for trade.

"When we say Country we might mean homeland, or tribal or clan area and in saying so we may mean something more than just a place; somewhere on the map. We are not necessarily referring to place in a geographical sense. But we are talking about the whole of the landscape, not just the places on it."

Professor Mick Dodson AM, August 2007

2.1.2 Managing Country

Living on this land for around 50,000 years, Aboriginal and Torres Strait Islanders established effective ways to use and sustain resources. One important aspect is the right of certain people to control the use of resources in a particular area. Aboriginal and Torres Strait Islander people don't see themselves as 'owning' land, animals, plants, or nature, but rather belonging with these things as equal parts of creation.

The rights of different groups to live in and manage certain areas of land are clear and recorded through art, stories, songs, and dance.

Deep cultural and spiritual values like totemism have also played an important part in Aboriginal and Torres Strait Islander resource management. Totemism is a belief and value system that connects human beings to other animals, plants, and aspects of nature. Groups and individuals are assigned a particular animal that they are related to and must care for. This gives them a profound sense of connection to and responsibility for the natural world.

Aboriginal and Torres Strait Islanders people have a wide range of traditional methods for gathering food including fish traps, subsistence agriculture, hunting and harvesting a wide range of natural fruits and vegetables. Some groups of people would stay in one place, while others moved around the land according to the seasons, to ensure sustainable and rich food supplies, and to fulfil their spiritual and cultural obligations.

Even before 1788 there were complex relationships for long distance trade between Aboriginal and Torres Strait Islander communities especially for coastal shells and stone hatchets. When people from different groups met socially to share resources, for ceremonies or to settle disputes, they brought items to exchange. Items included stones for hatchets, kangaroo skins, timber for spears, ochre or clay for paint and marine shells for decoration. The exchange of objects was not motivated by a desire for wealth accumulation but a social system to build connection between people and groups.

2.1.3 Recognising lore

In much of eastern Australia, Aboriginal communities live their lives like most Australians without resorting to tribal lore. However, in certain crucial areas, particularly associated with family, leadership roles, and caring for Country, Aboriginal lore continues, even in the most urbanised communities.

2.2 IDENTIFYING CULTURAL VALUES

A major aim of this assessment is to identify any cultural values within the landscape in which the proposal is located so that those values can be recognised and incorporated into the ACHAR's management recommendations.

Any cultural values relating to the proposal area will be captured by the OzArk archaeologists (if such information is provided by RAPs during the survey) and included in the ACHAR.

Understanding cultural landscapes can only come from the views of a particular community, in this case, the Aboriginal community. Unless informed, OzArk will not know of the community's feelings towards the cultural landscape in which the project will be located. Should any RAPs have knowledge of cultural values regarding the proposal area that they wish to share or that may affect the survey methodology set out in **Section 4**, OzArk invites them to contact us so that these values can be recorded and/or responded to in the methodology.

2.2.1 Use of information collected

An ACHAR will be prepared for the project which articulates Aboriginal cultural values and associated conservation methods across the proposal area, as identified during the consultations. The ACHAR will be circulated to all RAPs for comment as is set out in the ACHCRs. The ACHAR will be available to Heritage NSW for their consideration of the proposal and the report will be publicly available.

2.2.2 Public / confidential information

Information will be treated in accordance with instructions received by Aboriginal informants. Information described as confidential (culturally sensitive) will not be detailed in the publicly available report. Confidential information should be made available to the Applicant, its heritage consultants, and Heritage NSW so that significant cultural values can be conserved. On advice from the provider of the information, a redacted ACHAR would be made available to the wider public where any sensitive cultural information is removed.

2.2.3 Copyright

Information collected for this assessment remains the property of the Aboriginal informants and the author. Without written permission from individual informants and the author information may not be used for purposes other than those outlined above.

3 ARCHAEOLOGICAL CONTEXT

3.1 ABORIGINAL PEOPLE OF THE STUDY AREA

David Horton's 1994 map of Aboriginal linguistic boundaries places the study area on the border of the Ngunawal and Gundungurra language groups. In contrast, Tindale's 1974 map places the study area within the Ngunawal language group with the Gandangara (Gundungurra) linguistic group further north of Goulburn.

The study area is within the boundaries of the Pejar LALC.

3.2 REGIONAL ARCHAEOLOGICAL CONTEXT

The Aboriginal occupation of Australia begins prior to 40,000 BP (years before present) and possibly earlier than 50,000 BP. Dates exceeding 20,000 years occur in almost all parts of Australia resulting in the expectation that most areas should have a Pleistocene (>12,000 BP) occupational signature. However, such dates remain relatively rare due to a range of factors, both behavioural and post-depositional. These factors include a possible low density of occupation in the Pleistocene period and poor preservation of archaeological materials (particularly dateable organic materials).

Paton (1998) states that regional studies indicate that the most commonly encountered archaeological sites in the region are open campsites represented by scatters of stone artefacts.

Based on an assessment of site size, context and location, a model of site patterning is suggested for the area by Paton:

- Large sites (containing several thousand artefacts over several hectares) will be found on alluvial flats along major water courses or water bodies, particularly on sandy deposits near water. These sites are large, comparatively dense and close to permanent water sources. It is thought that they represent focal points for Aboriginal activity and would have been camped at regularly, and probably by larger groups than average.
- Smaller sites are found on undulating hills. These comprise the vast majority of sites in the region. The largest of them (and the majority) are found close to water sources. Sites become fewer in number and smaller away from water, and where ground is steeply sloping, such as hillsides. These sites probably represent small camps occupied when ephemeral water sources are full, and only used for short periods.
- A small number of sites are located on hilltops. Some of these sites are larger than those found on undulating hills, but smaller than those on the alluvial flats. These camps may represent ephemeral camps similar to those described above, although there is some historical evidence to suggest they may be associated with ceremonial activities.

3.3 LOCAL ARCHAEOLOGICAL CONTEXT

A search of the Aboriginal Heritage Information Management System (AHIMS) database on 1 November 2022 returned 23 results for Aboriginal sites within a 10 km radius of the study area (GDA Zone 55 Eastings: 718903–728903; Northings: 6127386–6137386).

Table 3-1 lists the site types and frequencies of the search result and **Figure 3-1** shows the location of previously recorded sites in the vicinity of the study area.

Stone artefact sites (isolated finds, artefact scatters and areas of potential archaeological deposit (PAD) are the most frequently recorded site types in the vicinity of the study area (**Table 3-1**). One other site type, quarry, is recorded in the region but to a lesser extent and in association with PAD.

Artefact scatters are a relatively stable indicator of past Aboriginal occupation. Sites in this category are less ambiguous to recognise and can remain close to their original deposition context despite disturbances.

Table 3-1: AHIMS site types and frequencies

Site Type	Number	% Frequency
Artefact scatter	15	65.22
Isolated find	5	21.74
Isolated find & PAD	1	4.35
Artefact scatter & PAD	1	4.35
Quarry & artefact scatter	1	4.35
Total	23	100

Figure 3-1 shows that one site, 51-5-0063 (CL1), is located near the study area. Site 51-5-0063 was recorded by Paton (1998) during his assessment for an expansion of the existing Barina Quarry. The site is described as consisting of three stone artefacts across a 50 m by 150 m area. Artefact materials consist of quartz and silcrete.

There remains some confusion over the location of 51-5-0073. As shown on **Figure 3-2**, the AHIMS location, when converted from AGD to GDA, places the site to the east of Pit 2. This location somewhat conforms to Paton's observation that the site is "about 500 m east of the existing hard rock quarry", i.e. Barina Quarry Pit 1 (see **Figure 3-3**). However, the site description of it being located on a track, and where it is shown on Paton 1998 Figure 2, places the site to the north of the eastern hard rock quarry. This area is also fenced to prevent impact to the site. On the balance of the evidence, the fenced location is considered to be where the site is located.

Figure 3-1: AHIMS sites in relation to the study area.

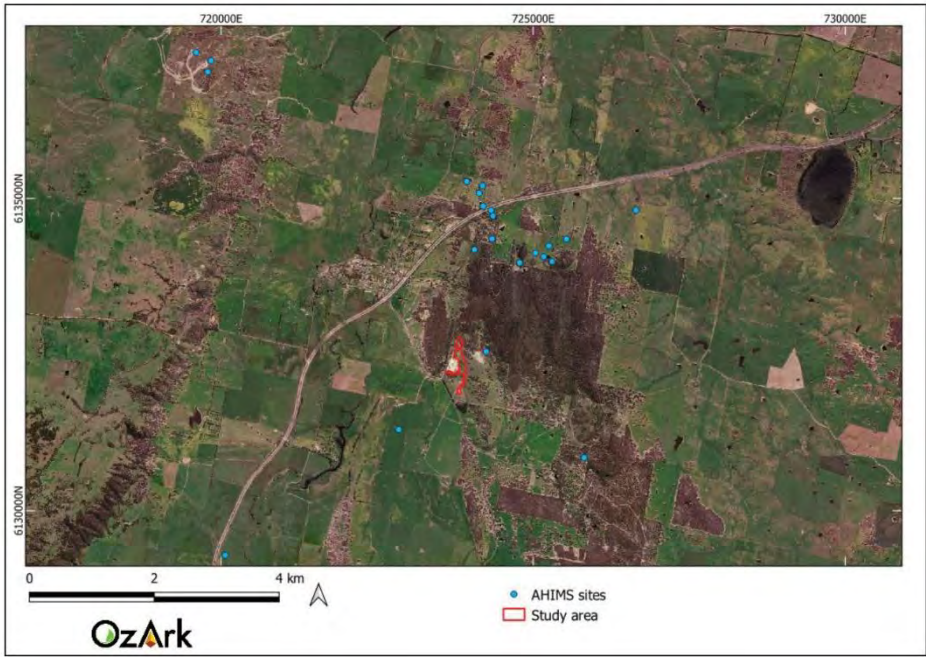


Figure 3-2. Aerial of the study area showing the various locations for site 51-5-0073.

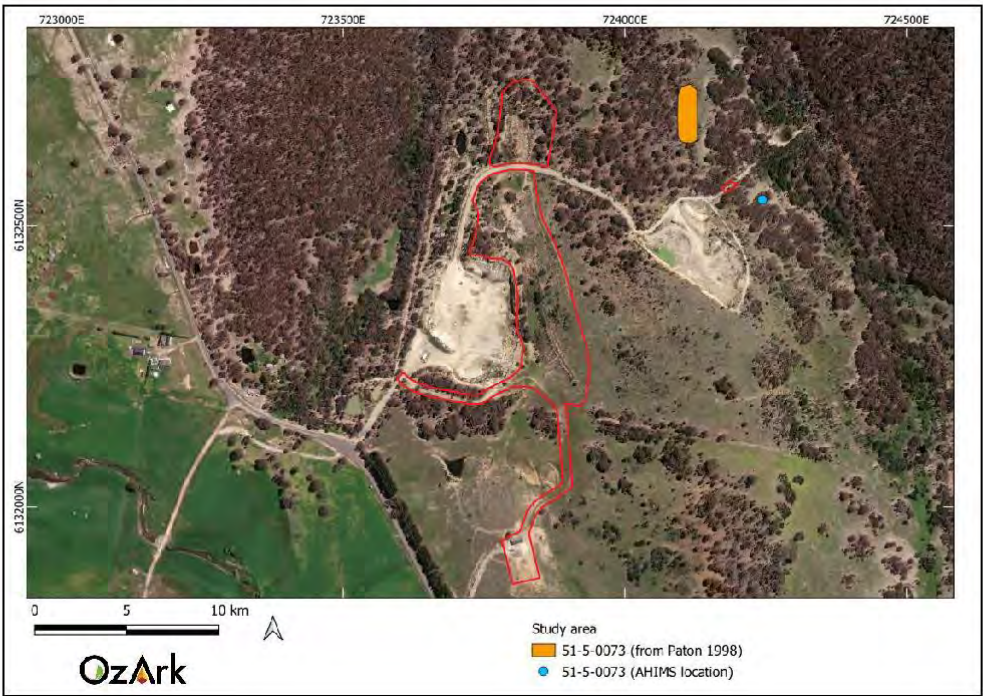
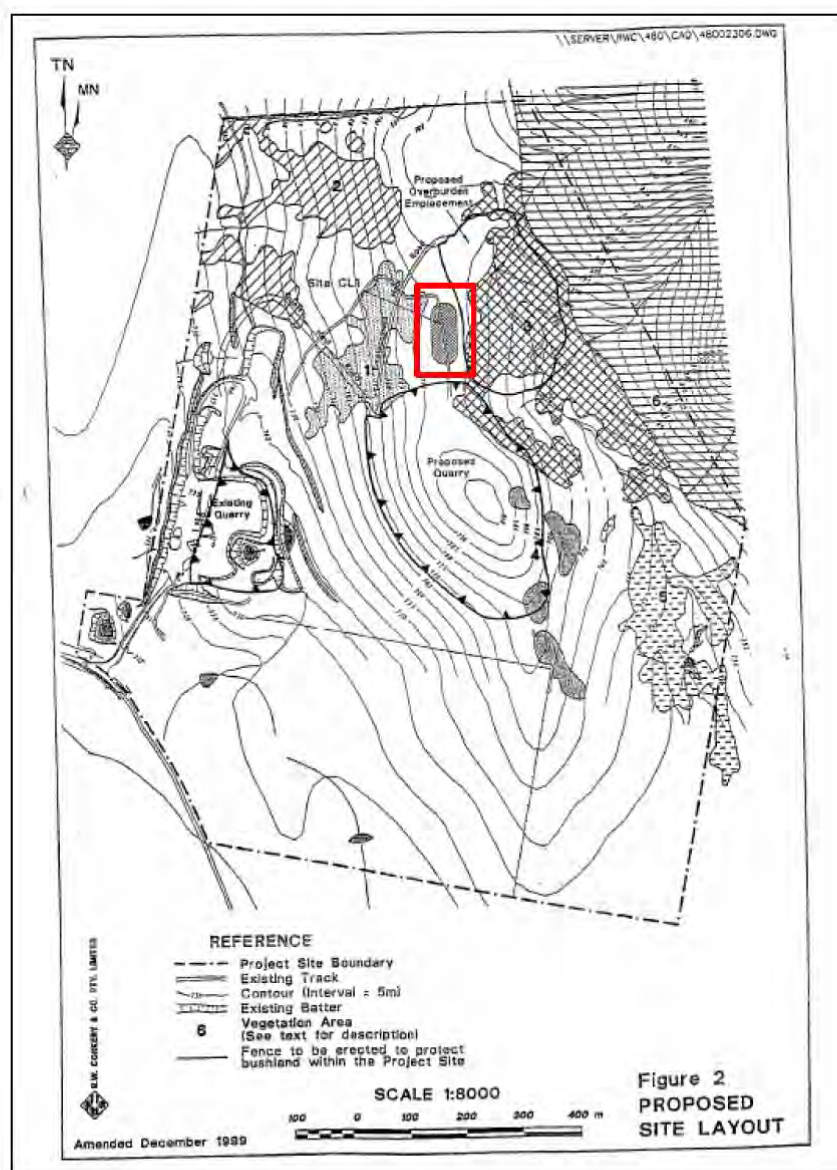


Figure 3-3. Site location of 51-5-0063 (CL1) (red square) from the original assessment in original EIS.



3.3.1 Archaeological investigations within and near the study area

3.3.1.1 *An Archaeological Investigation of a Proposed Quarry Extension (Paton 1998)*

In 1998, Robert Paton assessed 117 ha of land for the expansion of the Barina Quarry including the current study area. One Aboriginal archaeological site (51-5-0073) was recorded during the assessment (see **Figure 3-2** and **Figure 3-3**). Site 51-5-0073 was recorded as an artefact scatter

consisting of three stone artefacts (one quartz and two silcrete flakes) exposed over an area of approximately 150 by 50 m. Paton found site 51-5-0073 to be of low/moderate scientific significance.

Paton concluded that given the intensity of the study and that undertaken previously by the NSW National Parks and Wildlife Service archaeologist, it is unlikely that any other sites would be located by further archaeological work.

3.3.1.2 *Aboriginal Cultural Heritage Assessment – Proposed Collector Wind Farm (NSW Archaeology 2015)*

New South Wales Archaeology (2015) undertook an Aboriginal cultural heritage assessment of modifications to the proposed Collector Wind Farm in 2015, located 5.5 km northwest of the study area. During the assessment, three Aboriginal sites were recorded which all consisted of isolated finds. The three isolated finds consisted of three silcrete flakes and one quartz flake. All three sites were assessed to be of low archaeological significance.

NSW Archaeology concluded the landscape is comprised of very large amorphous landforms which are not archaeologically sensitive and do not contain micro-topographic features likely to have been targeted by Aboriginal people for activities other than low intensity use such as hunting and gathering and travel etc.

3.3.1.3 *Woodlawn Wind Farm – Environmental Impact Statement (Biosis as reported in URS 2004)*

In 2004, Biosis assessed heritage and archaeological impacts of the proposed Woodlawn wind farm located 17 km southeast of the study area (Biosis as reported in URS 2004). The assessment covered approximately 5 ha and found 15 previously unrecorded Aboriginal sites, all artefact scatters. Thirteen of the 15 sites were found to have low archaeological significance and possess low archaeological potential.

3.3.1.4 *Collector Waste Resource Facility (OzArk 2018)*

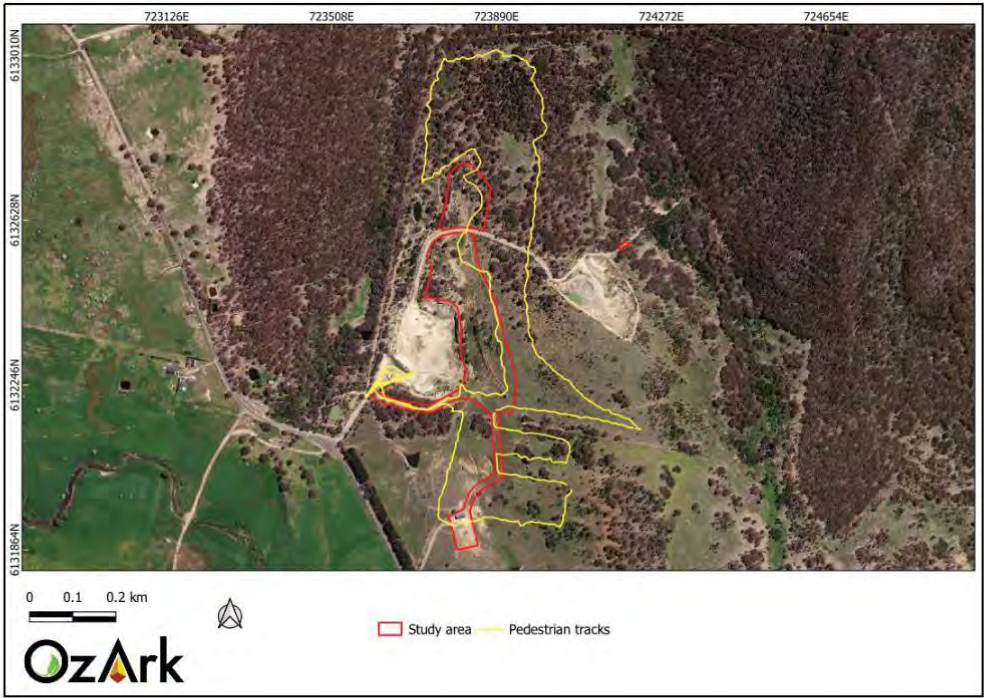
In 2018, OzArk prepared an ACHAR for the Collector Waste Resource Facility which included 10.8 ha of land and partly overlapped with the current study area. No Aboriginal sites were recorded during the assessment due to high levels of disturbance.

3.3.1.5 *Barina Quarry Modification*

As noted in **Section 1.2**, OzArk completed a survey for the project in 2023. The area assessed in 2023 was larger than the current study (see **Figure 3-4**). No Aboriginal sites were recorded during the assessment which was assisted by a representative from Pejar LALC and Tyrone Bell. No Aboriginal sites were recorded during the assessment. Further, due to the sloping nature of the landform, the observed thin soils and the high degree of disturbance, it is assessed that

there is a low probability for there to be further, undetected, subsurface sites within the assessment area.

Figure 3-4. 2023 survey tracks across the study area.



4 ASSESSMENT METHODOLOGY

4.1 ASSESSMENT APPROACH

The Aboriginal cultural heritage assessment of the study area will follow the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice; DECCW 2010b).

As highlighted in **Section 3.3**, the study area has been previously surveyed. This previous assessment has been able to successfully characterise the archaeological potential of the landforms present which precludes the need for any further archaeological survey. As such, no additional survey will be completed to inform the ACHAR.

4.2 PRODUCTION OF THE ACHAR

OzArk staff will prepare a draft ACHAR based on the previous field results, including comments from RAPs (if any are provided) and RAP assessments of the cultural significance of the study area. Critical timelines and milestones for the completion of the assessment and delivery of reports will adhere to the timeframes outlined in the ACHCRs.

OzArk staff understand that RAPs may not want culturally sensitive information to appear in the report. In these cases, we will need to work together to communicate information to the Applicant in a way that is culturally sensitive. As such, it will be beneficial for discussions to take place between the OzArk staff members drafting the report and knowledge holders with respect to the communication of culturally sensitive information.

Once approved for release, RAPs will be invited to review the draft report and provide formal comment within the ACHCR timeframes. Feedback will be incorporated into the final report and provided as an appendix for the determining authority to independently review. A copy of the final report will be provided to each stakeholder group prior to the Applicant submitting it to the relevant authorities.

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APPENDIX 3: ABORIGINAL HERITAGE: UNANTICIPATED FINDS PROTOCOL

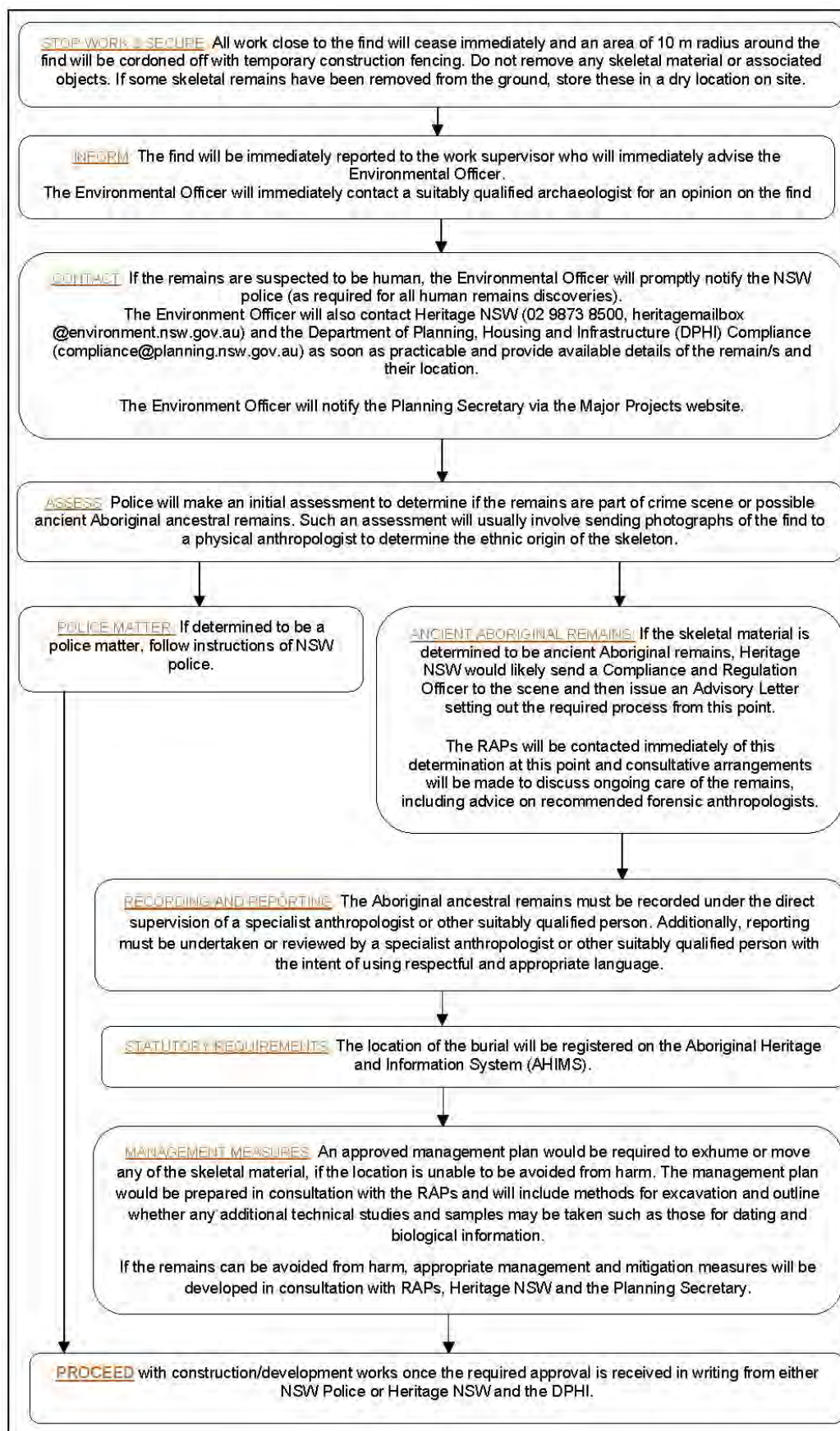
An Aboriginal artefact is anything which is the result of past Aboriginal activity. This includes stone (artefacts, rock engravings etc.), plant (culturally scarred trees) and animal (if showing signs of modification; i.e. smoothing, use). Human bone (skeletal) remains may also be uncovered while onsite.

Cultural heritage significance is assessed by the Aboriginal community and is typically based on traditional and contemporary lore, spiritual values, and oral history, and may also consider scientific and educational value.

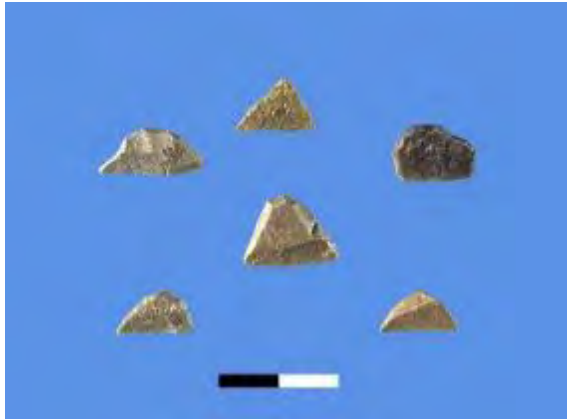
Protocol to be followed if previously unrecorded or unanticipated Aboriginal object(s) are encountered:

1. If any Aboriginal object is discovered and/or harmed in, or under the land, while undertaking the proposed development activities, the proponent must:
 - a. Not further harm the object
 - b. Immediately cease all work at the particular location
 - c. Secure the area to avoid further harm to the Aboriginal object
 - d. Notify Heritage NSW on (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au) and the Department of Planning, Housing and Infrastructure (DPHI) Compliance (compliance@planning.nsw.gov.au) as soon as practical providing any details of the Aboriginal object and its location; and
 - e. Not recommence any work at the particular location unless authorised in writing by Heritage NSW and / or DPHI.
2. If Aboriginal burials are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police, Heritage NSW and DPHI contacted.
3. Cooperate with the appropriate authorities and relevant Aboriginal community representatives to facilitate:
 - a. The recording and assessment of the find(s)
 - b. The fulfilment of any legal constraints arising from the find(s), including complying with Heritage NSW directions
 - c. The development and implementation of appropriate management strategies, including consultation with stakeholders and the assessment of the significance of the find(s).
4. Where the find(s) are determined to be Aboriginal object(s), recommencement of work in the area of the find(s) can only occur in accordance with any consequential legal requirements, normally through the procedures of an approved ACHMP.

APPENDIX 4: UNANTICIPATED SKELETAL REMAINS PROTOCOL



APPENDIX 5: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION

	
A retouched silcrete flake	A quartz flake
	
Microliths (scale = 1 cm)	Volcanic flakes
	
Flake characteristics (scale = 1 cm)	A mudstone/tuff core from which flakes have been removed

Appendix 10 Surface Water Impact Assessment

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COLLECTOR RESOURCES PTY LTD

Barina Quarry

Surface Water Impact Assessment

BNTL01469_0001-REP-001-1

28 APRIL 2025



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Rev	Date	Description	Author	Reviewer	Project Mgr.	Approver
0	26/02/2025	Draft for Client Comment	Sarah Green Goldberg and Lucy Stanton	Chris Bonomini	Sarah Green Goldberg	Chris Bonomini
1	28/04/2025	Client Issue	Sarah Green Goldberg and Lucy Stanton	Chris Bonomini	Sarah Green Goldberg	Chris Bonomini

Signatures:






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1. INTRODUCTION

Collector Resources Pty Ltd (Collector Resources) (the Applicant) has engaged Engeny Australia Pty Ltd (Engeny) to complete a surface water impact assessment (SWIA) to support the proposed modification of the Barina Quarry (the Project) development approval (DA1-01-2000). The SWIA is documented in this report and is inclusive of a preliminary Erosion and Sediment Control Plan (ESCP) and water balance for the Project. It is understood that this report will form an appendix of a Project Modification report.

1.1 Approved Development

Collector Resources owns and operates the Project, located on Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, Collector Road, Collector NSW, within the Queanbeyan-Palerang Regional Council (QPRC) Local Government Area (LGA) (refer to FIGURE 1-1).

The Project operates under a State Significant Development (SSD) consent approved by Orders of the Land & Environment Court on 28 March 2001 (DA1-01-2000). The approval permits production of up to 300,000 tonnes per annum (tpa) with a maximum monthly production of 40,000 t of hard rock (quartzite) quarry products including aggregates and sand for the construction industry.

The approved activities are summarised as follows.

- Completion of extraction from an initial open cut (Pit 1) to a floor elevation of 716 m Australian Height Datum (AHD) and floor area of 1.5 hectares (ha).
- Extraction by drill and blast methods from a second open cut (Pit 2) to a maximum depth of 714 mAHD.
- Delivery and disposal of overburden to emplacements north of Pit 1 and 2.
- In-pit crushing and screening operations utilising a primary jaw crusher, one or more cone crushers and a variety of stationary and vibrating screens.
- Transport from the Project of up to 134 vehicle movements per day and 20 vehicle movements per hour.
- Hours of operation commencing at 7.00 am to 6.00 pm Monday to Saturday.

The approved disturbance area of the Project incorporates additional features in the form of stripped and excavated land, drainage lines, dams, bunds and cut batters associated with the operations in the Project Area preceding DA 1-01-2000. These areas have been included within the approved disturbance footprint of the Project (refer to FIGURE 1-2).

1.2 Operational History and Current Status

Operations under DA 1-01-2000 commenced in 2005, with extraction in Pit 1 completed before transitioning to Pit 2 from which extraction was undertaken intermittently for several years. Crushing and screening was undertaken within Pit 1 with products stockpiled within Pit 1 and on lands to the immediate north of Pit 1. Extraction and other operations effectively ceased in 2008, with the extent of Pit 2 approximately 2 ha in area with a maximum depth of 778 mAHD. With occasional campaigns to crush and dispatch small volumes of quartz gravels, the Project has been in care & maintenance from 2008. Figure 1-2 presents a comparison of the current extent of disturbance compared with the approved disturbance footprint.

Collector Resources acquired the property and DA 1-01-2000 in 2016, however, operational control only reverted to the Applicant in 2019. While initially intending to recommence extraction operations in 2020, these plans were postponed pending the completion of further feasibility and quarry planning work.

A modification to DA 1-01-2000 was approved in November 2023 under Section 4.56 of the Environmental Planning & Assessment Act 1979 for a 12-month extension to operations. DA 1-01-2000 (MOD 2) made no change to the overall operations of the Project, however, introduced conditions requiring satisfactory completion of road upgrades and an independent environmental audit prior to recommencement. It is understood the independent environmental audit has now been completed and completion of road upgrades is a component of the proposed modification.

1.3 The Proposed Modification

A second modification is proposed to allow for continuation of operations. These modifications are identified on FIGURE 1-3 and summarised as follows:

- An extension to operations for 15 years (excluding rehabilitation which will be completed beyond the term of extended operations).
- Establishment of additional stockpiling areas:
 - South Stockpile Area. A new stockpiling area between Pits 1 and 2. This area has been the subject of ancillary activities associated with the Project (by a previous owner and operator) and ongoing property management. The area is considered modified and of low biodiversity value.
 - North Stockpile Area. Conversion of an area allocated to overburden emplacement (to the north of Pit 1) along with a small extension to the north and east.
 - Overburden Emplacement and Supplementary Stockpile Area. Modification to the Pit 2 Overburden Emplacement to allow for supplementary stockpiling of quarry product.
- Importation of clean fill materials for use as engineered fill for the construction of internal roads and stockpiling areas, and potentially blending with extracted quartz materials to produce specialty products.
- Relocation of mobile and modular crushing and screening operations to either Pit 2 (preferred option) or the new Stockpile Area (secondary option). It is also proposed to add a small washing circuit for the production of manufactured sand products.
- Removal of the distinction between laden and unladen movements (allowing for laden trucks to enter the Project Area with materials with a resource recovery order/exemption and leave with quarry products).
- Relocation of the Project Office, weighbridge and amenities onto the South Stockpile Area, inclusion of workshops and a small laydown area on Lot A DP86342, and realignment of some internal roads between the Project entrance, relocated facilities and stockpile areas.

Operations on the Project Area would continue to be undertaken during daytime hours, being Monday to Friday 7 am to 6 pm and Saturday 7 am to 1 pm with the following exceptions:

- Restriction on transport operations would only apply to the Quarry Site and Collector Road. Transport operations may extend beyond the nominated hours to allow for deliveries of product from and clean fill materials to the Project outside of peak traffic periods.
- Minor non-audible maintenance, repair or monitoring activities may be undertaken outside of these hours.

1.4 Potential Surface Water Impacts

The Project has the potential to have the following impacts on surface water resources:

- Minor reduction in runoff to the surrounding catchment as a result of runoff from the Project Water Management System (WMS) catchment being retained by the Project.
- Potential adverse water quality impacts on downstream receiving waters during all phases of the project (construction, operation and closure) as a consequence of:
 - Erosion and transport of sediment from exposed surfaces in stormwater discharges to the surrounding environment.
 - Other pollutants such as hydrocarbons (e.g. fuel/oil leaks or spills) entrained in stormwater discharges to the surrounding environment.
 - Residual elevated nitrate concentrations as a result of blasting activities.

Potential surface water impacts have been assessed in subsequent sections of this report.

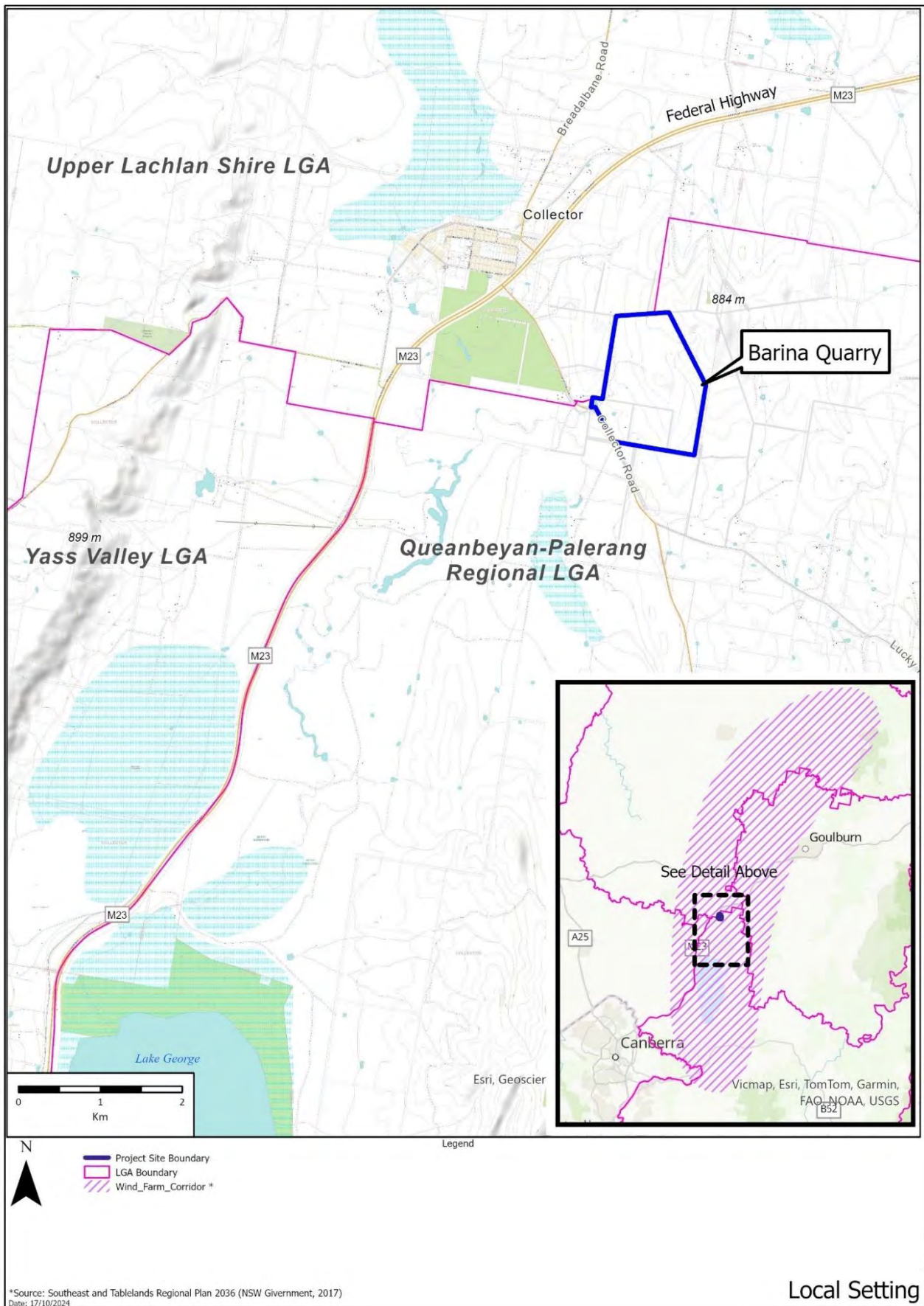


Figure 1-1: Local Setting

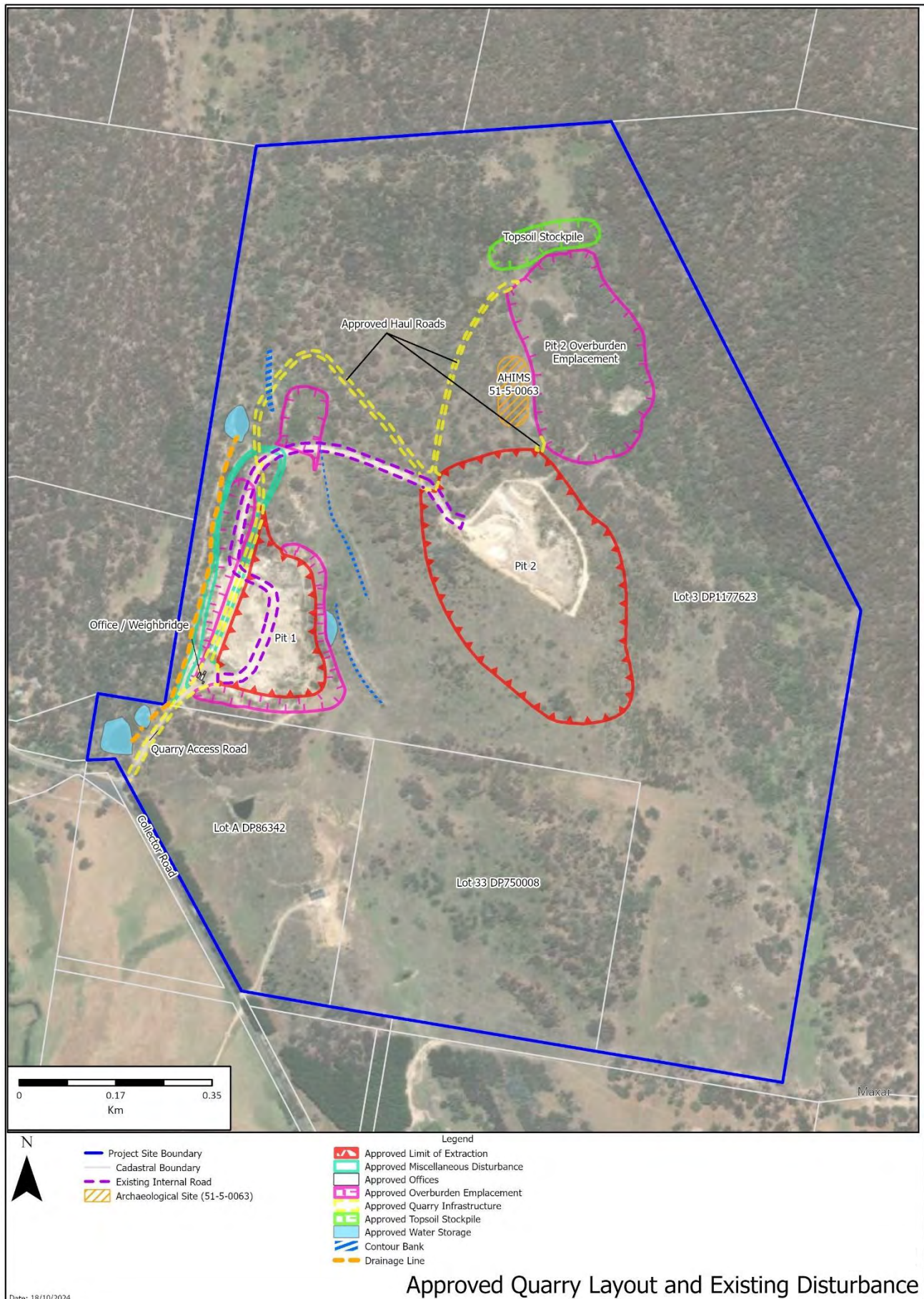


Figure 1-2: Approved Quarry Layout and Existing Disturbance

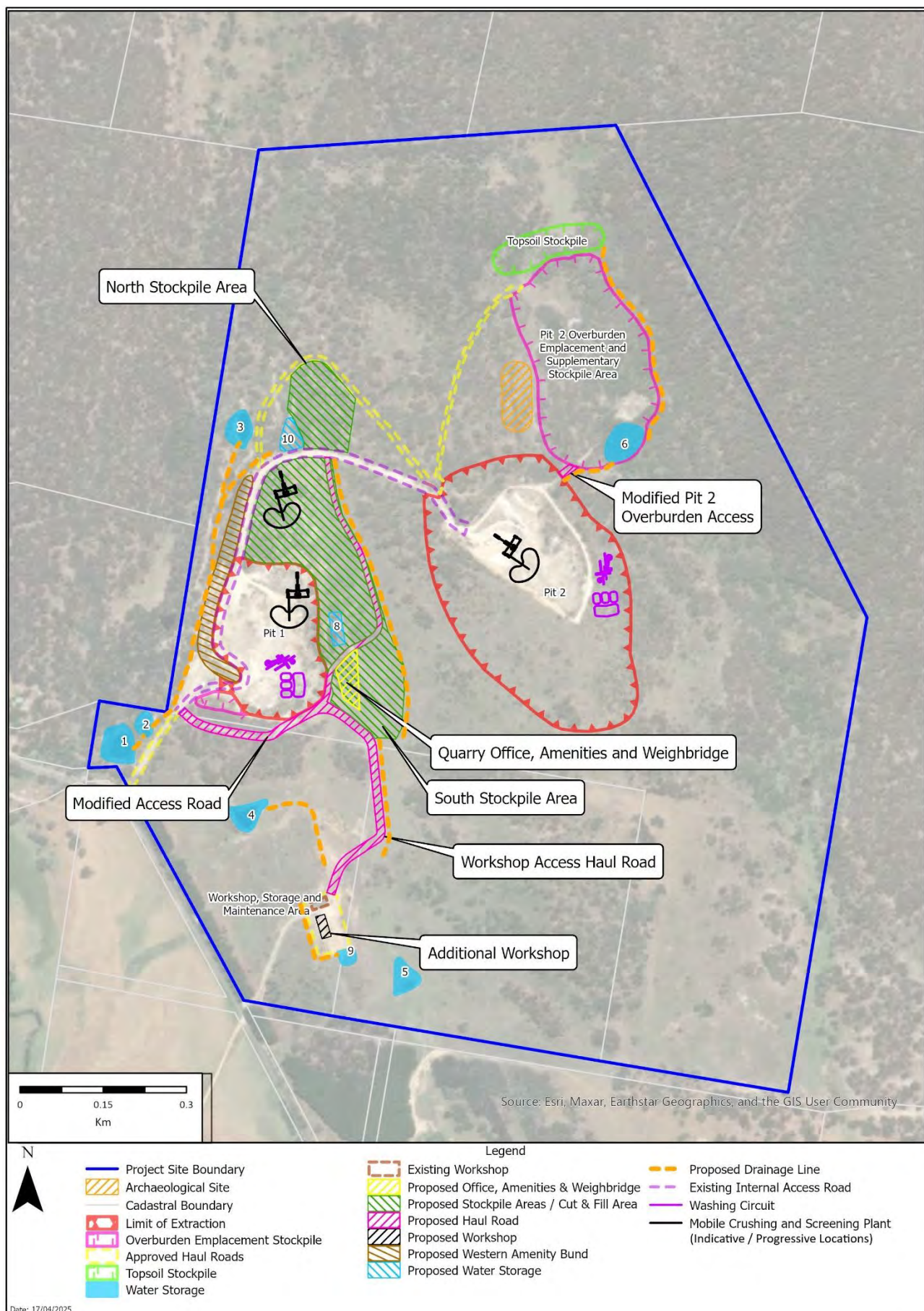


Figure 1-3: Proposed Modified Quarry Layout

2. SURFACE WATER CONTEXT

2.1 Catchment

2.1.1 Regional Catchment

The Project is located within the Lake George Catchment, which covers an approximate area of 950 km² in south-eastern NSW to the north of the NSW-ACT border. Lake George extends approximately 25 km in length and 10 km in width, covering approximately 16% of the total catchment area. It is an endorheic shallow lake, with water accumulating from major reporting tributaries derived from the surrounding hilly terrain. To the north, Collector, Tarago, and Currawang Creeks feed into the drainage basin, while the southern bounds of the catchment are drained by Butmaroo and Turallo Creeks. The creeks act as the primary water supply within the region and provide a reliable source for use by local councils, water utilities, livestock grazing, and agriculture (refer to Figure 2-1). There is no surface outflow from the lake with water lost via underground seepage and evaporation only.

2.1.2 Local Catchment

The Project is located within three minor catchments to which depressions and changes in elevation direct runoff southwards into Currawang Creek which subsequently drains into Lake George via Collector Creek. The total catchment area for the Project is approximately 1 km² equating to a negligible portion (<0.1%) of the overall Lake George Catchment.

2.2 Surface Hydrology

All mapped 'defined' watercourses within the Project Area have been identified from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) published hydroline dataset (2018). The Project Area is situated upon the eastern edge of a ridgeline that generally directs surface water runoff to the southeasterly.

Several first and second order drainage lines surround the Project Area consistent with the undulating hills and ridgelines of the surrounding landscape. Of these, two unnamed first order drainage lines directly intersect the Project Area. Along the western boundary, one drainage line flows within the Project Area before flowing 380m south into the fifth order Currawang Creek. At the eastern side of the Project Area, a first order watercourse partially intersects the overburden emplacement before flowing southeast into the existing Dam 7. Dam 7 overflows into a third order watercourse which drains to Currawang Creek. Currawang Creek flows in a north-westerly direction feeding into the sixth order Collector Creek approximately 1.7 km downstream from the Project Area. Collector Creek flows in a southerly direction for 6.5 km into Lake George.

2.3 Existing Water Management System

The existing water management system consists of five clean water dams and three sediment basins. Existing dirty water drains divert runoff from disturbed areas to the sediment basins. The existing water management features are proposed to be retained in the water management system, with some clean water dams to be utilised as sediment basins for capture of runoff from disturbed areas. The water management system features are further detailed in Section 3.2.

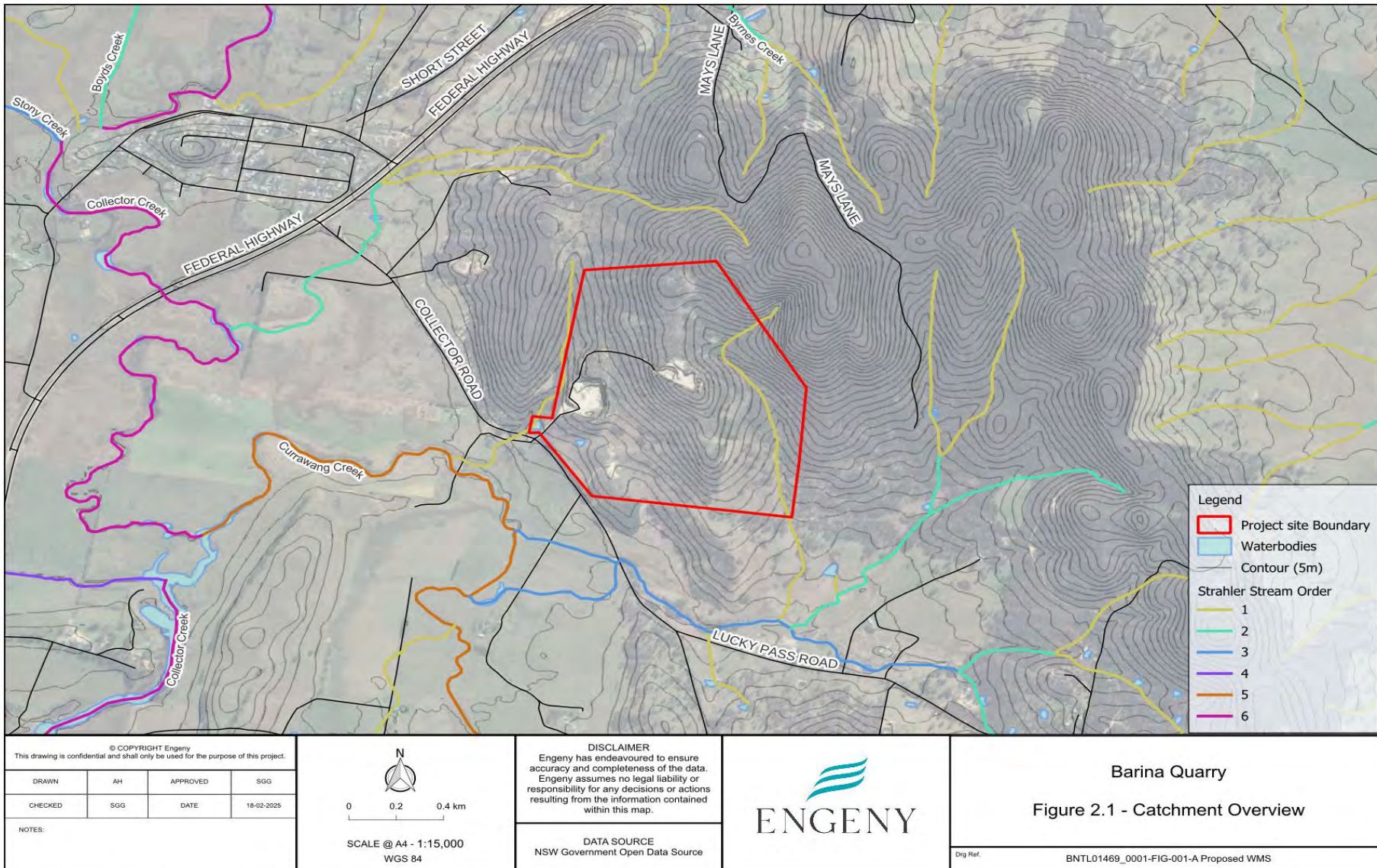


Figure 2-1: Barina Quarry Catchment Overview

2.4 Topography and Soils

Surrounding the Project Area, the topography is characterised by the undulating to steep terrain and gently sloping valleys of the Southern Tablelands of New South Wales (NSW) which trends north to south including Lake George, Collector Creek, and the township of Collector. Elevation across the Project Area ranges from 705m AHD in the southwest, to 830m AHD toward the northeast adjacent the main ridgeline. The natural topography of the existing Project Area has been modified by the existing approved quarry activities, with the existing landform now comprising of the current extraction area, product stockpile areas, diversions, sedimentation dams, and ancillary infrastructure including site access roads, tracks, and sheds. Areas to the north, east, and west of the Project Area are densely vegetated.

Publicly available modelled soil properties and hydrogeological landscape data (DCCEEW, 2022) relevant to the Project Area was sourced from the 'Sharing and Enabling Environmental Data in NSW' (SEED) Portal. Much of the Project Area incorporates the Midgee soil landscape, consisting of Kurosols that are commonly acid to neutral yellow duplex soils. Fronting Currawang Road, the southwestern boundary of the Project Area is situated on the Collector Creek soil landscapes which predominantly includes Sodosols that are moderately deep, grey and yellow mottled duplex soils (Figure 2-2).

The modelled soil properties are tabulated in Table 2-1 and hydrogeological landscape data in Table 2-2 and indicate that the Project Area soils:

- Have moderate erodibility.
- Have fine sandy textured topsoil progressing to a higher clay content subsoil.
- Have a low salinity hazard, indicated by low instream EC and moderate land salinity (refer to Table 2-2).
- Are acidic, consistent with a low to moderate pH.
- Have low to moderate fertility topsoils, indicated by moderate to high organic carbon but low CEC.

TABLE 2-1: MODELLED SOIL PROPERTIES

Parameter	Soil Profile		
	0-30cm Depth	30-60cm Depth	60-100cm Depth
Soil Erodibility, k factor (as used in the Revised Universal Soil Loss Equation (RUSLE))	0.05-0.06	0.05-0.06	0.05-0.06
Clay Percentage (%)	>10-15	>25-30	>25-30
Silt Percentage (%)	>15-20	>10-15	>10-15
Sand Percentage (%)	>80-85	>60-70	>40-50
pH (CaCl ₂)	>4.5-5.0	>4.5-5.0	>5.0-5.5
Cation Exchange Capacity (cmolc/kg)	>5-10	>10-15	>15-20
Soil Organic Carbon Concentration (%)	>1.50-2.00	>0.50-1.00	>0.25-0.50

TABLE 2-2: HYDROGEOLOGICAL LANDSCAPES

Overall Salinity Hazard	Land Salinity	Instream EC
Low	Moderate	Low

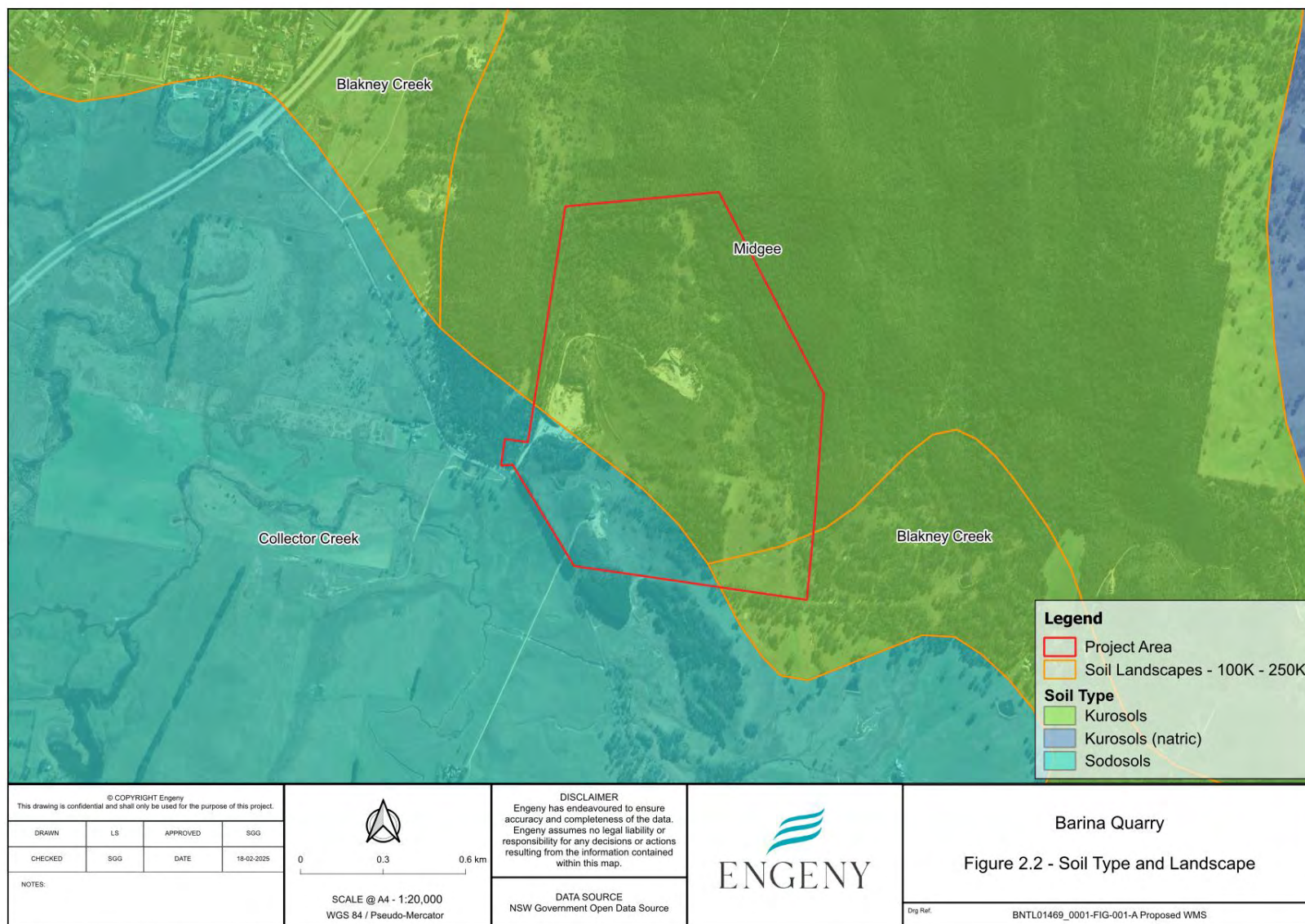


Figure 2-2: Soil Type and Landscape

2.5 Climate

The Project is located just over 1 km southeast of the village of Collector which is located in the Southern Tablelands region and characterised by a temperate climate. Rainfall varies throughout the region both spatially and year to year as a result of local weather patterns, larger scale climate patterns and topographical features such as the Great Dividing Range.

The closest Bureau of Meteorology (BoM) stations to the site include:

- **Collector (Brookdale) Station 70021** – Approximately 1.7 km northwest of the site with rainfall data from 1891 - 2006.
- **Collector (Winderadeen) Station 70290** – Approximately 2.2 km southwest of the site with rainfall data from 1976 - 2018.
- **Tooma (Woodend) Station 70272** – Approximately 3.5 km northwest of the site with rainfall data from 1973 -2019.
- **Yarra (Rowe’s Lagoon) Station 70088**– Approximately 6.5 km northwest of the site with rainfall data from 1896 - 2009.

Climate data for the site was also sourced from the Queensland Government Department of Environment, Tourism, Science and Innovation (DETSI) Synthetic Information for Landholders (SILO) database. The SILO database interpolates raw rainfall and evaporation data from gauges managed by the BoM to provide spatially and temporarily complete datasets. Rainfall and evaporation (Mortons potential lake evaporation) data was sourced for the SILO grid point closest to the site (-34.90 latitude and 149.45 longitude), for the period between 01/01/1889 to 23/02/2025.

Annual rainfall and evaporation statistics are tabulated in Table 2-3. Daily average rainfall and evaporation depths for the Project Area are presented in Figure 2-3. Monthly rainfall and evaporation depth ranges are shown in Figure 2-4 and Figure 2-5. Rainfall and evaporation characteristics relevant to the Project Area can be summarised as follows:

- The average rainfall and evaporation for the Project Area are typically higher in the winter, spring, and summer months and lower in the winter months.
- The total monthly evaporation is generally greater than rainfall with the exception of May, June, July, and August.
- Monthly average rainfall is greatest in October (67.7mm) and lowest in April (50.7 mm).
- The annual average rainfall for the Project Area is 704 mm.

TABLE 2-3: ANNUAL RAINFALL AND EVAPORATION STATISTICS (DESI, 2025)

Statistic	Annual Rainfall Depth (mm)	Annual Evaporation Depth (mm)
10th Percentile	477	1,162
50th Percentile	686	1,212
90th Percentile	941	1,290
Average	704	1,219

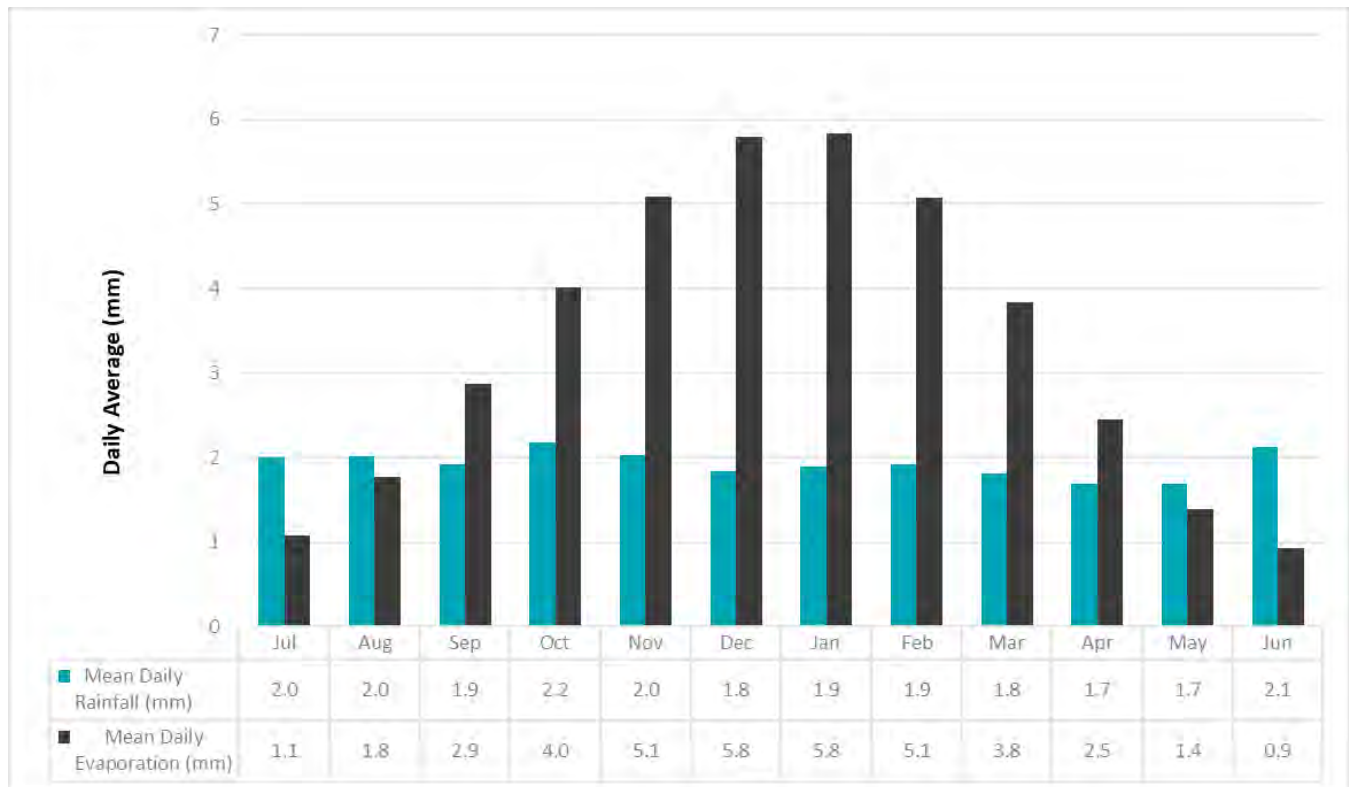


Figure 2-3: Daily Average Rainfall and Evaporation (Detsi, 2025)

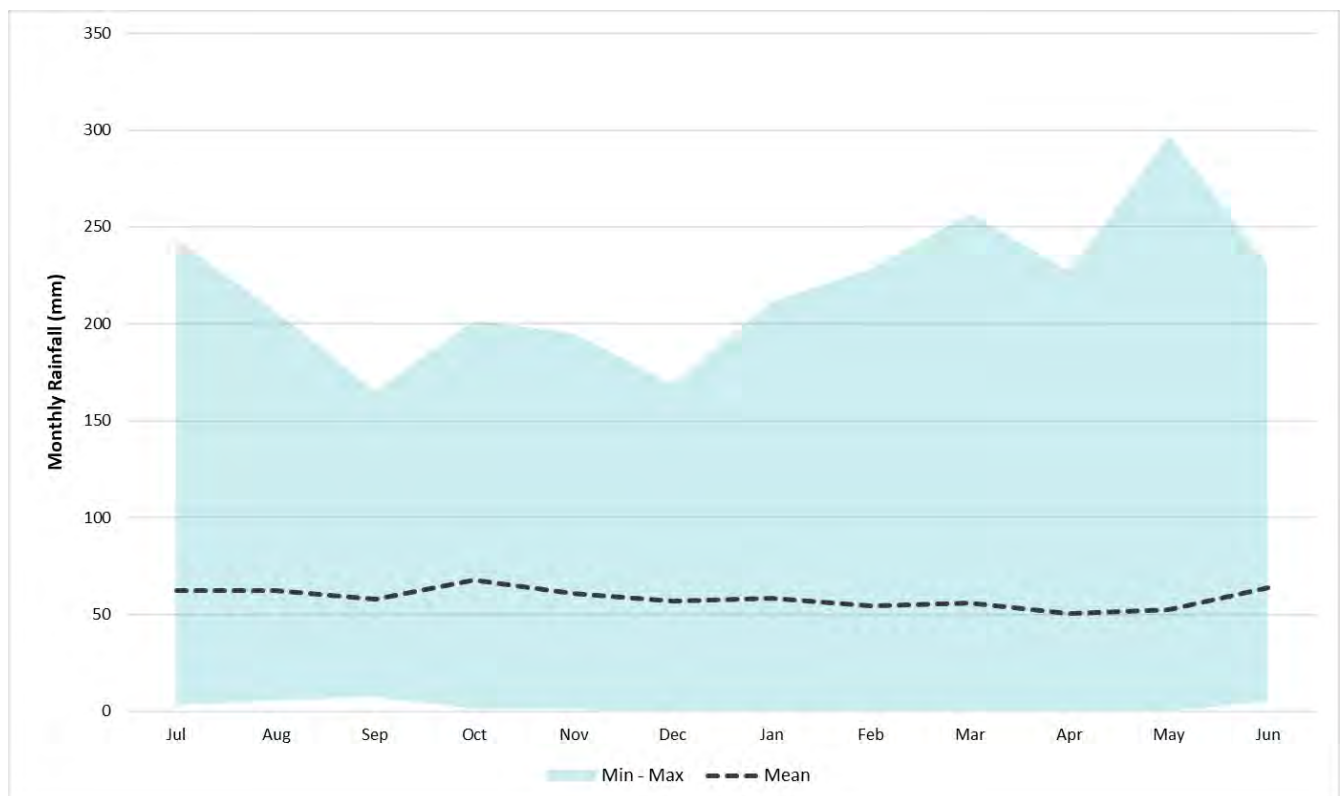


Figure 2-4: Monthly Rainfall Range and Average (Detsi, 2025)

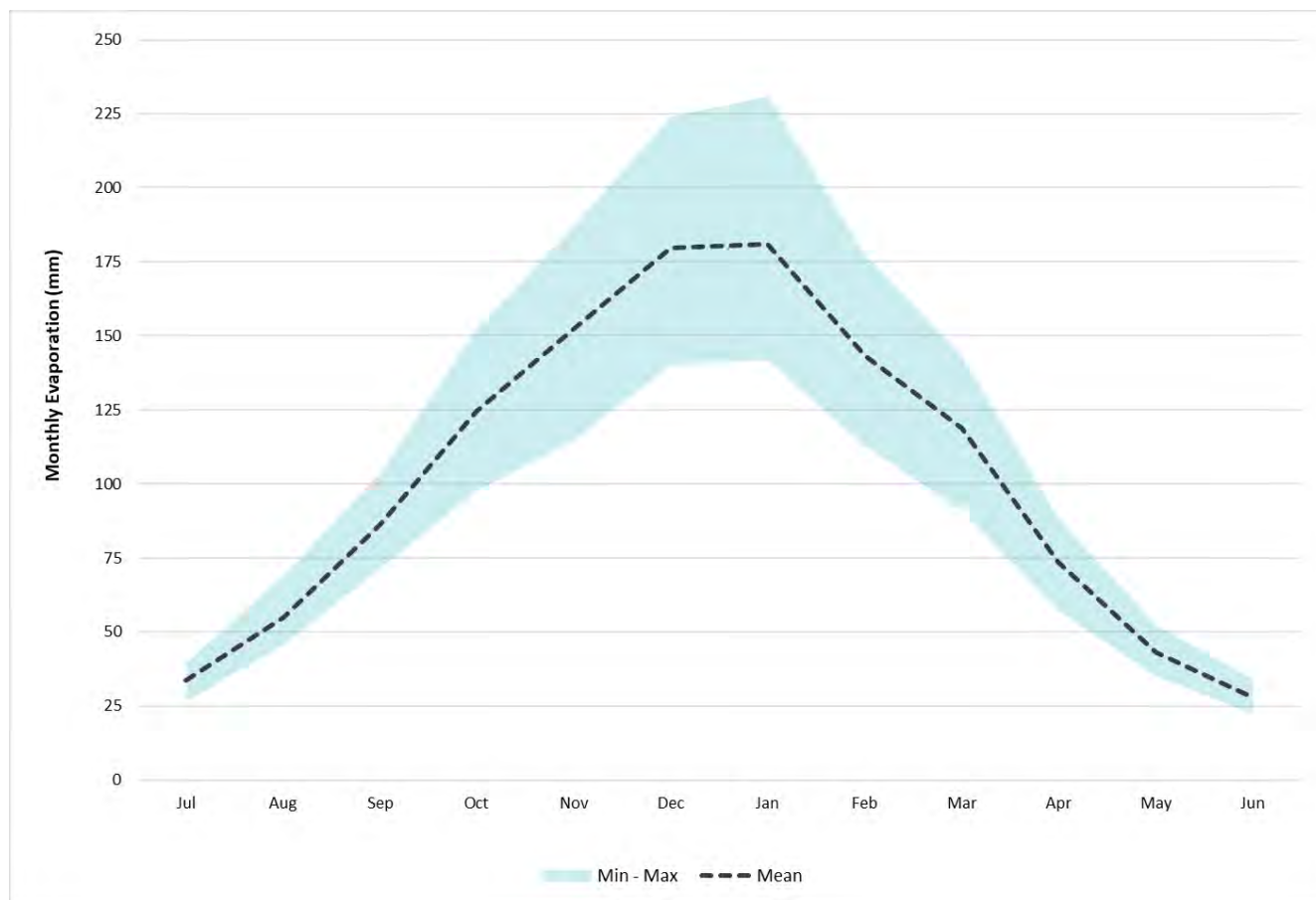


Figure 2-5: Monthly Evaporation Range and Average (Desi, 2025)

2.6 Water Quality

2.6.1 NSW Water Quality Objectives

NSW Water Quality Objectives (WQO) have been developed to guide plans and actions to achieve healthy waterways. The WQOs are based on measurable environmental values (EVs) for protecting aquatic ecosystems, recreation, primary industries, drinking water and industrial water (ANZECC & ARMCANZ, 2000). The aquatic ecosystem WQOs for the Murrumbidgee and Lake George Catchment that are considered relevant to the Project are presented in Table 2-4 below.

Given the agricultural land use surround the Project Area and Lake George located immediately downstream of the Project Area, livestock water supply guidelines are also considered relevant. Relevant livestock NSW WQOs for livestock drinking water are provided in Volume 3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australian and New Zealand Environment and Conservation Council (ANZECC), 2000) (ANZECC 2000) and include both total dissolved solids (TDS) and nitrate which are also presented in Table 2-4. Comparison of the aquatic ecosystem and livestock water supply WQOs shows that the guideline values for oxides of nitrogen (NOx) (noting that the livestock water supply guidelines have separate Nitrate and Nitrite guideline values) and total dissolved solids (TDS)/electrical conductivity (EC) (noting that EC is indicative of TDS) for livestock water supply are several orders of magnitude higher than those for protection of aquatic ecosystems.

TABLE 2-4: WATER QUALITY OBJECTIVES – UPLAND RIVER (>150 MAHD)

Parameter	Environmental Value	Units	Water Quality Objective Range
pH	Aquatic Ecosystems	pH units	6.5 - 8.0
Electrical Conductivity	Aquatic Ecosystems	µS/cm	30 - 350
Turbidity	Aquatic Ecosystems	NTU	2 - 25
Total Dissolved Solids	Livestock Water Supply	mg/L	0 – 4000 for beef cattle and sheep 0 – 2400 for dairy cattle
Nitrate as N	Livestock Water Supply	mg/L	400
Nitrite as N	Livestock Water Supply	mg/L	30

2.6.2 Baseline Water Quality

Water quality monitoring was undertaken at 4 surface water locations by Consulting Earth Scientists Pty Ltd (CES) in January 2025. Additional water quality monitoring was undertaken by ALS in March 2025. The monitoring locations are described in FIGURE 3-1. The water quality monitoring results for selected parameters are tabulated in Table 2-5.

The results for the dam water quality can be interpreted as follows:

- Results for pH indicate that surface water in the Project Area is neutral to slightly alkaline.
- Electrical conductivity for surface water was consistently low (between 24.0 µS/cm and 72.0 µS/cm) with values typical of fresh water.
- Surface water results for TDS were low (12 mg/L to 42 mg/L) and within the range of the livestock water supply guideline values for sheep and cattle (refer to Table 2-4).
- Most surface water results for turbidity in January 2025 were slightly higher than the aquatic ecosystem WQO (25 NTU) for upland rivers (refer to Table 2-4). Results for turbidity in March 2025 were less than the aquatic ecosystem WQO (25 NTU) for upland rivers.
- Total suspended solid (TSS) results were variable among the monitoring locations, ranging between 3 mg/L and 260 mg/L.
- Compared to results for turbidity, results for TSS at SW02 and SW05 for samples collected in January 2025 are higher than anticipated. The notable discrepancies between turbidity and TSS values at these locations could be the result of sampling error (e.g., excess solids entrained in the sample).

The results for the upstream and downstream reference site water quality can be interpreted as follows:

- Results for pH indicate that the water quality surrounding the site is neutral to slightly alkaline.
- Electrical conductivity at the upstream and downstream reference sites is notably higher than the dam water quality and is higher than the aquatic ecosystem WQO (30 to 350) for upland rivers (refer to Table 2-4).
- Compared to the dam water quality TDS, the TDS at the upstream and downstream reference sites is notably higher but still within the range of the livestock water supply guideline values for sheep and cattle (refer to Table 2-4).
- The turbidity result at the upstream reference site is slightly higher than aquatic ecosystem WQO (25 NTU) for upland rivers (refer to Table 2-4). The turbidity result downstream is slightly lower. Results for TSS at each of the monitoring locations are consistent with the turbidity results, i.e. higher at the upstream reference site and lower and the downstream site.

TABLE 2-5: SURFACE WATER QUALITY RESULTS (CES, 2025 AND ALS, 2025)

Monitoring Location	Date	pH	EC (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)
Dam 1	January 2025	7.2	72.0	42	260	46.8
	March 2025	Dry at the time of sampling.				
Dam 2	January 2025	8.3	65.7	19	12	41.0
	March 2025	6.4	31.0	Not analysed.	19	19.4
Dam 3	March 2025	6.9	33.3	12	25	20.2
	January 2025	6.3	24.0	Not analysed.	3	17.1
Dam 8	March 2025	6.8	66.1	27	130	41.0
	January 2025	6.8	45.0	Not analysed.	25	19.1
Upstream Reference Site 2	January 2025	Sampling not undertaken.				
	March 2025	7.3	1,060.0	668	48	41.0
Downstream Reference Site 2	January 2025	Sampling not undertaken.				
	March 2025	7.4	760.0	457	13	5.7

2.7 Licensing

2.7.1 Water Licensing

The NSW state government controls the use and flow of all water in rivers, lakes, and aquifers. Some landholders can take water without a licence, this is known as basic land holder rights (refer to Section 2.7.1.2). A water access licence or a water supply work and/or water use approval may be required to take water from a river, lake or aquifer. The *Water Management Act 2000* applies to all regions where there is a Water Sharing Plan (WSP) (refer to Section 2.7.1.1) in operation. The following sections discuss basic landholder rights, including the maximum harvestable right for the Applicant and associated land holdings.

Operational water requirements for the Project (materials processing and dust suppression) are proposed to be supplied via runoff captured within the Project water management system (WMS) (refer to Section 3). Water licensing requirements relevant to the Project are further detailed in Section 6.1.2.

2.7.1.1 Water Sharing Plan

Water Sharing Plans (WSPs) have been developed under the *Water Management Act 2000* (WM Act) to protect the environmental health of water sources, whilst securing sustainable access to water for all users. The WSPs specify maximum water extractions and allocations and provide licensed and unlicensed water users with a clear picture of when and how water will be available for extraction. The Project Area is located within the Murrumbidgee Unregulated River Water Sources (2012) WSP area and specifically, the Lake George Water Source.

2.7.1.2 Basic Landholder Rights

There are three types of basic landholder rights (BLR) in NSW (*Water Management Act 2000*):

- Domestic and stock rights – allows take and use of water for domestic consumption and non-intensive stock watering without the need for a water access licence (WAL) or water use approval. A water supply work approval (i.e. for a bore or dam, etc) is required.

- Harvestable rights – allows landholders to capture and store a proportion of the rainfall runoff from their landholding in one or more harvestable rights dams, without requiring a WAL, water use approval or water supply work approval.
- Native title rights – allows take and use of water in the exercise of native title rights (under the *Commonwealth Native Title Act 1993*), without requiring a WAL, water use approval or water supply work approval (unless the work is a dam or bore).

2.7.1.2.1 Harvestable Rights

Harvestable Rights provisions for the capture and reuse of surface water runoff generated within a property, is subject to the following rules:

- (1) Landholdings (owned and leased) must be contiguous (generally omits public roads and easements).
- (2) Harvestable rights cannot be transferred between water sources – i.e. water captured within a water source must be covered by a harvestable right (or licence) in that source.
- (3) Water captured (in dams, mining pits, etc) from higher order (3rd order and above) watercourses and above (or within 40 m (measured perpendicular), or on any floodplain, or on or within 3 km upstream of any Ramsar wetland, must be covered by a WAL, regardless of the Harvestable Right, unless exempt from licensing.

Harvestable rights dams do not require a WAL, water use approval or water supply work approval. However, if harvestable rights dam also stores and/or captures water taken under another right or licence this dam is known as a Mixed-rights dam. Mixed-rights dams may require a WAL and water supply work approval prior to construction.

2.7.1.2.2 Maximum Capacity of Harvestable Rights Dams – Method of Calculation

WaterNSW provides a tool to estimate harvestable rights, based on location and property area. This method uses a simple average annual unit runoff rate. The volume of water a landholder can capture and store under harvestable rights is expressed as a maximum harvestable right dam capacity for a landholding. The maximum harvestable right dam capacity for a landholding represents up to 10% of the average regional runoff for the region in which the landholding is located. The combined volume of all dams (or parts thereof) that capture and store harvestable rights water cannot exceed the maximum dam capacity.

There are three different harvestable rights orders applying to three different regions in NSW. These are:

- Coastal-draining catchments (September 2023).
- Central inland-draining catchments (September 2023).
- Western division order (March 2006).

The Project Area has a contiguous landholding area of approximately 181 ha and is in the central-inland draining catchment. Based on an average annual regional runoff of 0.07 ML/ha/year for the Project Area, the MHRDC allowance for the landholding is 12.7 ML (source: [Maximum Harvestable Rights Calculator - WaterNSW](#)). The harvestable rights order for the central-inland draining catchments (September 2023) states that harvestable rights water captured or stored in that dam may be taken and used for any purpose, except that it must not be moved to an excluded work or to any other dam on the landholding that is not a harvestable rights dam.

2.7.2 Environmental Protection Licence

The Project operates under Environmental Protection Licence (EPL) 5554. Condition L1.1 of the EPL indicates the requirement to comply with Section 120 of the *Protection of the Environment and Operations Act 1997 (POEO Act)*, meaning it shall not pollute waters. The condition states that “except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the *Protection of the Environment Operations Act 1997*.”

2.8 Surface Water Users

Licensed surface water users potentially impacted by the Project are located within the Lake George Water Source. A search of the NSW Water Register for the 2024/2025 financial year revealed that there are 13 WALs with a total of 403.5-unit shares within the Lake George Water Source. WALs held in the Lake George water source are tabulated in Table 2-6.

There are two known WALs (WAL 33021 and WAL 33015) registered to a lot downstream of the Project Area (Lot 5, DP 717984). The share component for these WALs totals 66 units comprised of a 61 ML unregulated river access licence and 5 ML domestic and stock [stock] access licence. Collector Creek flows south through Lot 5, DP 717984 prior to converging with Lake George. There are several smaller creeks upstream of Collector Creek that contribute to flows through the site. All other WALs identified in the Lake George Water Source are registered to lots upstream of the Project Area, or to the south of Lake George.

TABLE 2-6: LAKE GEORGE WATER SOURCE WATER ACCESS LICENCES

WAL Number	Licence Category	Share Components (units or ML)	Associated Works Approvals	Location (Lot/DP)
33016	Unregulated River	79	40CA413498	Lot 2, DP 548291
33013	Unregulated River	9	40CA413500	Lot 3, DP 876579
33018	Unregulated River	14	40CA413502	Lot 2, DP 1119227
33022	Unregulated River	14	40CA413504	Lot 1, DP 743064
33023	Unregulated River	25	40CA413506	Lot 1, DP 812981
33014	Unregulated River	3	40WA413508	Lot 31, DP 634213
33019	Unregulated River	26	N/A	Unknown
33020	Unregulated River	2.5	40CA413512	Lot 1, DP 817342
33017	Unregulated River	154	40CA413515	Lot 3, DP 876579
33024	Unregulated River	4	40CA413517	Lot 73, DP 754873
35290	Domestic and Stock	7	40WA414693	Lot 21, DP 1044788
33021	Domestic and Stock [Stock]	5	70CA614363	Lot 5, DP 717984
33015	Unregulated River	61	70CA614363	Lot 5, DP 717984

3. WATER MANAGEMENT SYSTEM

The purpose of this section of the report is to describe the proposed conceptual WMS and infrastructure for the Project.

3.1 Types of Water

Types of water generated by the Project are defined based on their source and quality. There are two types of water that will be associated with the Project: clean water and sediment water. Characteristics of these water types are summarised in Table 3-1. Each of the water types will require different management strategies, as discussed in subsequent sections.

TABLE 3-1: WATER TYPES

Type of Water	Definition
Sediment Water	Runoff from disturbed areas that are expected to contain increased levels of sediment. Sediment water is associated with runoff from the quarry pits, stockpiles and materials processing areas, and hardstand areas.
Clean Water	Rainfall and runoff from undisturbed or adequately rehabilitated catchment areas.

3.2 Operational Water Management

The proposed conceptual WMS has been developed based on the following strategy:

- Direct undisturbed catchment runoff around disturbed operational areas, where practicable, to minimise the quantity of dirty water runoff to be managed.
- Contain all untreated runoff from disturbed areas within the Project WMS for storm events not exceeding 5 day 95th percentile design storm event in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2E – Mines and quarries* (DECC, 2008) (the 'Blue Book').
- Maximise the reuse dirty water runoff from disturbed operational areas to minimise the requirement for imports of clean water and minimise the volume and frequency of controlled discharges from the WMS to the receiving environment.

3.2.1 Conceptual Water Management System Design

The WMS will be comprised of two pit sumps, several sediment dams, a series of drains and bunds to contain sediment water on the site and divert runoff from upstream clean water catchment areas, and three clean water dams. Details of the WMS features are provided in Table 3-2. An overview of the WMS layout is provided in FIGURE 3-1 and a schematic representation of the WMS is shown in FIGURE 3-2. The WMS features described in the following sections can be considered operational phase infrastructure. The WMS described is representative of the maximum WMS catchment extent when Pit 2 reaches its maximum extent.

The WMS described in Table 3-2 is conceptual and may undergo minor variation (such as the construction of additional dams) during the detailed Project design phase. Notwithstanding, the total WMS catchment extent is not anticipated to increase and the any changes to WMS inflow and outflow volumes (and the water balance modelling results presented in Section 4.2) will be negligible. If the WMS is changed, the required size for the dams and drains will be reviewed to ensure that the WMS features are adequately sized in accordance with 'Blue Book' and that the maximum harvestable rights dam capacity does not exceed the maximum harvestable right allowance for the Project.

TABLE 3-2: WATER MANAGEMENT SYSTEM COMPONENTS

Item	Water Type	Proposed or Existing	Functional Description	Preliminary Proposed Capacity (ML)
Pit 1 Sump	Sediment	Proposed	• Will capture runoff from Pit 1 and the upstream haul road area to the northeast. • Receives spills from Dam 8.	3.1 ML

Item	Water Type	Proposed or Existing	Functional Description	Preliminary Proposed Capacity (ML)
			- Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (2.1 ML settling zone with a 1.0 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 2.1 ML), Pit 1 Sump will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills within the Pit 1 footprint.	
Pit 2 Sump	Sediment	Proposed	- Captures runoff from Pit 2. - Surge storage capacity during wet periods (i.e. will receive transfers of surplus water from sediment basins). - Pit 2 Sump can dewatered to Dam 8 as required to supply demands. - A preliminary proposed capacity of 10 ML has been nominated, however, if the volume in the Pit 2 Sump was to exceed 10 ML Pit 2 has sufficient capacity to contain this water in the pit.	10 ML
Dam 1	Sediment	Existing	- Existing sediment dam that will capture runoff from the site access road and modified access road to the south of Pit 1. - Receives spills from Dam 2. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (0.4 ML settling zone with a 0.2 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 0.4 ML), Dam 1 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to the unnamed creek to the west of the Project Area. - A water balance assessment (refer to Section 4) for the Project indicates that in some climate conditions there will likely be a water surplus and, as such, controlled releases are expected to be required. It is likely that the proposed licenced discharge point will be Dam 1, however, this location is indicative only.	0.6 ML
Dam 2	Sediment	Existing	- An existing sediment dam that will capture runoff from the western amenity bund to the west of Pit 1. - Receives spills from Dam 3 and (possibly) Pit 1 Sump. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (0.6 ML settling zone with a 0.3 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 0.6 ML), Dam 2 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Dam 1.	0.9 ML
Dam 3	Sediment	Existing	- An existing sediment dam that will be used to capture runoff from the area to the west of the topsoil stockpile northeast of Pit 2. - Receives spills from Dam 10. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (0.25 ML settling zone with a 0.15 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 0.25 ML), Dam 3 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Dam 2.	0.4 ML

Item	Water Type	Proposed or Existing	Functional Description	Preliminary Proposed Capacity (ML)
Dam 4	Clean	Existing	- An existing clean water dam that will be used to capture runoff from an undisturbed area to the east of the workshop access haul road. - Sized to maximise clean water storage capacity while remaining with the maximum harvestable right dam capacity (MHRDC) allowance for the site. Dam 4 has been sized proportionally to clean water Dam 5 based on catchment area. - Water stored in Dam 4 can be used to supply demands if there is insufficient water available in sediment storages. - Spills to the receiving agricultural land to the south of the Project Area.	2.1 ML
Dam 5	Clean	Existing	- An existing clean water dam that will be used to capture runoff from an undisturbed area to the east of the workshop access haul road. - Receives spills from Dam 9. - Sized to maximise clean water storage capacity while remaining with the MHRDC allowance for the site. Dam 5 has been sized proportionally to clean water Dam 4 based on catchment area. - Water stored in Dam 5 can be used to supply demands if there is insufficient water available in sediment storages. - Spills to the receiving agricultural land to the south of the Project Area.	9.9 ML
Dam 6	Sediment	Existing	- It is proposed that Dam 6 be moved from its current location to the southern extent of the Pit 2 overburden emplacement area to capture runoff from the Pit 2 overburden emplacement area and the modified Pit 2 overburden access road. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (2.1 ML settling zone with a 1.0 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 2.1 ML), Dam 6 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Dam 7.	3.1 ML
Dam 7	Clean	Existing	- An existing clean water dam that captures runoff from an undisturbed area to the east of the site. - Receives spills Dam 6. - It is proposed that the existing capacity of Dam 7 be retained. The existing capacity of Dam 7 was estimated to be 0.7 ML using 1m LiDAR. - There is a ridgeline between Dam 7 and Pit 2. As such, water from Dam 7 will only be used as a contingency to supply demands if there is insufficient water available in the sediment dams and other clean water dams (Dam 4 and Dam 5). - Spills to the unnamed creek to the east of the Project Area.	0.7 ML
Dam 8	Sediment	Existing	- An existing sediment dam that will contain runoff from the south stockpile area and be the primary water storage for supply of operational demands (dust suppression and sand washing). - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (0.7 ML settling zone with a 0.4 ML sediment storage zone) and an additional operational storage allowance of 2 ML. - Receives transfers from all other sediment storages to facilitate sediment dam dewatering requirements and maintain operational water supply availability. - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e., 0.7 ML), Dam 8 will be dewatered to Pit 2 Sump to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Pit 1 Sump.	3.1 ML

Item	Water Type	Proposed or Existing	Functional Description	Preliminary Proposed Capacity (ML)
Dam 9	Sediment	Proposed	- Dam 9 is a proposed sediment dam that will capture runoff from the proposed workshop and workshop access haul road. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (0.9 ML settling zone with a 0.4 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e. 0.9 ML), Dam 9 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Dam 5.	1.3 ML
Dam 10	Sediment	Proposed	- Dam 10 is a proposed sediment dam that will capture runoff from the north stockpile area and the haul road between Pit 1 and Pit 2. - Sized to accommodate inflows from a 5 day 95th percentile rainfall event (as per the 'Blue Book') (1.3 ML settling zone with a 0.7 ML sediment storage zone). - Should water inventories exceed the required freeboard to accommodate the 'Blue Book' settling zone capacity (i.e. 1.3 ML), Dam 10 will be dewatered to Dam 8 to ensure freeboard is restored within five days of runoff generating rainfall. - Spills to Dam 3.	2.0 ML
Settlement Ponds	Sediment	Proposed	- At least three settlement ponds are proposed to be excavated adjacent to the sand washing plant, with initial placement within the Pit 1 footprint. The settlement ponds will receive process water inflows from the proposed sand washing plant. - The settlement ponds will be placed in sequence to allow for the progressive separation of sediment from process water. - As extraction progresses in Pit 2, the processing plant infrastructure and settlement ponds may be relocated into Pit 2 to allow sand washing processes to occur closer to the point of extraction. - Spills to Pit 1 or Pit 2 Sump.	3 x 1 ML Dams
Clean Drains	Clean	Existing and Proposed	- Clean water drains are proposed to be placed around the perimeter of site to divert runoff from upslope undisturbed areas to drainage lines into east and west of the site. - A clean water drain is proposed to be placed along the eastern extent of the south stockpile area. This drain will divert runoff from the undisturbed area to the west of Pit 2 and into clean water Dam 5. - A clean water drain is proposed to be placed along the western and southern extents of the workshop access haul road and modified access road. These drains will divert runoff from the undisturbed area to the west of the workshop access haul road to clean water Dam 4.	To be sized to accommodate flows from a critical duration 20 year Annual Recurrence Interval (ARI) (5% Annual Exceedance Probability (AEP)) storm event as per 'Blue Book' requirements.
Dirty Drains	Sediment	Existing and Proposed	- Dirty water drains are proposed to be placed around the perimeter of disturbed areas to contain dirty water runoff within the water management system. - The dirty water drains will divert runoff from areas that are currently disturbed and areas that are proposed to be disturbed to the sediment basins and pit sumps.	To be sized to accommodate flows from a critical duration 5% AEP storm event as per 'Blue Book' requirements.

Notwithstanding the preliminary proposed water storage capacities indicated in Table 3-2, different water storage capacities may be determined during detailed Project design. Capacities listed in Table 3-2 for clean water dams are indicative of a maximum combined capacity that is within the MHRDC allowance (12.7 ML, refer to Section 2.7.1.2.1 and Section 3.2.2.2) for the site. Capacities listed in Table 3-2 for

sediment dams and pit sumps (excluding operational allowances) are indicative of the minimum storage capacity for each of the dams. All installed sediment basins will be designed, constructed and managed to have adequate capacity to contain runoff from the 5 Day 95th percentile design storm event.

Water management system inflows, outflows and internal transfers associated with the Project are tabulated in

Table 3-3. The WMS is schematically represented in Figure 3-2.

TABLE 3-3: WATER MANAGEMENT SYSTEM INFLOW AND OUTFLOWS

Type	Description
Inflows	
Rainfall and Runoff	Rainfall and runoff captured by the WMS.
Potable Water Supply	Potable water supplied via tanker truck.
Outflows	
Evaporation	Evaporative losses from the water storage surfaces (including water stored in the pit sumps).
Dust Suppression	Water applied to roads and disturbed areas (including stockpiles) within the Project Area. This water will be supplied from Dam 8. If there is insufficient water available in Dam 8, this water will be supplied from clean water storages (Dam 4 and Dam 5).
Process Water Demands	Water used for production of quarry products. If there is insufficient water available in Dam 8, this water will be supplied from clean water storages (Dam 4 and Dam 5).
Controlled Discharges	Controlled discharges of surplus water.
Uncontrolled Discharges	Overflows from water storages.
Internal Transfers	
Sediment Basin and Pit Sump Dewatering	The sediment basin and pit sumps will be dewatered to Dam 8 when Dam 8 has available storage capacity above the required settling zone capacity.
Dam 8 Dewatering	Dam 8 will dewater to the Pit as required to maintain adequate freeboard.

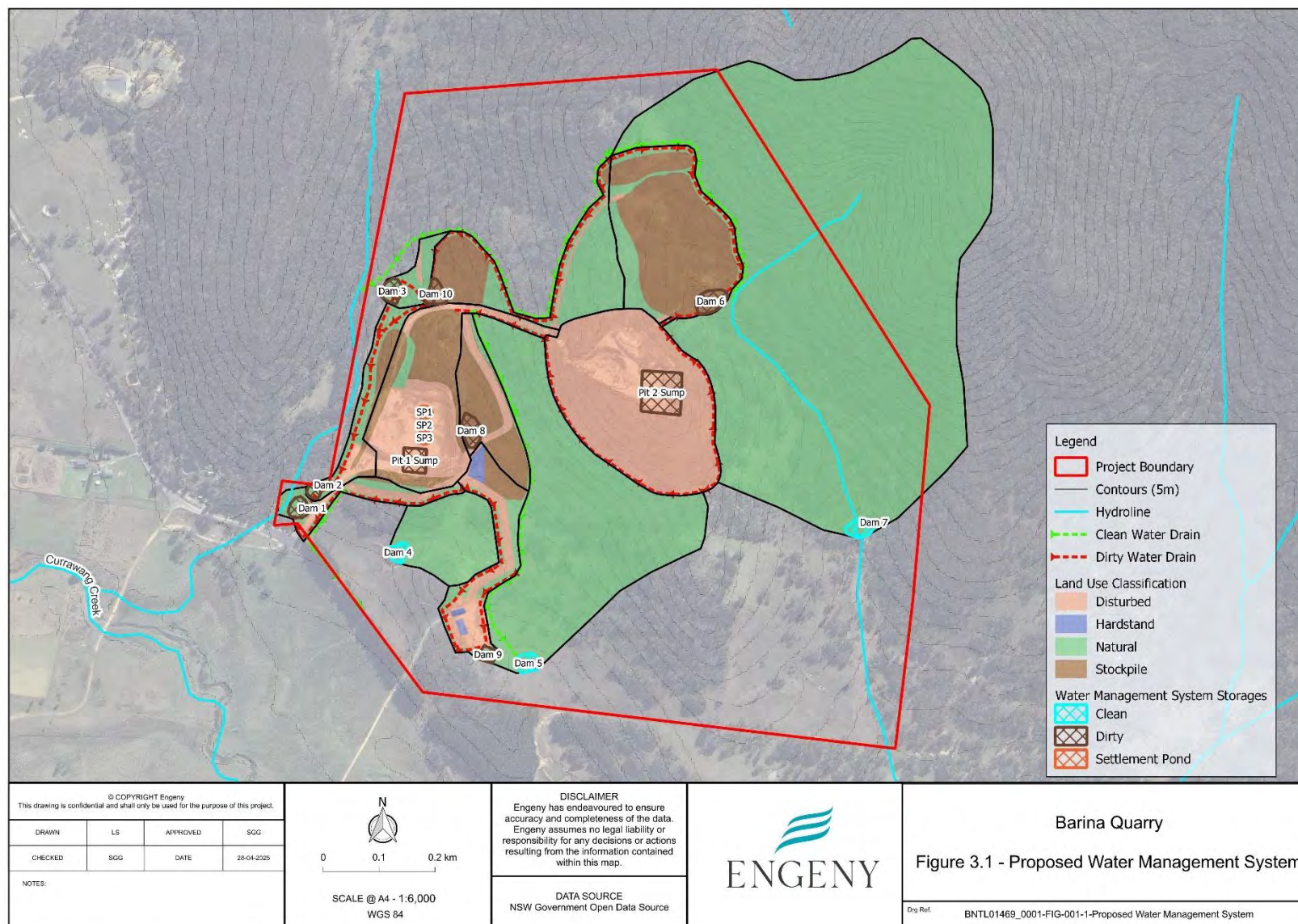


Figure 3-1: Proposed Water Management System

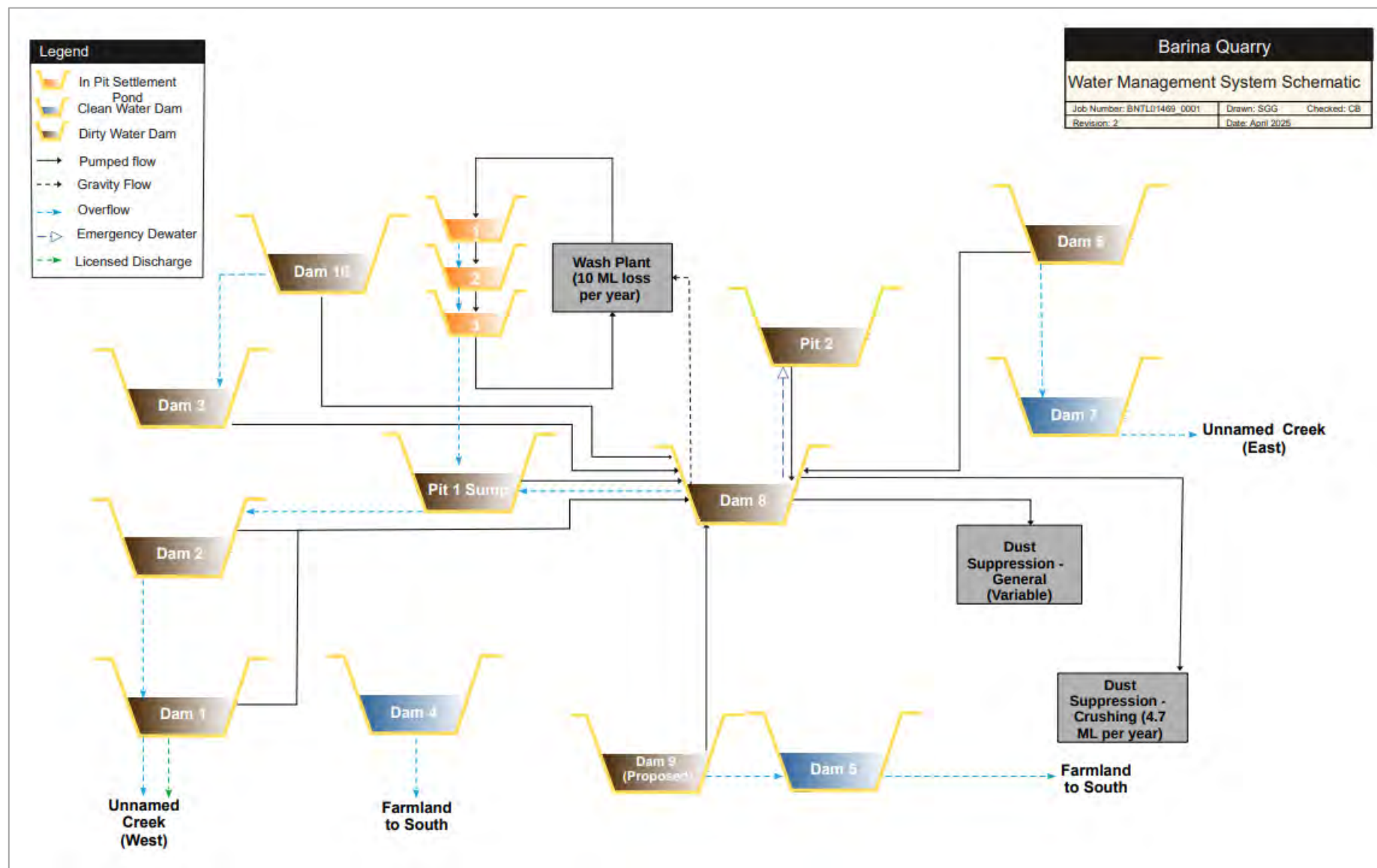


Figure 3-2: Water Management System Schematic

3.2.2 Water Storage Capacities

Water storage capacities for sediment dams have been determined in accordance with the 'Blue Book' (Landcom, 2004 and DECC, 2008). Water storage capacities for clean water dams that will be increased in size have been determined based on the maximum harvestable rights allowance for the Project Area. The preliminary proposed storage capacities are tabulated in Table 3-2 and a summary of the methodologies used to derive the capacities provided in Section 3.2.2.1 and 3.2.2.2.

3.2.2.1 Sediment Basin Design

An assessment of the Project Area was undertaken in accordance with the 'Blue Book' (Landcom, 2004 and DECC, 2008) to design the sediment basin components of a WMS for the site. The assessment determined that based on the soil types on site a type-F sediment basin would be required. Relevant parameters used to calculate the sediment basin settling zone and sediment zone storage capacities are tabulated in Table 3-4 with a full breakdown of the calculations for each of the individual sediment basins provided in Appendix A.

A fixed staff gauge will be used to indicate the maximum sediment storage level (top of the sediment storage zone) and, for storages that are inclusive of operational water storage allowances, the maximum operating level (top of the operational water storage zone). For sediment basins that do not have an operational water storage allowance, the volume above the sediment zone will include the settling volume and any required freeboard to be determined during detailed design. For sediment basins that do have an operational water storage allowance (i.e., Dam 8) the volume above the maximum operating volume will include the settling volume and any required additional freeboard to be determined during detailed design. The sediment basins are to be managed to maintain the availability of the settling zone storage (as per requirements outlined in the 'Blue Book' (Landcom, 2004 and DECC, 2008) so that the basin can contain the rainfall and runoff inflows during the design rainfall event.

These volumes have been considered during water balance modelling of the WMS (refer to Section 4).

TABLE 3-4: SEDIMENT BASIN SIZING BASIS

Parameter	Design Values	Notes and 'Blue Book' References
Total catchment area (ha)	Variable for each storage.	The entirety of the catchment area is disturbed.
Soil Texture Group	F	See Section 6.3.3(e) of the 'Blue Book'.
Design rainfall event	5 day, 95th percentile	See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25 of the 'Blue Book' and Table 6.1 in Volume 2E of the 'Blue Book'. The 5-day 95 th percentile event rainfall depth (40.8 mm) for Goulburn (the closest town listed in Table 6.3 of the 'Blue Book') was selected for the purpose of the assessment.
5-day, 95th percentile rainfall event (mm)	40.8	
Sediment Zone Design	50% of calculated settling zone capacity	See Table 6.1 in Section 6.3.3 of the 'Blue Book'.
Soil Hydrologic Group	D	See Section F.2 of 'Blue Book'.
Cv (Volumetric runoff coefficient)	0.74	See Table F2, page F-4 in Appendix F of the 'Blue Book'.

3.2.2.2 Clean Water Dam Design

The MHRDC allowance for the Project was calculated using the *WaterNSW Harvestable Rights Calculator*. The Project Area has a contiguous landholding area of approximately 181 ha and is in the central-inland draining catchment. Based on an average annual regional runoff of 0.07 ML/ha/year for the Project Area, the MHRDC allowance for the landholding is 12.7 ML.

Proposed storage capacities for clean water dams (Dam 4, Dam 5 and Dam 7) have been determined based on as follows:

- The estimated capacity for Dam 7 is 0.7 ML and has been determined based on the dam surface area (as shown on aerial imagery and a digital elevation model (DEM) produced from LiDAR sourced from the Elevation and Depth Foundation Spatial Data (ELVIS) Data Portal for the site) and depth (established using the DEM). The capacity of Dam 7 is not proposed to be increased as steep terrain between Dam 7 and the remaining storages in the water management system make transfers from this dam impractical.
- The remaining 12 ML of MHRDC allowance has been distributed between the remaining clean water dams in proportion to the catchment areas reporting to each of the dams. The proposed Dam 4 capacity is 2.1 ML and the proposed Dam 5 capacity is 9.9 ML. Increasing the capacity of Dam 4 and Dam 5 has been prioritised as the topography allows for transfers to be made from these dams to Dam 8 more easily than transfers from Dam 7.

Proposed dam capacities for clean water dams are representative of an upper limit of the dam capacity that above which would require a WAL (refer to Section 2.7).

3.2.3 Controlled Discharge Infrastructure

A water balance assessment (refer to Section 4) for the Project indicates that in some climate conditions there will likely be a water surplus and, as such, controlled releases are expected to be required. Should the Project be approved Collector Resources will submit an application to vary the site EPL to include licensed discharge points with appropriate water quality and quantity limit conditions (refer to Section 6.1.1). It is anticipated that the proposed discharge locations will be Dam 1, Dam 6 and Dam 9 (refer to Section FIGURE 3-1).

3.2.4 Potable Water Supply and Wastewater Management

Potable water for amenities will be supplied to the site by water tanker, supplemented by any rainwater harvested and stored in water tanks. Wastewater from amenities will be collected in a tank and removed from site by a licensed waste contractor as required.

3.3 Erosion and Sediment Control

The WMS described in Section 3.2 details the operational phase erosion and sediment control plan (ESCP) for the Project. During the construction phase, erosion and sediment controls (ESCs) will be used to minimise erosion and reduce the risk of sediment laden runoff reporting off-site. During all phases of the Project, including the construction phase, ESCs will be designed and implemented generally in accordance with requirements outlined in the 'Blue Book'. The following sections outline the Project ESC design standards and anticipated ESCs to be implemented at the Project. Should the Project modification be approved and constructed, a detailed soil and water management plan (SWMP) will be prepared by a suitably qualified person to facilitate implementation of best practise ESCs during all phases of the Project.

3.3.1 Design Standard

3.3.1.1 Erosion Controls

Erosion hazard is dependent on a range of factors including soil characteristics, topography, rainfall intensity and groundcover. The erosion hazard (i.e., low or high) for a given location helps to inform what erosion and sediment controls (ESCs) should be implemented to minimise on-site erosion and transport of sediment to the downstream environment.

An erosion hazard assessment has been undertaken in accordance with Chapter 4.4.1 of Volume 1 of the 'Blue Book'. The R-factor (rainfall erosivity) for the site was calculated using Equation (2) in Appendix A of the 'Blue Book' Volume 1:

$$R = 164.74 \times 1.1177^S \times S^{0.6444}$$

where:

S is the 2-year, 6-hour duration storm event (or 0.5EY storm event based on AR&R 2016 terminology) intensity for the site (7.17 mm/hr).

$$R = 164.74 \times 1.1177^{7.17} \times 6.18^{0.6444}$$

$$R = 1,060$$

The average site slope (15.5%) was derived from a DEM for the site. Plotting the slope and R-factor on Figure 4.6 from Volume 1 of the 'Blue Book' determines whether the site has a high or low erosion hazard. Figure 3-3 presents the erosion hazard assessment plot which demonstrates that the site has a low erosion hazard.

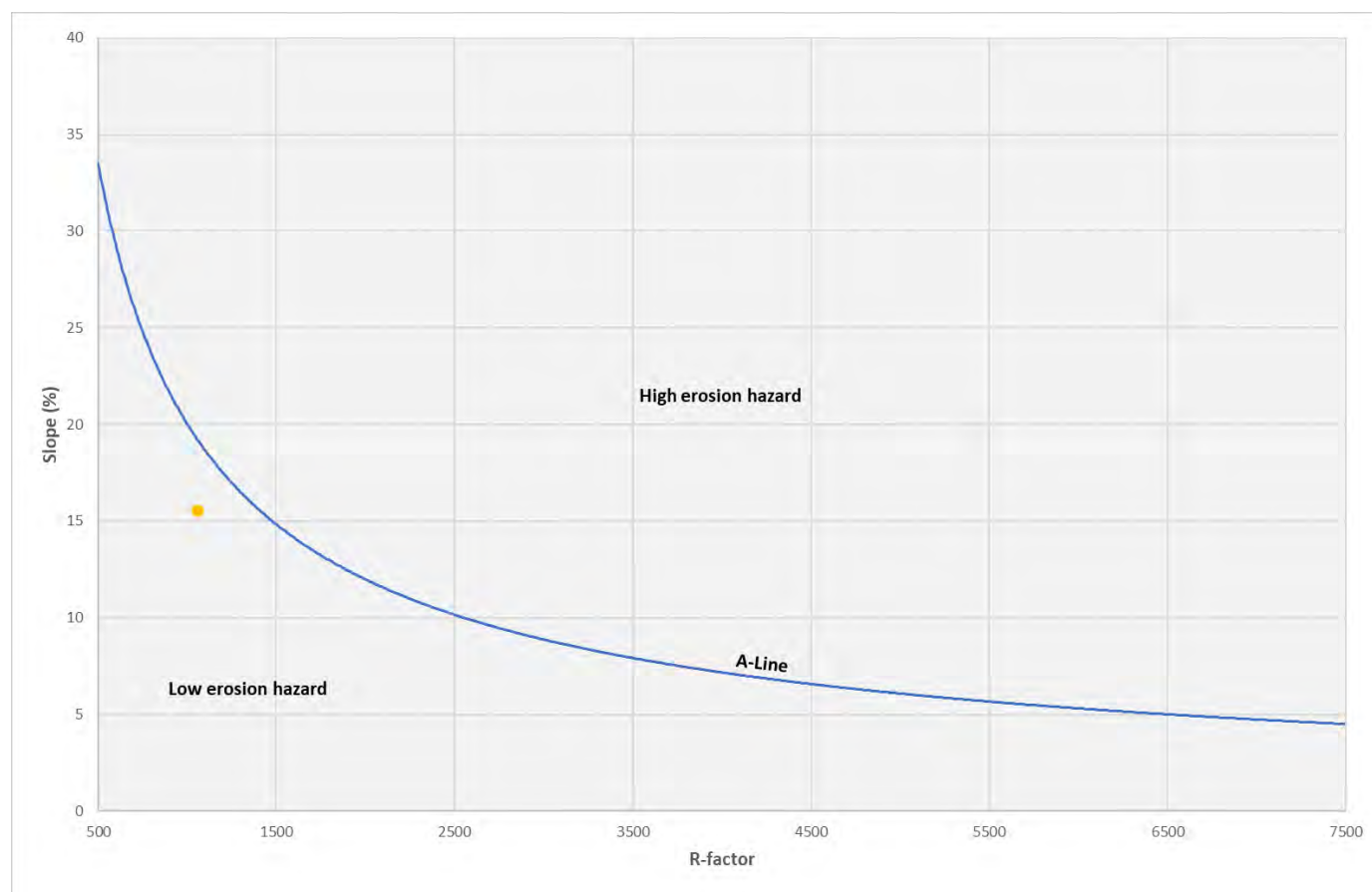


Figure 3-3: Erosion Hazard Assessment Plot

While the erosion hazard assessment in Section 3.3.1.1 indicates a low erosion hazard for the site, soil loss class is also used to indicate erosion hazard based on calculated soil loss (as tonnes/ha/year) and in conjunction with the site rainfall distribution zone can be used to identify the requirements for works timing restrictions and/or special erosion control measures. The 'Blue Book' defines 7 soil loss classes that equate to erosion hazards ranging from very low to extremely high based on the soil loss rate determined using the Revised Universal Soil Loss Equation (RUSLE) (refer to Table 4.2 of Volume of the 'Blue Book'). The annual soil loss rate for the site has been estimated using RUSLE with the input parameters provided in Table 3-5.

TABLE 3-5: RUSLE PARAMETERS

Parameter	Definition and Value Source	Value	Units
A	The Annual soil loss rate.	to be calculated	tonnes/ha/year
R	Rainfall erosivity. The R-factor for the site was calculated using Equation (2) in Appendix A of the 'Blue Book' Volume 1 as described in Section 3.1.	1,060	-
K	The value of 0.055 for soil erodibility has been adopted as K-factor for the site from the eSpade NSW Soil and Land Information website (DPE, 2024).	0.055	-
LS	The slope length gradient factor. Sourced from Table A1 the 'Blue Book' Volume 1 and is dependent on the maximum slope length (estimated at 80 m) and average site slope of 15.5%.	5.3	-

Parameter	Definition and Value Source	Value	Units
C	The ground cover factor. Sourced from Figure A5 of the 'Blue Book' Volume 1 (assume worst case of no groundcover).	1	-
P	Erosion control Practice factor. Sourced from Table A2 the 'Blue Book' Volume 1 and is dependent on level of compaction and roughness of the disturbed surface (assume compacted and smooth).	1.3	-

$$\text{RUSLE: } A = R \times K \times LS \times C \times P$$

$$A = 1,060 \times 0.055 \times 5.3 \times 1.0 \times 1.3$$

$$A = 402 \text{ tonnes/ha/year}$$

The calculated annual soil loss rate for the site (402 tonnes/ha/year) corresponds to a soil loss class of 4 which has a moderate erosion hazard (refer to Table 4.2 of Volume 1 of the 'Blue Book'. Figure 4.9 of Volume 1 of the 'Blue Book' shows that the site is located in rainfall distribution zone 7. Table 4.3 of Volume 1 of the 'Blue Book' indicates that no construction works timing restrictions or special erosion control measures apply for sites in rainfall distribution zone 7 with soil loss class 4.

3.3.1.2 Drainage Controls

All proposed temporary drainage controls must be designed to have non-erosive hydraulic capacity to accommodate a 5% AEP critical duration design storm event (refer to Section 2.3.1. of Volume 1 of the 'Blue Book') based on a duration of disturbance of 3 years or more and a sensitive receiving environment (refer to Table 6.1 of Volume 2E of the 'Blue Book').

3.3.1.3 Sediment Controls

The 'Blue Book' states that sediment basins are required to be used when the soil loss rate exceeds 150 m³ /year (approximately 200 tonnes/year) for the total disturbed area. Based on a soil loss rate 402 tonnes/ha/year (refer to Section 3.3.1.2) the total soil loss based on the disturbance area (35.8 ha) is approximately 14,392 tonnes/year. As the estimated soil loss is greater than the 200 tonnes/year, a sediment basin is required for Project construction.

The typical design standard for sediment basins at the Project Area location (based on 'Blue Book' design criteria) is presented in Table 3-1. Six sediment basins have been incorporated into the conceptual operational WMS design (refer to Section 3.2.1) that have been sized for the design storm event presented in Table 3-4.

All temporary sediment controls will be designed and installed to be structurally sound during a 5% AEP critical duration storm event based on a duration of disturbance for each works area of 3 years or more and a sensitive receiving environment (refer to Table 6.1 of Volume 2E of the 'Blue Book').

3.3.2 General Erosion and Sediment Control Strategy

All ESCs are to be installed, managed and maintained in general accordance with the 'Blue Book' (Landcom, 2004) to:

- Divert clean water around disturbed areas wherever practicable.
- Prevent sediment moving off-site and sediment laden water entering any watercourse, drainage line, or drain inlet.
- Reduce water velocity and capture sediment on site.
- Minimise the amount of material transported from site to surrounding pavement surfaces.

3.3.2.1 General Site Management

The following ESC management strategies will be implemented at the Project.

- (1) To minimise ground disturbance, construction and operational activities including vehicle and machinery movements, stockpiling, temporary vehicle parking and material laydown will be restricted to designated work areas. The disturbance boundary is to be clearly delineated with construction fencing or barrier tape.

- (2) All fuels, chemicals and liquids will be stored in an impervious bunded area, a minimum of 50 m away from drainage lines or waterways.
- (3) Refuelling of plant and equipment is to be undertaken in an impervious bunded area located a minimum of 50 m from drainage lines or waterways.
- (4) Emergency spill kits are to be kept on site at all times. All workers are to be made aware of the location of the spill kits and trained in their use.
- (5) Any concrete washout undertaken on site will be in a bunded area that is not on waterfront land and at least 10 m from drains.
- (6) Where possible, topsoil will be stripped and handled only when it is moist (not too wet or too dry) to avoid decline of soil structure.
- (7) Topsoil stockpiles will be stabilised with vegetation (seeded) if they are to be inactive for long periods.
- (8) Stockpiles of erodible material that have the potential to cause environmental harm if displaced will be located away from concentrated surface flow and excessive up-slope stormwater surface flows.
- (9) Wherever reasonable and practicable, "clean" surface waters must be diverted away from sediment control devices and any untreated, sediment-laden waters.
- (10) All runoff from the works is to be passed through sediment controls.
- (11) Sediment traps should be located as close to the source of the sediment as practicable.
- (12) Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event. Sediment traps should be maintained to ensure that no more than 30% of their design capacity is lost to accumulated sediment.
- (13) Sediment removed from any trapping device is to be disposed of in locations where further erosion and consequent pollution to downslope lands and waterways will not occur.
- (14) Temporary soil and water management structures are to be removed only after the Project Area is stabilised appropriately.
- (15) Disturbed areas will be progressively stabilised/revegetated when no further disturbance is expected.

4. OPERATIONAL WATER BALANCE

A water balance model (WBM) representative of the proposed WMS was developed using the GoldSim software platform. The WBM simulates inflows from rainfall and runoff (including direct rainfall on water surfaces), outflows for dust suppression and process demands, and evaporative losses to assess future inventories and the frequency and volume of controlled and uncontrolled releases from the site. Sections 4.1 and 4.2 detail the development of the WBM and the WBM results, respectively.

4.1 Model Development

4.1.1 Dam Characteristics

Storage characteristics for each of the dams were developed based on the dam sizing requirements outlined in Section 3.2.2. The modelled water storage capacities are provided in Table 4-1. It should be noted that modelled sediment basin capacities do not include the sediment storage volume. The modelled sediment basin capacities are inclusive of the settling storage zones and operational water storage (for Dam 8) allowances only. Conceptual stage storage curves (i.e. volume – surface area relationship) for these storages were generated with assumed internal batters of 3:1. It is also noted that Dam 10 has not been explicitly included in the WBM as it was a late inclusion in the WMS. Prior to the inclusion of Dam 10, the Dam 10 catchment was modelled draining directly to Dam 3 and the modelled settling zone capacity of Dam 3 is sized to accommodate runoff from the Dam 10 catchment. Given Dam 10 will spill directly to Dam 3, it is considered that inclusion of Dam 10 in the WBM is not necessary and changes to WBM outputs would be negligible.

TABLE 4-1: STORAGE CHARACTERISTICS

Storage	Water Type	Capacity (ML)
Dam 1	Sediment	0.4
Dam 2	Sediment	0.6
Dam 3	Sediment	1.6
Dam 4	Clean	2.1
Dam 5	Clean	9.9
Dam 6	Sediment	2.1
Dam 7	Clean	0.7
Dam 8	Sediment	2.7
Dam 9	Sediment	0.9
Pit 1 Sump	Sediment	2.1
Pit 2 Sump	Sediment	10.0

4.1.2 Catchment Area, Land Use and Runoff

Catchments draining to the water storages were assigned land use classifications based on the proposed Project layout. Four discrete land use classes are represented in the model, including:

- **Disturbed** – Disturbed land such as pits, roads and dam floors.
- **Hardstand** – Any hard surfaced area, primarily buildings.
- **Natural** – Vegetated or largely undisturbed areas.
- **Stockpile** – Soil and material stockpile areas.

The catchment areas reporting to each of the storages for each land use type are provided in Table 4-1 and shown in FIGURE 3-1. Australian Water Balance Model (AWBM) (an antecedent rainfall runoff model) parameters have been adopted for each land use type, as described in Section 4.1.4.

TABLE 4-2: CATCHMENT LAND USE BREAKDOWN

Storage	Land Use Area (ha)				Total (ha)
	Disturbed	Hardstand	Natural	Stockpile	
Dam 1	0.4	0.0	0.9	0.0	1.3
Dam 2	0.3	0.0	1.1	0.4	1.8
Dam 3	0.2	0.0	3.6	1.4	5.2
Dam 4	0.0	0.0	2.9	0.0	2.9
Dam 5	0.0	0.0	13.3	0.0	13.3
Dam 6	0.1	0.0	1.5	5.4	7.0
Dam 7	0.0	0.0	46.5	0.0	46.5
Dam 8	0.5	0.0	0.2	1.8	2.5
Dam 9	1.2	0.2	1.0	0.4	2.8
Pit 1 Sump	3.4	1.0	0.4	2.1	6.9
Pit 2 Sump	9.1	0.0	0.0	0.0	9.1
Total					99.3

4.1.3 Climate Data

Climate data inputs to the water balance model include site specific daily rainfall, evapotranspiration (Mortons Potential) and lake evaporation (Mortons Shallow Lake) for a 134-year period sourced from the SILO climate database (refer to Section 2.5).

4.1.4 AWBM Runoff Model

The AWBM was used to simulate catchment runoff based on the relationship between rainfall, evapotranspiration, storage catchment area and land use classification. The adopted AWBM parameters are presented in Table 4-3. These parameters were adopted based on an EIS completed for the East Guyong Quarry in NSW (Evans and Peck, 2009). The AWBM parameters adopted are considered to be appropriate for representing the runoff characteristics at the Project in absence of catchment specific monitoring data that could be used to calibrate the runoff model.

TABLE 4-3: AWBM RUNOFF PARAMETERS

Parameter	Description	Natural	Disturbed	Hardstand	Stockpile
Soil Store 1 (C1) (mm)	The capacity of surface storages.	30	5	5	20
Soil Store 2 (C2) (mm)		50	30	10	50
Soil Store 3 (C3) (mm)		100	50	0	100
Partial Area 1 (A1)		0.134	0.185	0.9	0.185

Parameter	Description	Natural	Disturbed	Hardstand	Stockpile
Partial Area 2 (A2)	The partial area ratio of the overall catchment contributing to storages.	0.433	0.430	0.1	0.430
Partial Area 3 (A3)		0.433	0.385	0	0.385
Base Flow Index (BFI)	Baseflow Index – The proportion of excess rainfall flowing to the baseflow store (remainder in surface store).	0.6	0.05	0	0.05
Baseflow Recession Constant (Kb Day-1)	Baseflow Recession Constant – The proportion of volume in the baseflow store remaining at the end of each day.	0	0.985	0	0.985
Surface Flow Recession Constant (Ks day-1)	Surface Recession Constant – The proportion of volume in the surface store remaining at the end of each day.	0	0	0	0
Average Long-Term Runoff Coefficients (%)		7%	22%	51%	9%

4.1.5 Groundwater Inflows

Collector Resources has indicated that groundwater inflows to Pit 1 and Pit 2 are expected to be negligible and have therefore been excluded from the WBM.

4.1.6 Modelled Transfers and Operating Logic

Table 4-4 describes how outflows and internal transfer are modelled based on operating rules and adopted rates. Transfers rates for sediment basins (except for Dam 8) have been calculated based on the rate required to dewater the settling volume within 5 days following a rainfall event (as per Volume 2E of the 'Blue Book'). Pump rates for clean water transfers from Dam 4 and Dam 5 have been calculated based on the rate required to supply daily demands. The transfer pump rates for Pit 2 Sump and Dam 8 have been nominally increased to 4.9 L/s to allow for increased efficiency of transfers between these storages to meet demands as required.

TABLE 4-4: MODEL TRANSFER LOGIC AND RATES

Category	Transferred From	Transferred To	Description	Operating Rules	Rate
Internal Transfer	Dam 1	Dam 8	Rainfall and runoff intercepted by the sediment basins and in pit sumps will be dewatered to the Dam 8.	- The sediment basins and pit sumps can be completely dewatered. - Dam 8 can receive transferred inflows until the storage reaches its maximum operating volume (2 ML).	1.0 L/s
	Dam 2				1.4 L/s
	Dam 3				3.8 L/s
	Dam 6				4.9 L/s
	Dam 9				2.1 L/s
	Pit 1 Sump				4.9 L/s
	Pit 2 Sump				4.9 L/s
Internal Transfer	Dam 8	Pit 2 Sump	Dam 8 will dewater to the Pit 2 Sump to maintain adequate freeboard.	The Sediment Basin will begin dewatering if the volume stored exceeds the maximum operating volume (2 ML).	Assumed maximum transfer rate of 4.9 L/s

Category	Transferred From	Transferred To	Description	Operating Rules	Rate
Outflow	Dam 8	Demands	Water stored in Dam 8 will be used to meet dust suppression (general and crushing) and process demands.	Dam 8 can be completely dewatered and will request water from clean water storages if the volume stored is below 0.1 ML.	23.6 ML /year to 25.0 ML/year (depending on climate conditions).
Outflow	Clean Water Dams 4 and 5	Demands	Water stored in Dam 4 and Dam 5 will be used to meet dust suppression (general and crushing) and process demands if there is insufficient water available in Dam 8.	Dam 4 and Dam 5 can be completely dewatered.	1.2 L/s
Outflows	Dam 1	Receiving Environment	Controlled discharge of surplus water to the unnamed creek to the west of the site.	When Dam 8 and Pit 2 reach capacity water will be discharged via the proposed discharge point at Dam 1.	Variable

4.1.7 Assumptions and Limitations

There is no historical operational data to use for calibration of the WBM. As such, the WBM has not been calibrated.

4.2 Water Balance Model Results

The WBM was simulated for 134 climate realisations to conduct a probabilistic Monte Carlo assessment using historic climate data. Each WBM realisation was simulated for a one-year period at the estimated maximum quarry catchment extent (as described in Section 4.1.2). Each modelled realisation uses one year of actual historic data, cycling through the historic dataset. The realisations are time shifted from the start of the climate series (1889) by the realisation number (i.e., realisation 1 uses data from 1889, realisation 2 uses data from 1890 etc.) so that the model results cover the full range of consecutive one-year scenarios within the modelled climate dataset. Key results are presented in Sections 4.2.1 to 4.2.4.

4.2.1 Gross Water Balance

TABLE 4-5 presents 10th, 50th and 90th percentile statistic gross water balance results (excluding controlled discharges) derived from the WBM. The gross water balance results indicate that at peak catchment extent:

- The Project is likely to have a water deficit in dry years (10th percentile result), and
- The Project is likely to have a water surplus and requirement for discharges in median and 90th percentile rainfall years.

TABLE 4-5: GROSS WATER BALANCE

Statistic	Units	Result
10 th Percentile	ML/year	-12.4
50 th Percentile	ML/year	12.8
90 th Percentile	ML/year	54.9

4.2.2 Median Year Net Water Balance

Table 4-6 presents the net water balance results for the modelled rainfall year closest to the gross water balance for the 50th percentile.

TABLE 4-6: MEDIAN YEAR NET WATER BALANCE RESULTS

Parameter	Volume (ML/year)
Inflows	
Rainfall	9.6
Catchment Runoff	63.6
Total Inflows	73.2
Outflows	
Evaporation	15.1
Operational Demands	24.6
Controlled Discharges	4.7
Uncontrolled Discharges from Dirty Water Dams	0.0
Uncontrolled Discharges from Clean Water Dams	20.6
Total Outflows	65.0
Change in Storage	8.2
Net Water Balance	0.0

4.2.3 Discharges

4.2.3.1 Controlled Discharges

TABLE 4-7 present the predicted 10th, 50th and 90th percentile annual controlled discharges volumes at the maximum quarry extent. The results indicate that controlled discharges will be required for median and wet years to manage surplus rainfall runoff captured in the WMS.

TABLE 4-7: CONTROLLED DISCHARGES

Statistic	Units	Result
10 th Percentile	ML/year	0.0
50 th Percentile	ML/year	10.3
90 th Percentile	ML/year	48.1
Maximum	ML/year	97.9

4.2.3.2 Uncontrolled Discharges

The predicted likelihood and frequency of an uncontrolled discharge event occurring from a sediment dam is presented in Table 4-8. Model results indicate that the average number uncontrolled discharge from Dam 1 (the only dirty water dam to overflow offsite) per year at the

maximum quarry catchment extent is 1.2. This is consistent with the 1 – 2 spills per year indicated in Volume 2E of the ‘Blue Book’ as being typical of sediment basins sized to contain runoff from a 5 day 95th percentile rainfall event.

TABLE 4-8: UNCONTROLLED DISCHARGE ASSESSMENT

Parameter	Units	Result
10 th Percentile Number of Overflow Events Per Year	-	0.0
Median Number of Overflow Events Per Year	-	0.0
90 th Percentile Number of Overflow Events Per Year	-	4.0
Average Number of Overflow Events Per Year	-	1.2

4.2.4 Shortfall

The total site water demand is estimated to be between 23.6 ML /year and 25.0 ML/year (depending on climate conditions). This volume is inclusive of 4.7 ML/year for crushing dust suppression, 10.0 ML/year sand wash plant losses and 8.9 ML/year to 10.3 ML/year for haul road dust suppression. If there is insufficient water to meet demands, operations will be scaled to match the available water supply while maintaining environmental controls (e.g. dust suppression) as a priority. Should ongoing shortfalls be considered likely, Collector Resources will investigate the feasibility of extracting groundwater via an appropriately approved and licensed (as required) bore to supplement operational demands.

Table 4-9 presents the predicted annual site water shortfall statistics for the maximum quarry catchment extent operating scenario. Model results indicate that there is no shortfall for the 10th percentile and median results. The 90th percentile result indicates an annual shortfall volume of 4.9 ML.

TABLE 4-9: SHORTFALL

Parameter	Units	Result
10 th Percentile Shortfall	ML/year	0.0
50 th Percentile Shortfall	ML/year	0.0
90 th Percentile Shortfall	ML/year	4.9

5. IMPACT ASSESSMENT

5.1 Water Quality

Several components of the Project introduce potential for impacts to the receiving surface water quality. The activities and potential impacts are summarised in Table 5-1.

TABLE 5-1: SURFACE WATER QUALITY IMPACTS

Activity	Risk / Impact	Mitigation Measure Overview
- Vegetation clearing & ground disturbance. - Earthworks. - Concrete works. - Vehicle movement. - Stockpiling.	- Soil erosion and sedimentation of downstream watercourses. - Spill of hydrocarbons or other pollutants used to support transportation and construction activities. - Release of stockpiled materials or concrete by-products (dust, slurry, water) into downstream watercourses.	- Erosion and Sediment Control Plan (ESCP) - Construction Environmental Management Plan (CEMP).
Wastewater from site amenities.	Discharge / spill of wastewater (treated or untreated) into downstream watercourses.	Appropriately designed and maintained wastewater management system.
Controlled and uncontrolled discharge of water from the water management system.	Discharge of sediment laden water (treated or untreated) into downstream watercourses.	- Appropriately designed and maintained water management system (as outlined in Section 3). - Controlled discharge of water completed in accordance with proposed water quality concentration limits in Table 6-1.
Blasting.	Residual elevated nitrate concentrations as a result of blasting activities.	- Appropriately designed and maintained water management system (as outlined in Section 3). - Reuse of water captured in the WMS. - Discharges of affected water only likely during periods of higher rainfall resulting in dilution of any nitrates in water released from Project.

Watercourses within the Project Area are minor ephemeral watercourses. The immediate downstream receiving watercourses are 1st order ephemeral drainage lines to the south of the Project Area. With the mitigation measures tabulated in Table 5-1 in place, it is considered that potential surface water quality impacts will be negligible.

5.2 Water Quantity

5.2.1 Catchment Yield

There will be a minor reduction in runoff to the surrounding catchment as a result of runoff from the Project WMS catchment being retained by the project. The catchment area for the Project is approximately 1 km² equating to a minor portion (<0.1%) of the overall Lake George Catchment and resulting loss of yield for downstream water users that is considered negligible.

5.2.2 Water Security

The total site water demand is estimated to be between 23.6 ML /year and 25.0 ML/year depending on climate conditions. Water balance modelling results indicate that at the Project will typically have a water surplus (refer to Table 4-5) and capture enough water within the

WMS to meet Project demands. Results for shortfall (refer to Table 4-9) indicate that there is no shortfall for the 10th percentile and median results. The 90th percentile result indicates an annual shortfall volume of 4.9 ML.

If there is insufficient water to meet demands, operations will be scaled to match the available water supply while maintaining environmental controls (e.g. dust suppression) as a priority. Should ongoing shortfalls be considered likely, Collector Resources will investigate the feasibility of extracting groundwater via an appropriately approved and licensed (as required) bore to supplement operational demands.

5.2.3 Flooding

Due to the location of the Project on a ridge line, the surrounding topography, and presence of only minor watercourses in the Project Area, it is considered that changes to flood regimes and overland flow paths as a result of the Project will likely have a negligible impact on flood behaviour.

6. LICENSING, MONITORING, AND REPORTING

6.1 Licensing

6.1.1 Environmental Protection Licence

The WBM results indicate that controlled discharges will likely be required in median and wet years to prevent excessive water accumulation in the WMS (refer to Section 4.2.3). As such, a variation application to enable controlled discharges from the WMS under EPL 5554 will be submitted to the EPA (up to approximately 98 ML/year). It is anticipated that the proposed discharge locations will be Dam 1, Dam 6 and Dam 9 (refer to Section FIGURE 3-1). Table 6-1 presents the water quality concentration limits that will be proposed in the EPL variation application

TABLE 6-1 PROPOSED ANALYTE CONCENTRATION LIMITS FOR CONTROLLED DISCHARGES

Pollutant	Units of Measurement	Proposed Discharged Water Concentrations
pH	pH	6.5 – 8.0
TSS	mg/L	50
EC	µs/cm	350

6.1.2 Surface Water

The Project Area contains three clean water dams to retain clean water for the Project that presently have an aggregate capacity within MHRDC for the landholding. There are no new harvestable rights dams proposed to be constructed as part of the Project. However, it is proposed that the capacities of two of the existing clean water dams (Dam 4 and Dam 5) will be increased (refer to Section 3.2.2.2) such that the average clean water dam capacity is equal to the MHRDC for the landholding.

Sediment basins are used for the Project to prevent the contamination of a water source and are considered as excluded works under Schedule 1 of the *Water Management (General) Regulation 2018* (WM (General) Regulation 2018) and therefore, exempt from requiring a WAL under Schedule 4 Clause 12 of the WM (General) Regulation 2018.

As such, it is considered that no licensing for surface water extraction will be required during the operational phase of the Project.

Surface water take associated with any final voids and/or other water storages that will remain after closure of the Project will be licensed as required based on contemporary legislation at that time and with consideration of the harvestable rights entitlement for the landholding. These licensing requirements will be communicated to any future landholders.

6.1.3 Groundwater

Should the Project ultimately determine that groundwater extraction to supplement operational water demands is required, a works approval should be obtained in addition to a WAL with sufficient entitlement for any groundwater bore installed.

6.2 Monitoring

6.2.1 Surface Water

Table 6-2 and Table 6-3 present the proposed surface water quality and quantity monitoring program for the Project. Proposed surface water monitoring locations are depicted in FIGURE 6-1. The following water management system features within the project Area locations have been nominated as surface water monitoring locations:

- Dam 1: Existing sediment basin.
- Dam 5: Existing clean water dam to be monitored if a discharge from Dam 9 occurs.
- Dam 6: Existing sediment basin dam.
- Dam 7: Existing clean water dam to be monitored if a discharge from Dam 6 occurs.
- Dam 9: Proposed sediment basin dam.

Three reference locations have been nominated, including:

- US REF1: Upstream reference location on Currawang Creek.
- DS REF1: Downstream reference location, in stream of a first order unnamed stream immediately downstream of Dam 1.
- DS REF2: Downstream reference location on Currawang Creek. Downstream of the unnamed creek at the western perimeter of the Project Area.

Impact assessment criteria for receiving water quality downstream of the Project will be developed in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018).

TABLE 6-2: PRELIMINARY SURFACE WATER QUALITY MONITORING PROGRAM

Location	Parameter	Units	Frequency	Methodology
Dam 1	pH	-	Monthly and during, or as soon as possible following, uncontrolled discharge (or following if uncontrolled discharge occurs when site unattended).	Water quality meter (pH, EC, Turbidity) Grab sample (All parameters).
Dam 6	EC	µS/cm		
Dam 9	TSS	mg/L		
US REF1	Turbidity	NTU		
DS REF1	Nitrate	mg/L		
DS REF2	Nitrite	mg/L		
	Oxides of Nitrogen (NOx)	mg/L		
	Oil and Grease	mg/L		
Dam 5	pH	-	Monitored during, or as soon as possible following, uncontrolled discharge from an upstream sediment basin.	Water quality meter (pH, EC, Turbidity) Grab sample (All parameters).
Dam 7	EC	µS/cm		
	TSS	mg/L		
	Turbidity	NTU		
	Nitrate	mg/L		
	Nitrite	mg/L		
	Oxides of Nitrogen (NOx)	mg/L		
	Oil and Grease	mg/L		

TABLE 6-3: PRELIMINARY SURFACE WATER QUANTITY MONITORING PROGRAM

Location	Units	Frequency	Methodology
Sediment Basin Volumes	ML	Monthly and prior to the onset of significant rainfall.	Fixed staff gauge and Sediment Basin stage storage relationship.
Pit Sump Volumes	ML	Monthly and prior to the onset of significant rainfall.	Fixed staff gauge and Pit Sump stage storage relationship.
Dust Suppression	ML	Continuous during use.	Totalising flow meter or number of water cart fills.
Process Water	ML	Continuous during use.	Totalising flow meter.

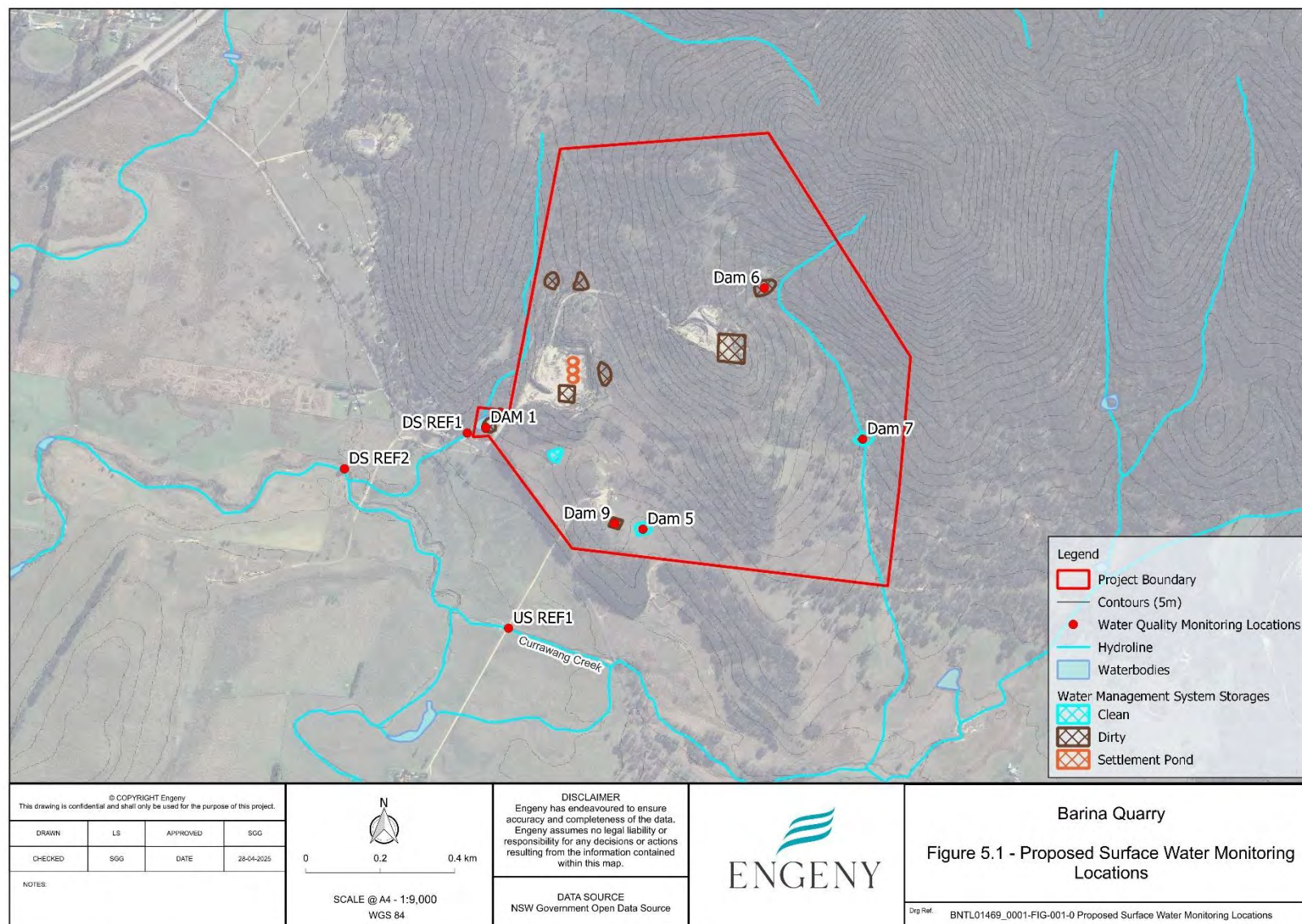


Figure 6-1: Proposed Surface Water Monitoring Locations

6.2.2 Amenities Potable Water

The proponent will implement an inspection and water quality testing program for potable water stored in tanks on site (delivered by water tanker) to ensure amenities water quality meets the Australian Drinking Water Guidelines – Version 3.5 (ADWG) (National Health and Medical Research Council, 2011).

6.3 Reporting

6.3.1 Environment Protection Licence

The proponent will be required to complete and submit an Annual Return to the NSW EPA that it is anticipated to include a summary of any uncontrolled water discharges, controlled discharges, monitoring, any complaints and a statement of compliance with EPL conditions. In the event that an incident occurs that threatens or causes environmental harm such as the contamination of water that does not meet EPL criteria, the proponent will notify the EPA immediately after becoming aware of the incident. The proponent will also provide a written report to the EPA within seven days of the date of becoming aware of the incident.

6.3.2 Annual Review and Incidents

The proponent will submit an Annual Review to DPHI that will include a summary of the Project WMS performance. It is anticipated that the Annual Review will include the annual site water balance results, water quality monitoring results and details of any incidents or complaints. If an environmental incident involving surface water occurs the relevant authorities (including DPHI and the EPA) will be notified and reports provided as required.

7. CONCLUSION

An assessment of the potential impacts on surface water resources associated with the Project was undertaken and the following conclusions have been drawn from the assessment outcomes:

- The Project will have an adequate water source (i.e., captured rainfall runoff) for most climate conditions. Water balance model results indicate that there could be some shortfall during dry climate conditions. If there is insufficient water to meet demands operations will be scaled to match the available water supply while maintaining environmental controls (e.g. dust suppression) as a priority. Should ongoing shortfalls be considered likely, Collector Resources will investigate the feasibility of extracting groundwater via an appropriately approved and licensed (as required) bore to supplement operational demands.
- Water balance model results indicate that the site could experience a water surplus in wet climate conditions. As such, the proponent will seek to amend the EPL for the Project to include a licensed discharge point. Discharges made from the water management system will be made in accordance with the approved conditions in the amended EPL.
- The potential for adverse water quality impacts on downstream receiving waters during the operational phases are considered negligible.
- The potential for adverse water quality impacts on downstream receiving waters during construction and closure phases of the Project can be satisfactorily mitigated by the implementation of ESCs in general accordance with the Blue Book.
- Reductions in rainfall runoff volumes reporting to downstream users due to the Project WMS catchment area are considered negligible.

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APPENDIX A: SEDIMENT BASIN DESIGN CALCULATIONS



Parameter	Dam 1	Dam 2	Dam 3	Dam 6	Dam 8	Dam 9	Dam 10	Pit 1 Sump
Catchment Area (ha)	1.3	1.8	0.8	7.0	2.5	2.8	4.4	6.9
Sediment Basin Storage (soil) Volume (ML)	0.2	0.3	0.15	1.0	0.4	0.4	0.7	1.0
Sediment Basin Settling (water) Volume (ML)	0.4	0.6	0.25	2.1	0.7	0.9	1.3	2.1
Sediment Basin Total Volume (ML) ¹	0.6	0.8	0.4	3.1	1.1	1.3	2.0	3.1

¹Design sediment basin volumes are exclusive of operational water storage allowances.

Appendix 11 Traffic Impact Assessment

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David Pavey Pty Ltd trading as Pavey Consulting Services
Specialising in

- Traffic Impact Assessments and Transportation Planning
- Road Safety, Traffic Management Plans and Traffic Control Plans
- Civil and Structural Design
- Project Management and Contract Administration
- Mediation and Government Relations



Traffic Impact Assessment Modification to Barina Quarry Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, Collector Road, Collector NSW

30 June 2025 Rev 2

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Authorised SafeWork NSW - Prepare a Work Zone Plans - No TCT1017730

NSW Department of Planning and Environment Secretary's approval as suitably qualified person to prepare the Traffic Management Plan (TMP)

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INTRODUCTION

Pavey Consulting Services (PCS) has been commissioned by Collector Resources Pty Limited to provide traffic advice and ultimately a Traffic Impact Assessment for a modification of Barina Quarry, located on Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, 2692 Collector Road, Collector NSW.

LIMITS OF REPORT

This report considers the instructions and requirements of our client. Pavey Consulting Services (PCS) has taken care in the preparation of this report, however it neither accepts liability nor responsibility whatsoever in respect of:

- Any use of this report by any third party;
- Any third party whose interests may be affected by any decision made regarding the contents of this report; and/or
- Any conclusion drawn resulting from omission or lack of full disclosure by the client, or the clients' consultants.

SUITABILITY OF AUTHOR

This Traffic Impact Assessment (TIA) has been prepared by David Pavey who in addition to above qualification has been endorsed by the Secretary Department of Planning and Environment suitably qualified and experienced person to carry out Traffic Impact Assessment and Traffic Management Plans.

The author also holds the appropriate Safe Work NSW Certificate No: TCT1017730 - Prepare a Work Zone Plans.

BASIS OF TRAFFIC IMPACT ASSESSMENT

This TIA has been prepared in accordance with the relevant government assessment requirements, guidelines and policies.

The TIA has been developed in accordance with:

- Austroads Guide to Traffic Management Part 3 Traffic Studies and Analysis;
- Austroads Guide to Traffic Management Part 12 Traffic Impacts of Developments;
- Austroads Guide to Traffic Management Austroads Part 6 Intersections Interchanges and Crossings;
- Austroads Guide to Road Design Part 4 Intersections and Crossings General Ed2.2; and
- TfNSW Guide to Transport Impact Assessments 2024.

PROJECT OVERVIEW

Irwin Environmental Management (IEM) has been engaged by Collector Resources Pty Limited to manage the preparation of a modification of Barina Quarry, a State Significant Development (SSD) originally approved by Orders of the Land & Environment Court on 28 May 2001 (DA1-01-2000). Collector Resources is the owner and operator of the Barina Quarry, located on Lot 3 DP1177623, Lot 33 DP750008 and Lot A DP1177623, 2692 Collector Road, Collector NSW, within the Queanbeyan-Palerang Regional Council (QPRC) Local Government Area (LGA)

DA 1-01-2000 approves production of up to 300,000 tonnes per annum (tpa) (at an average of 25,000 t per month with maximum monthly production of 40,000 t forecast) subject to satisfactory completion of road upgrades.

The proposed modification will provide for a long-term extension to extraction activities (10-15 years) along with some additional operations as follows.

- Establishment of a new stockpiling areas (noting that these overlap with areas of existing and approved disturbance).
- Importation of virgin excavated natural materials (VENM) / excavated natural materials (ENM) for use as engineered fill for construction of internal roads and stockpiling areas. Initial estimates are for the import of up to 120,000 tpa of VENM/ENM for the first four years, with reduced volumes (<30,000 tpa) thereafter.
- No increase in the maximum vehicle movements 134 per day or 20 per hour, however, trucks may be laden in both directions (to and from the Quarry) allowing for laden trucks to enter the Quarry Site with VENM/ENM.

EXISTING SITE CONDITIONS

Site Location

The location of the site is shown as **Figure 1** and **2**.

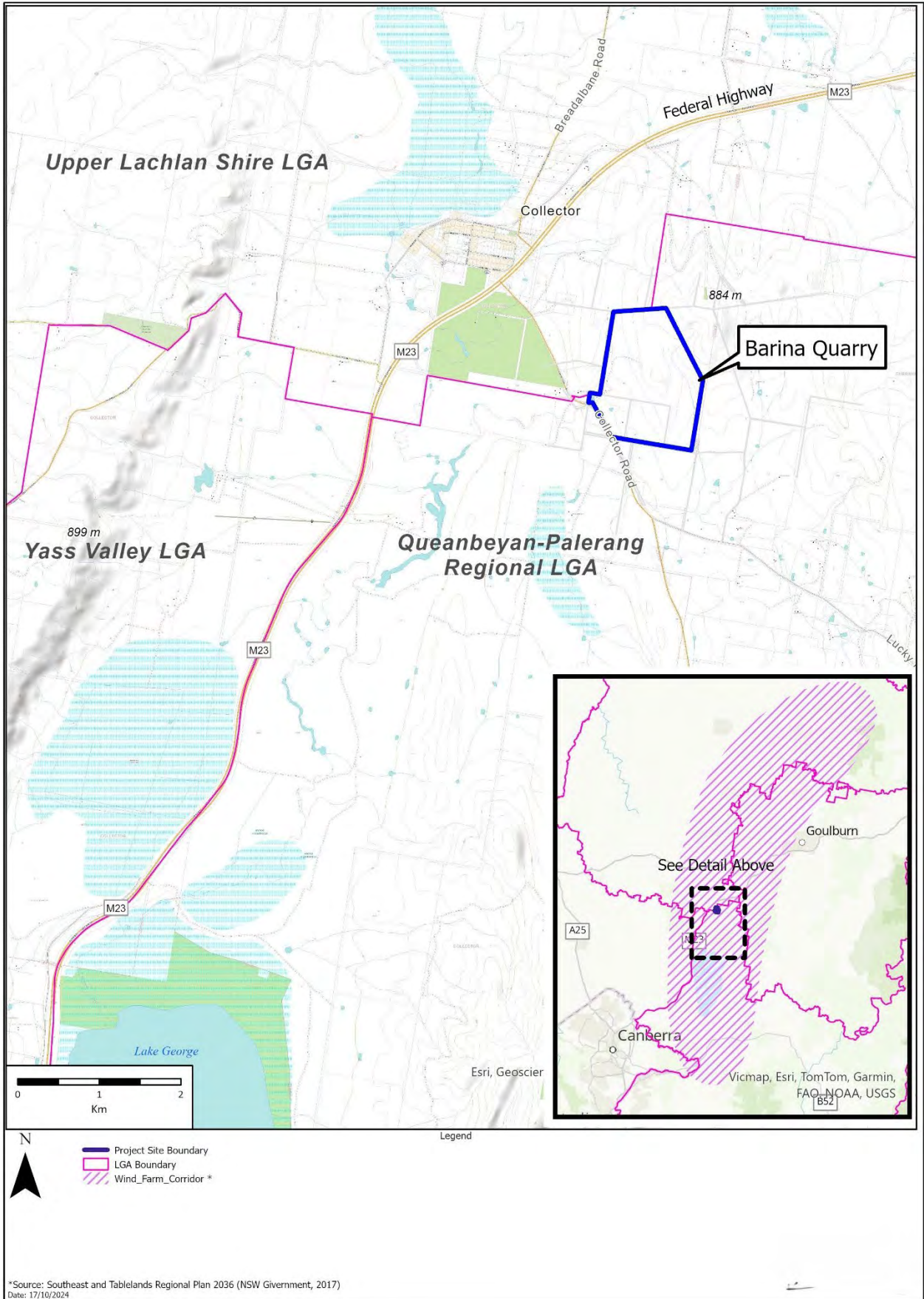


Figure 1 Site Location

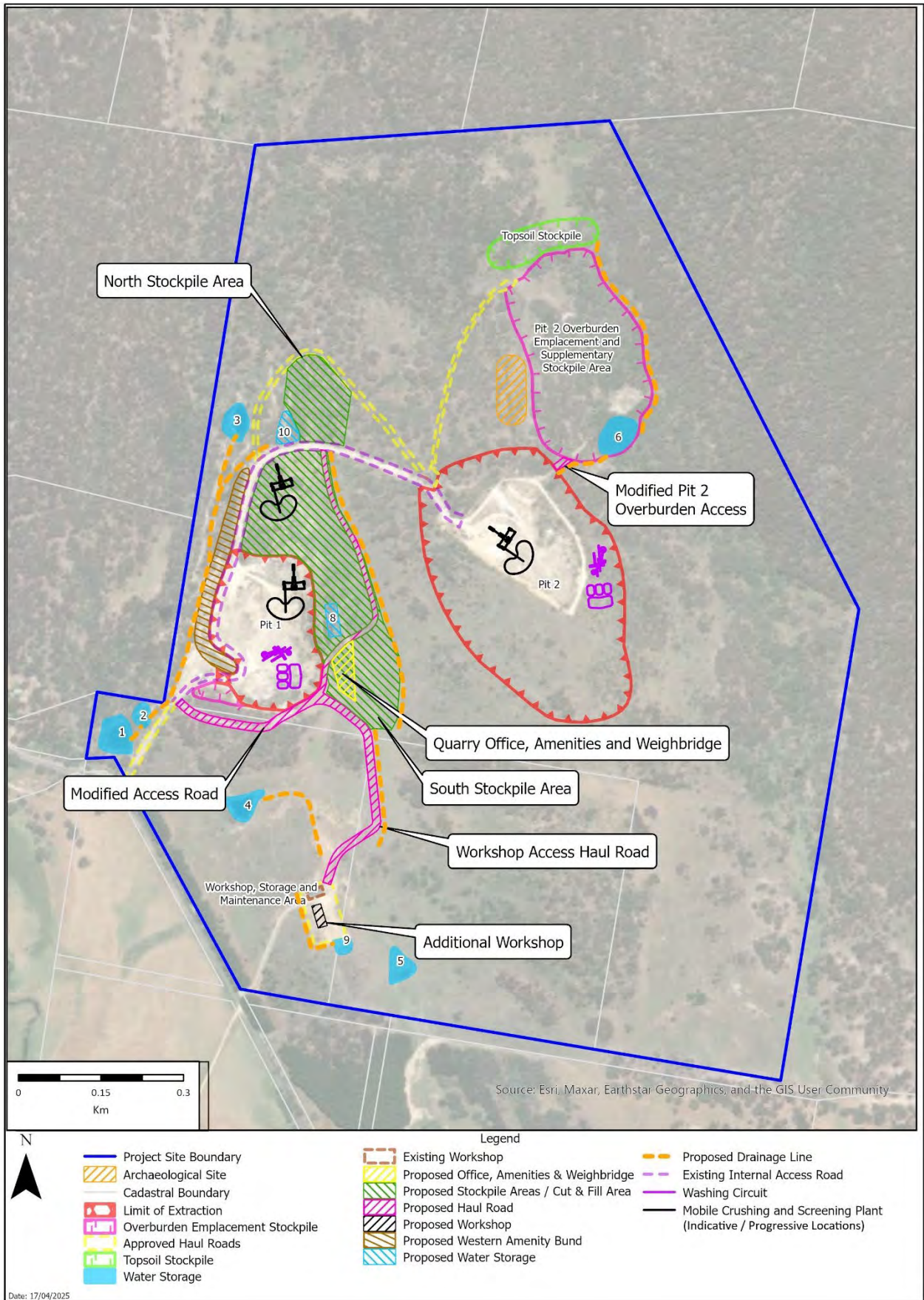


Figure 2 Site Context

Operating Hours and Workforce

The hours of operation for site preparation, extraction, processing, and product dispatch are 7:00 am to 6:00 pm Monday to Friday, and 7:00 am to 1:00 pm Saturdays.

Site Access and adjoining Road Network

The quarry provides direct access onto Collector Road and then onto the Federal Highway at an existing seagull type junction.

Federal Highway

Federal Highway is a State Road under the care and maintenance of the TfNSW with a speed limit of 100 km/hr.

The road is configured as a two-lane divided carriage way with a wide median and 1.5m shoulder.

The Federal Highway provides connections Goulburn (to the north) to Canberra to the south).

Current traffic Data for this section of road has been sourced from TfNSW Traffic Volume Viewer for

Station Id: 6110 340m East of Short Street, Collector 2581

For south bound vehicles the recorder show 7,491 vehicles per day with a peak hourly flow of 574 per hour between 3 pm and 4 pm.

There is no north bound available traffic data so for the basis of this report it is assumed that the volumes heading north are consistent with those heading south.

Collector Road

Collector Road is a local road under the care and maintenance of Councils with a speed limit of 80 km/hr.

The road is configured as a sealed two-lane carriageway with 3.5m lane and no sealed shoulder provided for each direction.

The section of road adjacent to the site access was recently upgraded as per the development consent.

Current traffic data for this section of road has been sourced from a 15-day traffic count installed by Council 200m east of the Federal Highway in October 2024.

It should be noted that the quarry was not operating at this time.

These counts indicated a daily traffic flow of 158 vehicles per day and approximately 15 per hour in the peak hour.

Collector Road Federal Highway Intersection

The current configuration of the intersection of Collector Road and the Federal Highway is a standard seagull type junction (**Figures 3, 4, 5 and 6**).



Figure 3 Site Access Monaro Highway looking North



Figure 4 Site Access Monaro Highway looking North

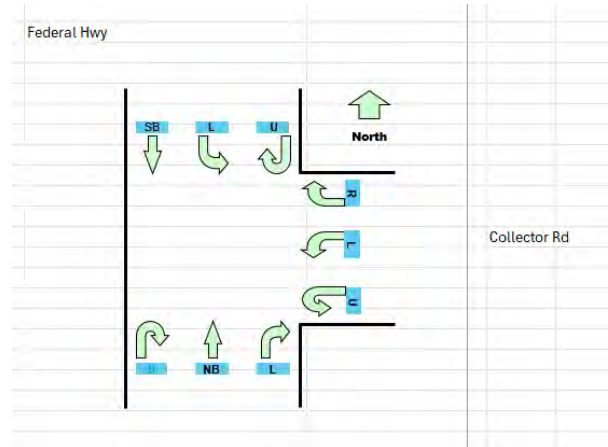


Figure 5 Site Access Monaro Highway looking North



Figure 6 Site Access Monaro Highway looking North

A detailed intersection count was undertaken on 27 May 2025 and these results are provided in **Appendix A** and are summarised in **Table 1**



Approach	Road Name	Turn	LV	HV	TV
North	North Approach Federal Hwy	U	0	0	0
North	North Approach Federal Hwy	SB	493	82	575
North	North Approach Federal Hwy	L	3	0	3
East	East Approach Collector Rd	U	17	7	24
East	East Approach Collector Rd	R	3	1	4
East	East Approach Collector Rd	L	13	0	13
North	South Approach Federal Hwy	U	0	0	0
North	South Approach Federal Hwy	R	5	0	5
North	South Approach Federal Hwy	NB	241	62	303

Table 1 Existing Traffic Movement at intersection of Federal Highway and Collector Road

Site Access off Collector Road

The existing private access off Collector Road is should in **Figures 7 and 8**.



Figure 7 Site Access Collector Road looking south



Figure 8 Site Access Collector Road looking south

Road Capacity

Table 4.5 of the NSW Roads and Maritime Services (RMS) RTA's *Guide to Traffic Generating Developments* provides some guidance on likely levels of service being experienced on two lane two-way rural roads for different terrain types. This table is reproduced below.

Table 4.5
peak hour flow on two-lane rural roads (veh/hr)
(Design speed of 100km/hr)

Terrain	Level of Service	Percent of Heavy Vehicles			
		0	5	10	15
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

The data for Table 4.5 assumes the following criteria:

- terrain level with 20% no overtaking.
- rolling with 40% no overtaking.
- mountainous with 60% no overtaking.
- 3.7 m traffic lane width with side clearances of at least 2m.
- 80/40 directional split of traffic.

Based on the Table 4.5 of the RTA's *Guide to Traffic Generating Developments*, with a heavy vehicle of 6 % Collector Road is operating at a Level of Service of B.

PROPOSED DEVELOPMENT

Traffic Generation

There is no plan to increase the maximum vehicle movements 134 per day or 20 per hour allowed under the existing conditions of DA 1-01-2000, the modification seeks to allow for loaded vehicles to operate in each direction.

Vehicles are predominantly 20 m truck and dog trailer combinations.

Traffic Distribution

The origin and destination for the distribution of various products (both incoming and outgoing) will vary day to day

Based on discussions with the operator the distribution of traffic will approximate the following.

- o Entering and leaving the site onto Collector Road
 - Incoming 100% from the west
 - outgoing 100 % to the west
- o Entering and leaving the Federal Highway is as likely to be.
 - 50% to and from the north
 - 50% to and from the south

Based on discussions with the operator the distribution of traffic is as follows

Crash History

The most recent 5-year crash history obtain from TfNSW Centre for Road Safety - Interactive crash statistics (2019-2023) is shown in Figure 9. There has been one crash at the intersection of the Federal; Highway and Collector Road.

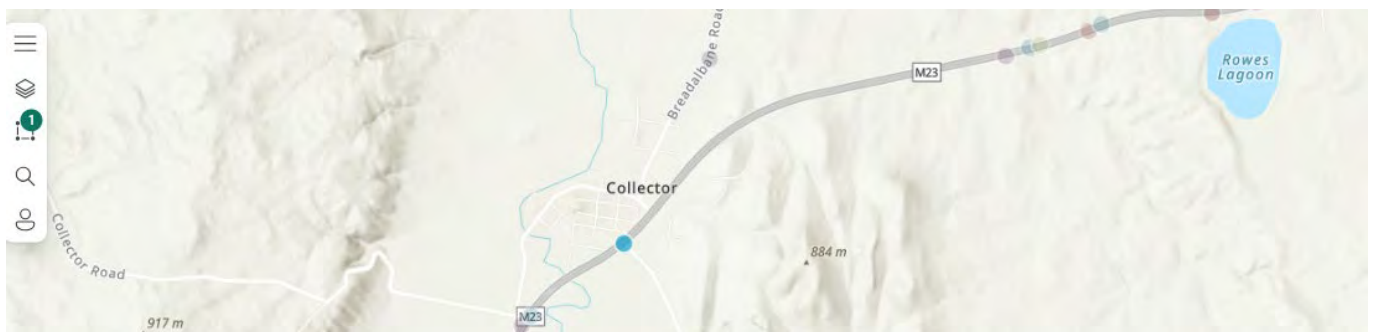


Figure 9 NSW Crash Data

This crash occurred in 2020 resulting in minor injury due to vehicle leaving the road and hitting an animal at dusk.

There are no other recorded crashes in the vicinity of the Quarry, nor is there any crash cluster or road safety issued identified at this location.

SIGHT DISTANCE

Background

Austroroads guidelines provide general parameter values, which they refer to as the Normal Design Domain (NDD).

This report discusses the existing intersection in terms of Normal Design Domain criteria only.

As illustrated in **Figure 10**, Safe Intersection Sight Distance (SISD) is measured from a driver eye height of 1.1 m above the road to a point 1.25 m above the road, which represents the upper part of a car. It is measured along the carriageway from the approaching vehicle to a conflict point.

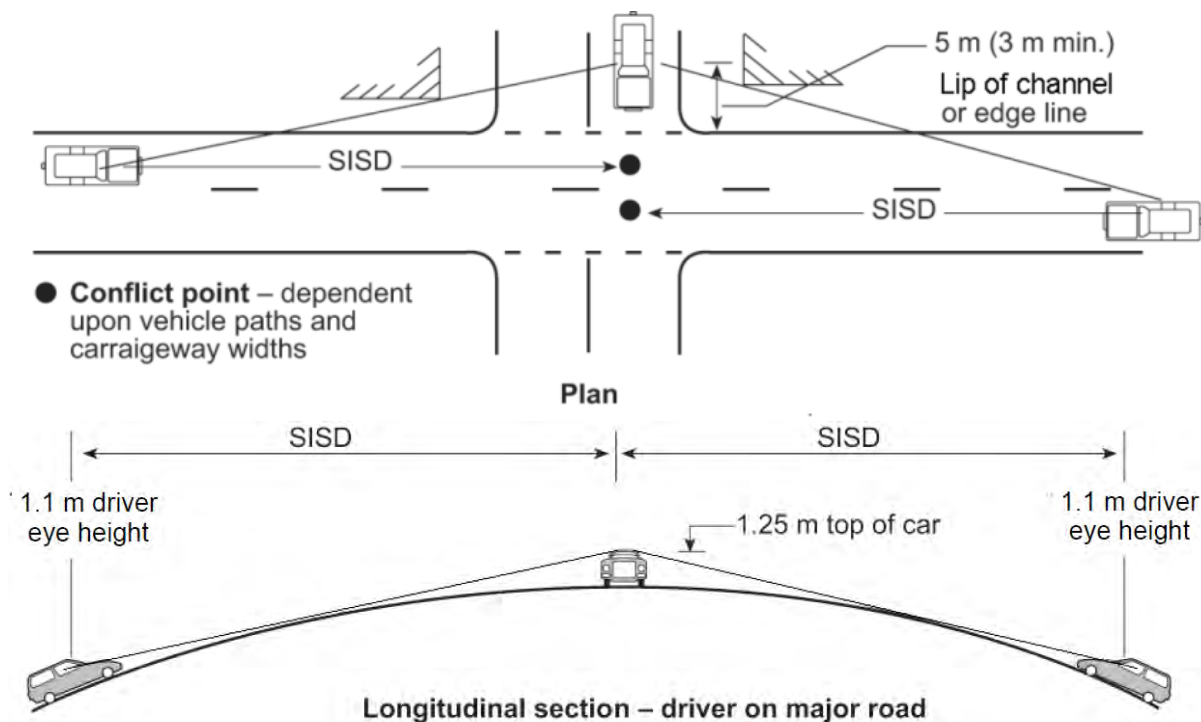


Table 3.2: Safe intersection sight distance (SISD) and corresponding minimum crest vertical curve size for sealed roads ($S < L$)

Design speed (km/h)	Based on safe intersection sight distance for cars ⁽¹⁾ $h_1 = 1.1$; $h_2 = 1.25$, $d = 0.36$ ⁽²⁾ ; Observation time = 3 sec					
	$R_T = 1.5$ sec ⁽³⁾		$R_T = 2.0$ sec		$R_T = 2.5$ sec	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97
120	–	–	324	112	341	124
130	–	–	365	143	383	157

⁽¹⁾ If the average grade over the braking length is not zero, calculate the safe intersection sight distance (SISD) values

Figure 10 SISD diagrams from Austroads, Figure 3.2

Austroads in calculating the required SISD allows the use of a 2.5 seconds' or 2.0 seconds observation time for T-intersections on single carriageway roads that have a traffic volume less than 4,000 vehicles per day with the minor road having a traffic volume of less than 400 vehicles per day. For the 110 km/hr speed design speed and 90 km/hr (being 10% above the signposted speed) these values are listed in **Table 2**

Safe Intersection Sight Distance values are: Design speed (km/h)	Reaction time (seconds)	SISD (m)
sign posted speed 80km/hr Design speed 90km/hr	2.0	214
sign posted speed 80km/hr Design speed 90km/hr	2.5	226
sign posted speed 100km/hr Design speed 110km/hr	2.0	285
sign posted speed 100km/hr Design speed 110km/hr	2.5	300

Table 2 Required SISD

In addition to SISD Austroads also requires a check critical gap acceptance sight distance, These requirements are set out in **Figure 11** with the appropriate sight distance is detailed in **Table 3**

Table 3.5: Critical acceptance gaps and follow-up headways

Movement	Diagram	Description	$t_a^{(1)}$ (sec)	$t_r^{(2)}$ (sec)
Left turn		Not interfering with A Requiring A to slow	14–40 5	2–3 2–3
Crossing		Two lane/one way Three lane/one way Four lane/one way Two lane/two way Four lane/two way Six lane/two way	4 6 8 5 8 8	2 3 4 3 5 5
Right turn from major road		Across one lane Across two lanes Across three lanes	4 5 6	2 3 4
Right turn from minor road		Not interfering with A One way Two lane/two way Four lane/two way Six lane/two way	14–40 3 5 8 8	3 3 3 5 5
Merge		Acceleration lane	3	2

1 t_a = critical acceptance gap (sec).
2 t_r = follow-up headway (sec).

Table 3.6: Table of minimum gap sight distances ('D' metres) for various speeds

Critical gap acceptance time (t _a) (secs)	85 th percentile speed of approaching vehicle (km/h)										
	10	20	30	40	50	60	70	80	90	100	110
4	11	22	33	44	55	67	78	89	100	111	122
5	14	28	42	55	69	83	97	111	125	139	153
6	17	33	50	67	83	100	117	133	150	167	183
7	19	39	58	78	97	117	136	155	175	194	214
8	22	44	67	89	111	133	155	178	200	222	244
9	25	50	75	100	125	150	175	200	225	250	275
10	28	56	83	111	139	167	194	222	250	278	305

Figure 11 Critical Gap Sight Distance

Gap Acceptance : Design speed (km/h)	Reaction time (seconds)	Min Gap acceptance distance (m)
sign posted speed 80 km/hr Design speed 90km/hr	5	111
sign posted speed 100 km/hr Design speed 110km/hr	5	153

Table 3 Gap Acceptance Sight Distance

Intersection of Federal Highway and Colector Road

Available Safe Intersection Sight Distance (SISD) was measured by field measurements, as detailed in **Table 4**, as being greater than 350m and as such meets:

- Austroads Guide to Road Design Part 3: Geometric Design for both reaction time of 2.0 and 2.5 seconds; and
- Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections minimum Gap Sight Distance (MGSD) with a 5 sec gap acceptance.

Sight Distance looking left	Sight Distance looking right
Greater than 700	Greater than 700

Table 4: Measured Sight Distance Federal Highway

Intersection of Site Access and Collector Road

Available Safe Intersection Sight Distance (SISD) was measured by field measurements, as detailed in **Table 5**, as being greater than 226m and as such meets:

- Austroads Guide to Road Design Part 3: Geometric Design for both reaction time of 2.0 and 2.5 seconds; and
- Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections minimum Gap Sight Distance (MGSD) with a 5 sec gap acceptance.

Sight Distance looking left	Sight Distance looking right
600	230

Table 5: Measured Sight Distance Collector Road

ACCESS REVIEW

Intersection Operation Federal Highway and Collector Road

How adequate the capacity of an intersection is judged by whether it can physically and operationally cater for the traffic using it.

The performances of the intersections relevant to the proposal have been assessed using the intersection modelling SIDRA software. The model provides parameters of the performance of an intersection including the degree of saturation (DoS) and the average delay per vehicle. It provides an accurate and consistent guide to the performance of an intersection under the different traffic flow scenarios. The recommended criteria for evaluating capacity of intersections are shown in **Table 6**.

Level of Service	Degree of Saturation (DoS)	Ave. Delay/ Veh. (Secs)
A/B - good operation	less than 0.80	Less than 28
C - satisfactory	0.80 to 0.85	29-42
D poor but manageable	0.85 to 0.90	43-56
E - at capacity	0.90 to 1.0	57-70
F - unsatisfactory, extra capacity required	Over 1.0	Over 70

Table 6: Criteria for Evaluating Capacity of Intersection

In the absence of historical growth figures, a conservative 1% traffic growth rate was applied to the 2025 traffic counts to determine a 10-year forecast.

To determine if the proposed movements would have an effect on the operations of the existing intersection of a SIDRA analysis was carried out.

The analysis has been carried out for the following scenarios:

- Existing
- Existing with proposed development,
- 10-year planning horizon (with above assumed growth rate), and
- 10-year planning horizon with proposed development.

Traffic Modelling Assumption

- Analysis was carried out for the maximum hour flow as shown in table 2 only as this is worst case scenario for traffic,
- Existing intersection geometry, including lane lengths and widths were measured
- SIDRA default values were adopted,
- Level of Services Method is set to TfNSW,

The results of the modelling and Summary Movement Tables from the model are provided in **APPENDIX B**.

In summary the increase traffic from this development causes no decrease in level of service in either the AM and or PM under all the modelling scenarios there is no deterioration of Av Delay, Level of Service, or Que length when development traffic is added to either of the base case or 10 years simulations of the intersection.

In all scenarios all the intersections operate at Level of Service of A

Type of Access Required

The suitability of the existing private access and the need to upgrade the access based on the vehicles utilising it can be assessed against either Section 7.2 “Property Access” contained within Austroads Guide to Road Design Part 4: Intersections and Crossings: General or within Section 2 “Selection of Intersection Type” contained within Austroads Guide to Traffic Management Part 6 Intersections if it is considered as an intersection depending on whether the access is assessed as a “private access” or a “T junction intersection”.

If it is classified as a “T Junction Intersection” than Section 2 (including figure 2.25) of the Austroads Guide to Traffic Management Part 6 Intersection (which is provided in **Figure 12** and **13**) provides guidance for the type of T junction intersection that is appropriate given the traffic volumes anticipated to be experienced at the intersection such as a BAR (Basic Right Turn) or CHS (channelised intersection).

Intersection of Collector Road and Federal Highway

Based on the traffic volumes (**Table 1**) and projected development flows of 20 per hour split 50/ 50 in each direction the relevant inputs to the **Figure 12** for this intersection of in the highest peak hour during operating hours are:

- $Q_m = Q_{T1} + Q_{T2} + Q_L = 575 + 303 + 13 = 891$
- $Q_R = 15$
- $Q_L = 13$

Right and left Turn warrant

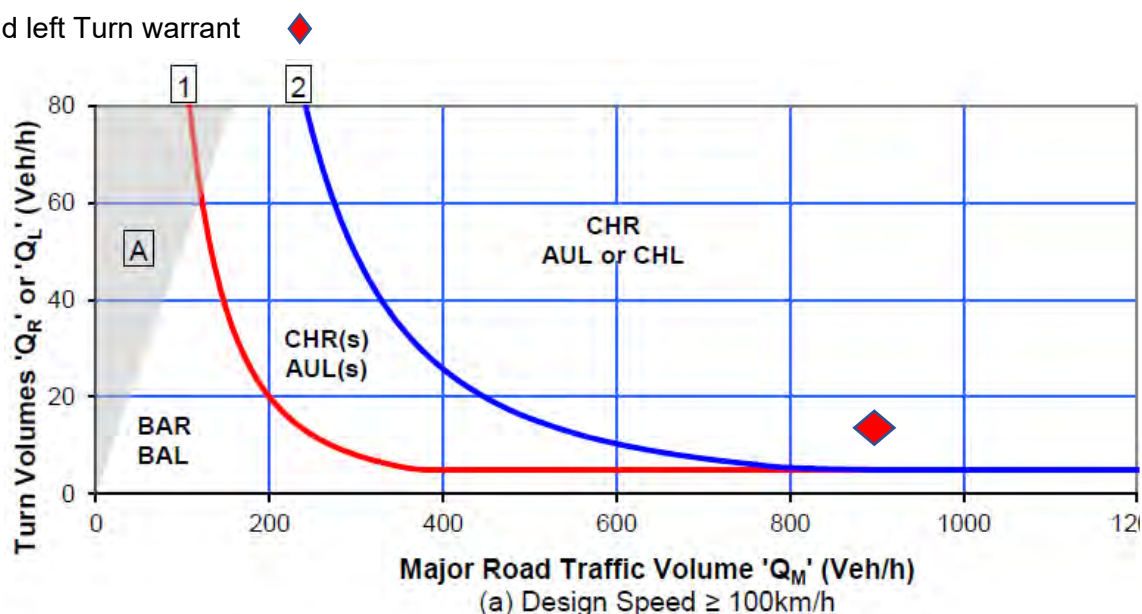


Figure 12: Austroads Part 6 Warrants for turn treatments on the major road at unsignalized intersections Figure 2.25

Base on the above analysis the existing seagull treatment is adequate for this modification.

Site Access Road off Collector Road

Based on data found on in Council's traffic count and projected development flows of 20 per hour the relevant inputs to the **Figure 13** for this intersection of in the highest peak hour during operating hours are:

- $Q_m = Q_{T1} + Q_{T2} + Q_L = 15 + 15 + 20 = 50$
- $Q_R = 20$
- $Q_L = 20$

Right and left Turn warrant ◆

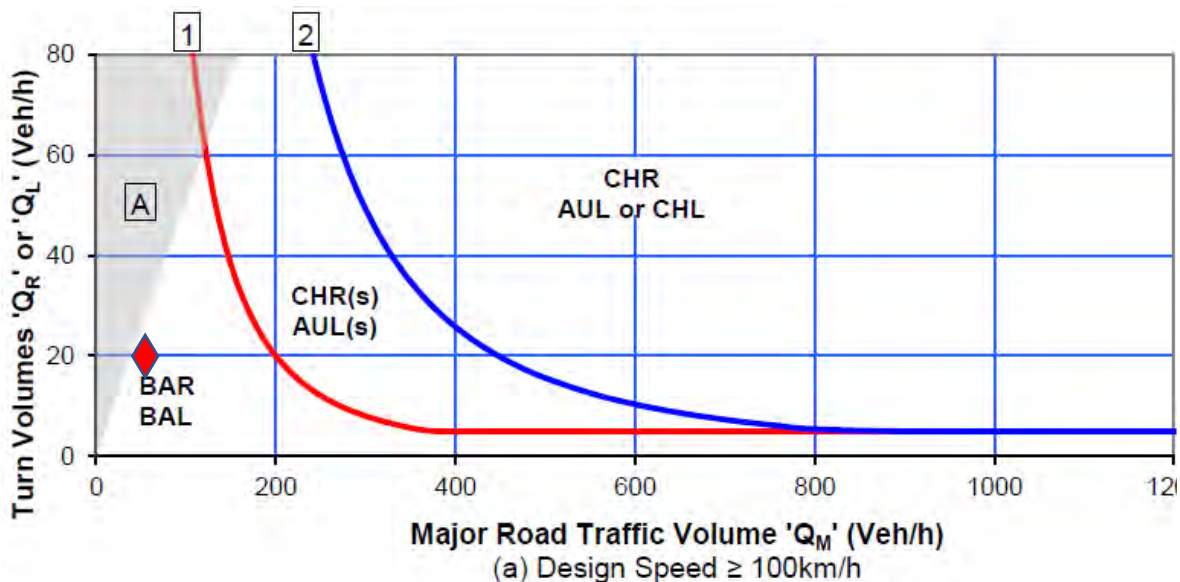


Figure 13: Austroads Part 6 Warrants for turn treatments on the major road at unsignalized intersections Figure 2.25

From a technical perspective and in accordance with Austroads Guidelines, intersection upgrades in brownfield (existing) sites are only warranted if there are significant delays in vehicles waiting to turn or if there is a sightline issue that prevents vehicles traveling at the nominated speed limit to stop prior to impacting a vehicle waiting to turn.

In addition, it is important to note that the Austroads Guidelines clearly indicate that use of the warrants is based on the construction of new intersections in “Greenfield” locations, but suggests that the above figure be used as a reference for:

- The construction of new intersections on existing roads; and
- Intervention levels when upgrading existing intersection turn treatments.
- It is also important to note that the warrants are not intended for direct application to accesses and driveways.

As there is:

- No adverse crash history along this section of road,
- Traffic attracted to the proposed development will not cause an adverse impact along the road; and
- Turning volumes at peak times are extremely low.

Based on the above assessment it is considered that the Austroads Guide to Road Design Part 4: Intersections and Crossings: General Section 7 2 Property Access (as shown in **Figure 14**) rather than the Austroads Guide to Traffic Management Part 6 Intersection is the most applicable standard for this access.

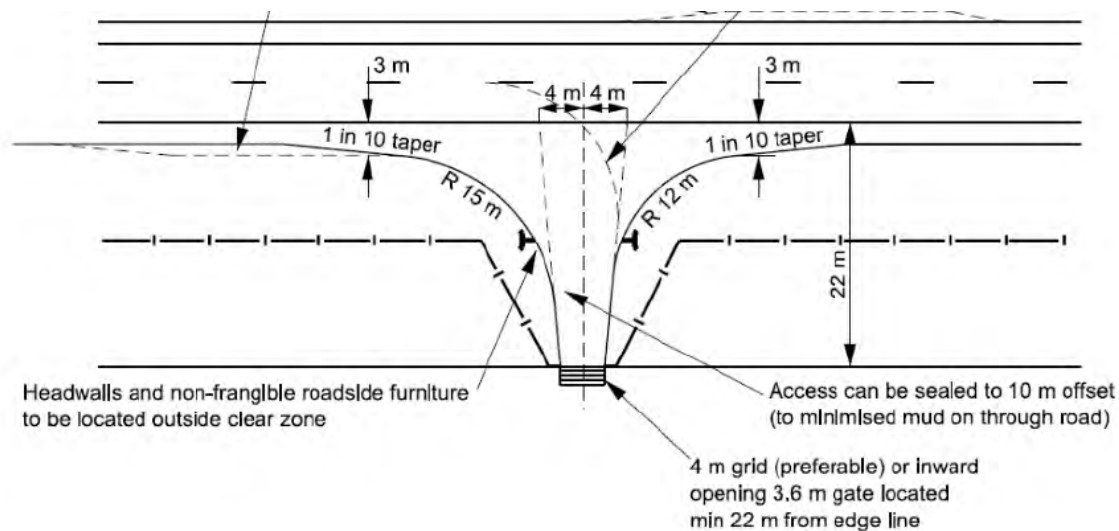


Figure 14: Austroads Guide to Road Design Part 4: Intersections and Crossings: General Figure 7.4

This determination (i.e. application of Austroads Guide to Road Design Part 4: Intersections and Crossings: General - Section 7 2 property access) is consistent with the recent decision by TfNSW (21 January 2025- Masa Kimura Development Services Case Officer - Transport Planning - TfNSW) when assessing a proposed heavy vehicle access off the New England Highway at Tenterfield. In which she states that

New England Highway (HW09) is a classified State road)

It is understood that traffic generation / peak movements for the entire development (Stages 1-5) will be as follows:

- 6:00am to 8:00am – max 15 per hr total movements (8 in and 7 out)
- 8:00am to 3:30pm – max 4 per hr total movements (2 and 2 out)
- 3:30pm to 5:30pm – max 15 per hr total movements (8 in and 7 out)

With vehicles comprised of

- 1 x 25m B-Double,
- 3 x 19m Semi-trailer,
- 3 x MRV, and
- 8 x cars

Peak hourly through traffic along New England Highway amounts to

Period Start	SB	NB
Morning Peak 6am to 9am	109	96
Mid-Day Peak 11am to 12 noon	101	109
Evening Peak 2:45pm to 3:45 pm	104	96

Right and left Turn warrant ◆

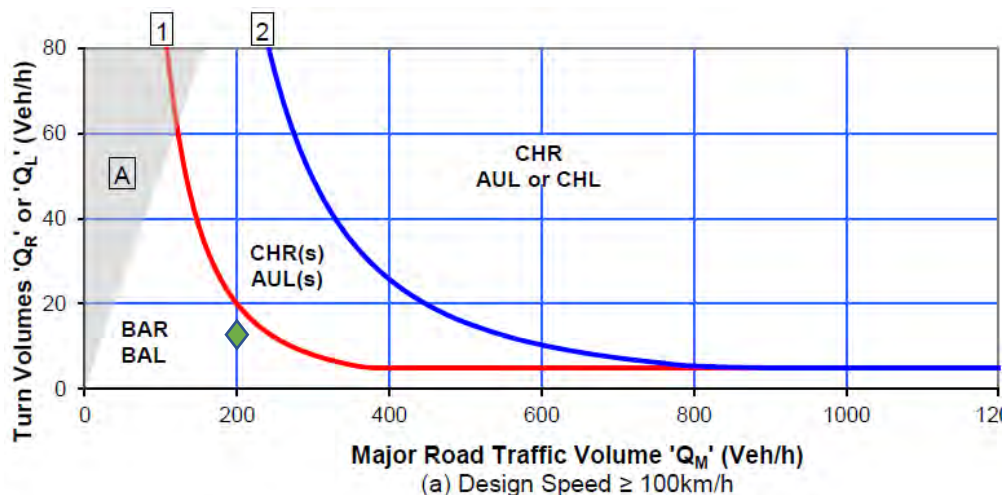


Figure 15 Austroads Part 6 Warrants for turn treatments on the major road

Access via the widened driveway fronting New England Highway, as detailed in the submitted plan by Pavey Consulting Services (refer Sketch No. SK2025-012-001, Revision 1, dated 18/11/2024), is considered adequate to support the above development traffic movements.

Sweep Path

A sweep path analysis has been undertaken for both the intersection of Collector Rd and Federal Highway and the existing entrance to the site based on largest and most common vehicle being a 20 m Truck and Dog combination.

This sweep path analysis indicates that the existing formation of the intersection of Federal Highway and Collector Road and the access off Collector Road is adequate for heavy vehicles. This analysis is shown in **Appendix B**.

Impact on Public Transport

There is no impact on public transport as traffic movements are minimal.

Impact of Road Safety

As detailed above a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all injury crashes along Federal Highway and Collector Road in the vicinity of the site has been carried out.

From a traffic safety perspective, both Federal Highway and Collector Road are currently operating in a manner consistent with other rural, classified roads in the area.

The existing intersection of Collector Road and Federal Highway along with the existing access way to be utilised by quarry traffic has the required sight distances and will be sufficient to accommodate heavy vehicles.

The proposed movements associated with the proposed extractive industry are minor in nature and would not make any significant change to vehicle numbers compared to those currently associated with the site. Upgrades of the intersection are not required.

Consequently, a review of road safety issues along this section of Federal Highway and Collector Road has indicated that a full road safety audit is not required to support the TIA or application to modify DA 1-01-2000.

.Driver Code of Conduct

It is recommended that a Driver Code of Conduct be developed for this site and finalised upon approval of the development and after consultation with Council and TfNSW.

Summary

The traffic impacts from the proposed development of the quarry have been assessed and the key findings are as follows:

- The surrounding road network is suitable to accommodate the proposed development,
- The additional traffic generated by the quarry of less than 10 vehicle per hour would not impact the current a Level of Service along the either Federal Highway and Colector Rd and both would continue to operate satisfactorily,
- The existing “seagull” type intersection of Collector Road and Federal Highway operates at a Level of Service A and shows no sign of deuteriation over the 10-year planning horizon,
- The existing property access off Collector Road is sufficient to handle the increase in vehicle traffic and currently has the appropriate site distances and manoeuvring area for all turn movements.

Based on the findings of this report, Pavey Consulting Services is of the opinion that there are no traffic engineering related matters that should preclude approval of this modification

APPENDIX A INTERSECTION COUNT

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Collector Rd and Federal Hwy, Collector

GPS -34.917676, 149.436876

Date:	Tue 27/05/25
Weather:	Overcast
Suburban:	Collector
Customer:	N/A

North:	Federal Hwy
East:	Collector Rd
South:	Federal Hwy
West:	N/A

Survey	AM:	7:00 AM-12:00 PM
Period	PM:	12:00 PM-6:00 PM
Traffic	AM:	7:15 AM-8:15 AM
Peak	PM:	3:30 PM-4:30 PM

All Vehicles

Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:00	7:15	0	118	2	0	0	4	0	0	53	837	
7:15	7:30	0	142	1	0	0	3	0	4	65	903	Peak
7:30	7:45	0	123	1	0	2	3	0	0	69	866	
7:45	8:00	0	149	1	0	1	3	0	0	93	880	
8:00	8:15	0	161	0	0	1	4	0	1	76	813	
8:15	8:30	0	102	1	0	2	1	0	0	72	770	
8:30	8:45	0	128	0	0	1	0	0	2	81	796	
8:45	9:00	0	100	2	0	2	0	0	1	75	794	
9:00	9:15	0	117	1	0	5	1	0	0	76	811	
9:15	9:30	0	105	0	0	1	0	0	1	97	809	
9:30	9:45	0	109	1	0	0	0	0	0	100	815	
9:45	10:00	0	119	1	0	1	0	0	1	75	812	
10:00	10:15	0	86	1	0	0	0	0	1	110	804	
10:15	10:30	0	92	2	0	2	2	0	1	111	803	
10:30	10:45	0	109	0	0	0	2	0	0	96	784	
10:45	11:00	0	91	1	0	1	0	0	0	96	762	
11:00	11:15	0	96	0	0	2	1	0	0	98	774	
11:15	11:30	0	98	0	0	1	0	0	0	92		
11:30	11:45	0	97	0	0	0	1	0	1	86		
11:45	12:00	0	86	2	0	0	1	0	0	112		
12:00	12:15	0	95	0	0	0	0	0	0	92	757	
12:15	12:30	0	82	1	0	1	1	0	0	91	748	
12:30	12:45	0	89	0	0	0	0	0	0	85	782	
12:45	13:00	0	97	0	0	0	0	0	0	123	801	
13:00	13:15	0	84	1	0	0	0	0	1	92	777	
13:15	13:30	0	100	0	0	2	0	0	0	108	798	
13:30	13:45	0	97	0	0	0	0	0	1	95	803	
13:45	14:00	0	80	0	0	0	0	0	1	115	820	
14:00	14:15	0	103	0	0	0	1	0	0	95	845	
14:15	14:30	0	101	2	0	1	0	0	1	110	862	
14:30	14:45	0	92	2	0	2	1	0	1	112	856	

Traffic Impact Assessment – Barina Quarry

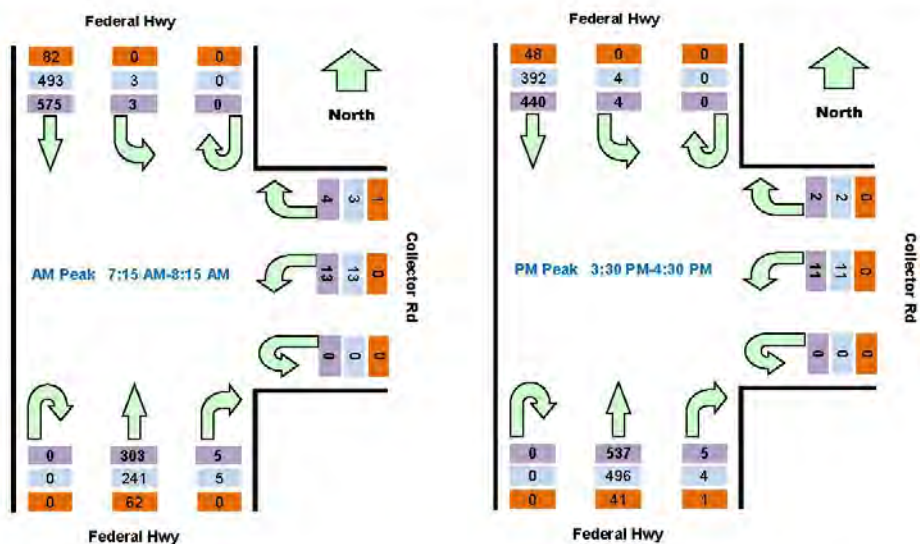
14:45	15:00	0	85	1	0	0	0	0	0	135	885	
15:00	15:15	0	96	1	0	3	2	0	0	114	912	
15:15	15:30	0	90	1	0	1	0	0	0	117	962	
15:30	15:45	0	96	2	0	1	6	0	0	134	999	Peak
15:45	16:00	0	116	0	0	1	4	0	1	126	995	
16:00	16:15	0	112	1	0	0	1	0	0	152	965	
16:15	16:30	0	116	1	0	0	0	0	4	125	929	
16:30	16:45	0	101	3	0	0	1	0	0	130	883	
16:45	17:00	0	93	1	0	1	0	0	2	121	845	
17:00	17:15	0	97	0	0	0	0	0	2	131	821	
17:15	17:30	0	73	1	0	0	1	0	2	123		
17:30	17:45	0	83	1	0	0	0	0	2	111		
17:45	18:00	0	63	0	0	2	0	0	2	127		

Peak Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
7:15	8:15	0	575	3	0	4	13	0	5	303	903
15:30	16:30	0	440	4	0	2	11	0	5	537	999

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Light Vehicles

Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
7:00	7:15	0	92	2	0	0	4	0	0	39
7:15	7:30	0	120	1	0	0	3	0	4	43
7:30	7:45	0	105	1	0	1	3	0	0	55
7:45	8:00	0	132	1	0	1	3	0	0	78
8:00	8:15	0	136	0	0	1	4	0	1	65

Traffic Impact Assessment – Barina Quarry

8:15	8:30	0	93	1	0	2	1	0	0	51
8:30	8:45	0	111	0	0	1	0	0	2	61
8:45	9:00	0	80	2	0	2	0	0	1	62
9:00	9:15	0	100	1	0	5	1	0	0	57
9:15	9:30	0	85	0	0	1	0	0	1	78
9:30	9:45	0	90	1	0	0	0	0	0	81
9:45	10:00	0	100	1	0	1	0	0	1	55
10:00	10:15	0	70	1	0	0	0	0	1	92
10:15	10:30	0	76	2	0	2	2	0	1	96
10:30	10:45	0	92	0	0	0	2	0	0	73
10:45	11:00	0	73	1	0	1	0	0	0	79
11:00	11:15	0	87	0	0	2	1	0	0	76
11:15	11:30	0	90	0	0	1	0	0	0	75
11:30	11:45	0	80	0	0	0	1	0	1	66
11:45	12:00	0	76	1	0	0	1	0	0	88
12:00	12:15	0	81	0	0	0	0	0	0	72
12:15	12:30	0	73	1	0	1	1	0	0	64
12:30	12:45	0	83	0	0	0	0	0	0	57
12:45	13:00	0	83	0	0	0	0	0	0	98
13:00	13:15	0	70	1	0	0	0	0	1	76
13:15	13:30	0	84	0	0	2	0	0	0	95
13:30	13:45	0	80	0	0	0	0	0	1	83
13:45	14:00	0	70	0	0	0	0	0	1	99
14:00	14:15	0	88	0	0	0	1	0	0	82
14:15	14:30	0	91	2	0	1	0	0	1	97
14:30	14:45	0	80	2	0	2	1	0	1	98
14:45	15:00	0	72	1	0	0	0	0	0	114
15:00	15:15	0	90	1	0	1	2	0	0	101
15:15	15:30	0	79	1	0	1	0	0	0	95
15:30	15:45	0	87	2	0	1	6	0	0	125
15:45	16:00	0	100	0	0	1	4	0	1	116
16:00	16:15	0	99	1	0	0	1	0	0	141
16:15	16:30	0	106	1	0	0	0	0	3	114
16:30	16:45	0	93	3	0	0	1	0	0	114
16:45	17:00	0	89	1	0	1	0	0	2	111
17:00	17:15	0	90	0	0	0	0	0	2	121
17:15	17:30	0	68	1	0	0	1	0	2	113
17:30	17:45	0	76	1	0	0	0	0	2	103
17:45	18:00	0	58	0	0	2	0	0	2	119

Peak Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	

Traffic Impact Assessment – Barina Quarry

7:15	8:15	0	493	3	0	3	13	0	5	241	758
15:30	16:30	0	392	4	0	2	11	0	4	496	909

Heavy Vehicles

Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
7:00	7:15	0	26	0	0	0	0	0	0	14
7:15	7:30	0	22	0	0	0	0	0	0	22
7:30	7:45	0	18	0	0	1	0	0	0	14
7:45	8:00	0	17	0	0	0	0	0	0	15
8:00	8:15	0	25	0	0	0	0	0	0	11
8:15	8:30	0	9	0	0	0	0	0	0	21
8:30	8:45	0	17	0	0	0	0	0	0	20
8:45	9:00	0	20	0	0	0	0	0	0	13
9:00	9:15	0	17	0	0	0	0	0	0	19
9:15	9:30	0	20	0	0	0	0	0	0	19
9:30	9:45	0	19	0	0	0	0	0	0	19
9:45	10:00	0	19	0	0	0	0	0	0	20
10:00	10:15	0	16	0	0	0	0	0	0	18
10:15	10:30	0	16	0	0	0	0	0	0	15
10:30	10:45	0	17	0	0	0	0	0	0	23
10:45	11:00	0	18	0	0	0	0	0	0	17
11:00	11:15	0	9	0	0	0	0	0	0	22
11:15	11:30	0	8	0	0	0	0	0	0	17
11:30	11:45	0	17	0	0	0	0	0	0	20
11:45	12:00	0	10	1	0	0	0	0	0	24
12:00	12:15	0	14	0	0	0	0	0	0	20
12:15	12:30	0	9	0	0	0	0	0	0	27
12:30	12:45	0	6	0	0	0	0	0	0	28
12:45	13:00	0	14	0	0	0	0	0	0	25
13:00	13:15	0	14	0	0	0	0	0	0	16
13:15	13:30	0	16	0	0	0	0	0	0	13
13:30	13:45	0	17	0	0	0	0	0	0	12
13:45	14:00	0	10	0	0	0	0	0	0	16
14:00	14:15	0	15	0	0	0	0	0	0	13
14:15	14:30	0	10	0	0	0	0	0	0	13
14:30	14:45	0	12	0	0	0	0	0	0	14
14:45	15:00	0	13	0	0	0	0	0	0	21
15:00	15:15	0	6	0	0	2	0	0	0	13
15:15	15:30	0	11	0	0	0	0	0	0	22
15:30	15:45	0	9	0	0	0	0	0	0	9
15:45	16:00	0	16	0	0	0	0	0	0	10
16:00	16:15	0	13	0	0	0	0	0	0	11

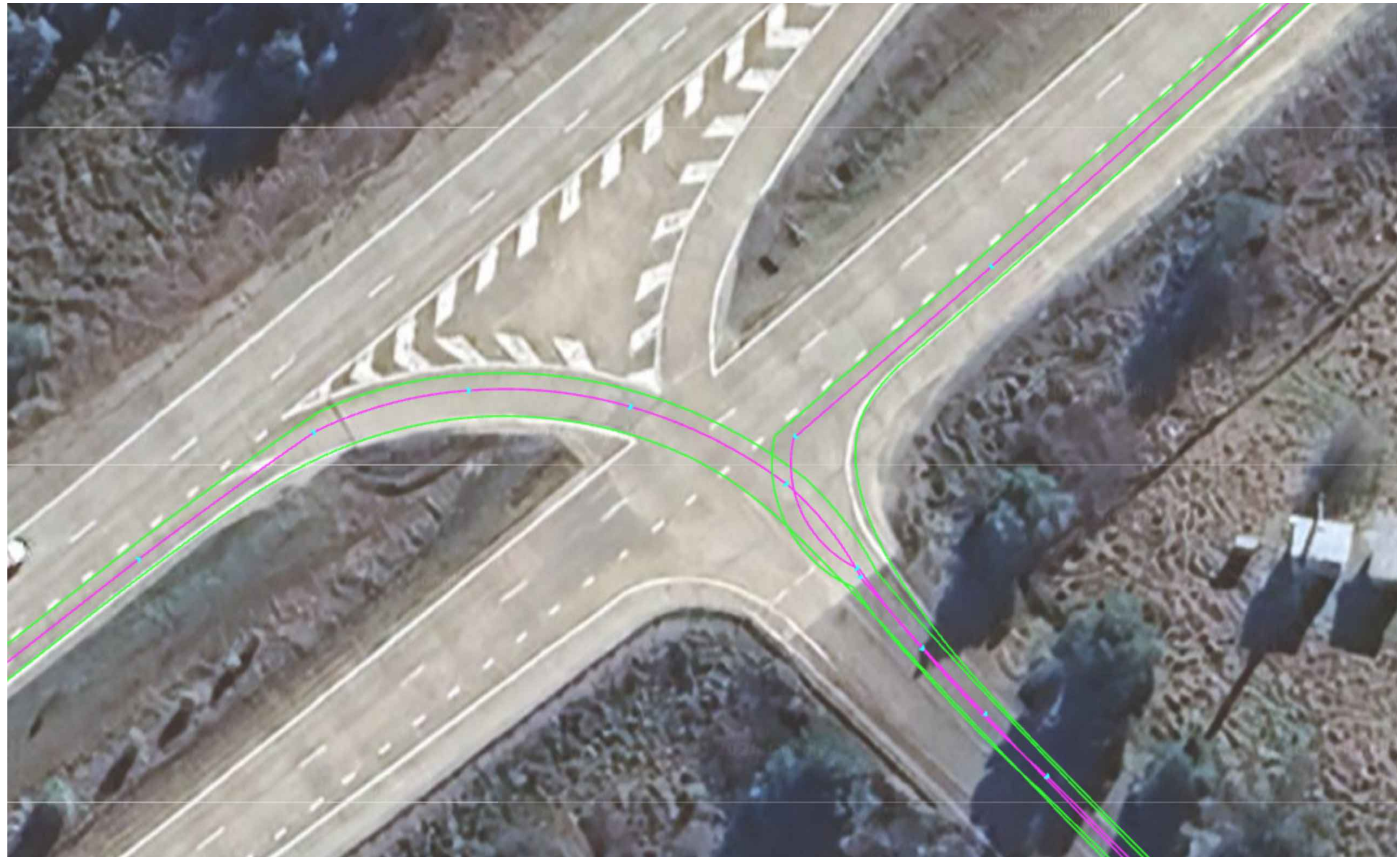
Traffic Impact Assessment – Barina Quarry

16:15	16:30	0	10	0	0	0	0	0	1	11
16:30	16:45	0	8	0	0	0	0	0	0	16
16:45	17:00	0	4	0	0	0	0	0	0	10
17:00	17:15	0	7	0	0	0	0	0	0	10
17:15	17:30	0	5	0	0	0	0	0	0	10
17:30	17:45	0	7	0	0	0	0	0	0	8
17:45	18:00	0	5	0	0	0	0	0	0	8

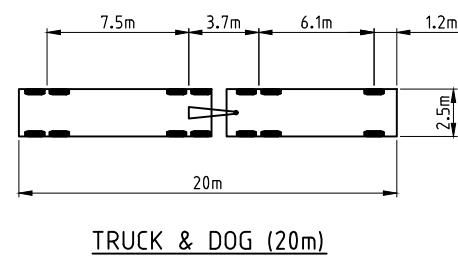
Peak Time		North Approach Federal Hwy			East Approach Collector Rd			South Approach Federal Hwy			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
7:15	8:15	0	82	0	0	1	0	0	0	62	145
15:30	16:30	0	48	0	0	0	0	0	1	41	90

Appendix B – SIDRA OUTPUTS

APPENDIX B SWEEP PATH



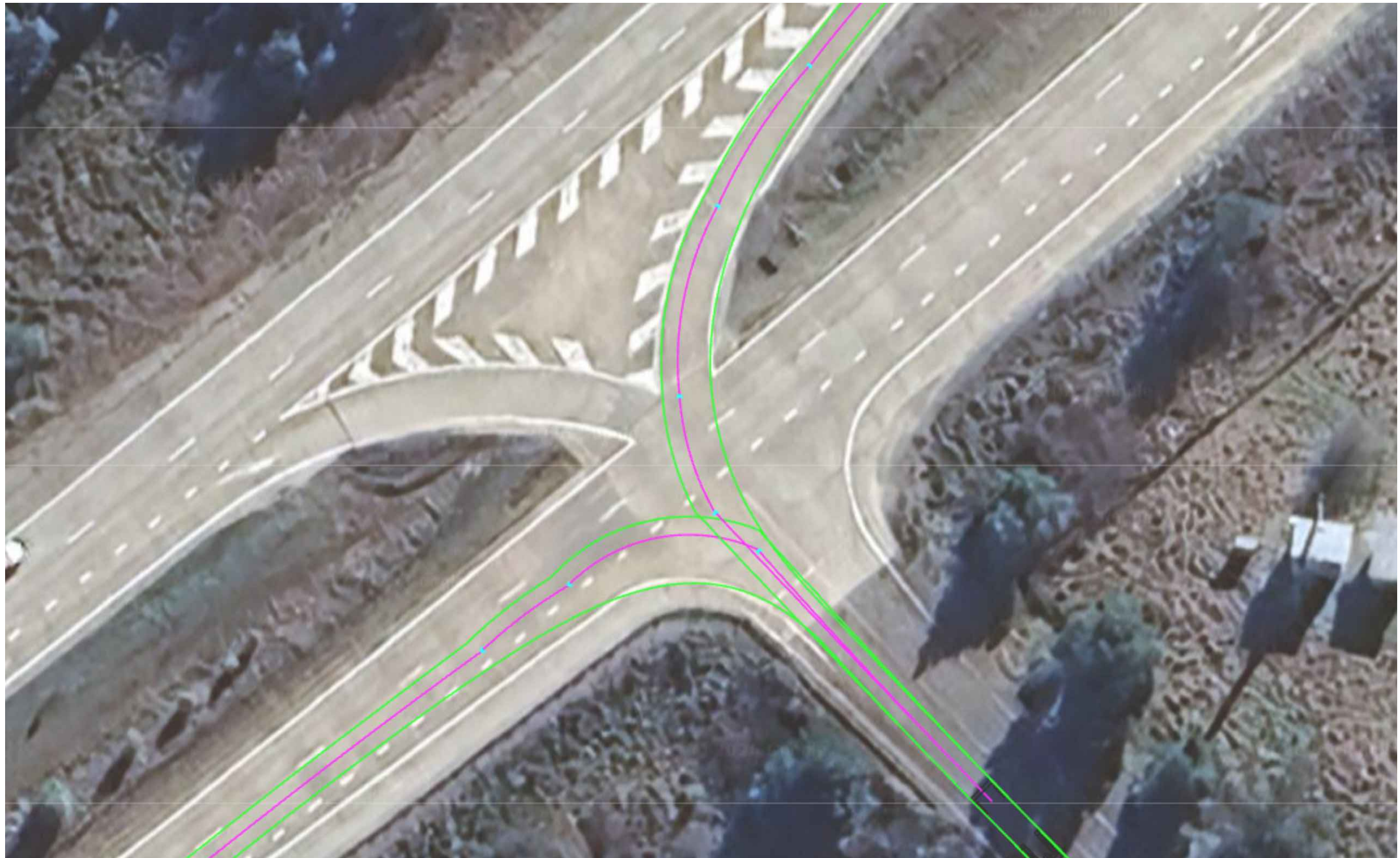
**PRELIMINARY ONLY
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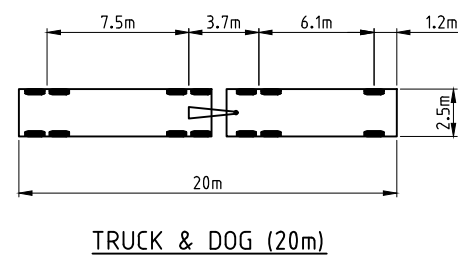
ENGINEER - DAVID PAVEY
B.E. (CIVIL)

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DESIGNED:	D.P.
DRAWN:	B.S.
APPROVED:	D.P.

PAVEY CONSULTING SERVICES			
TITLE BARINA QUARRY, COLLECTOR ROAD, COLLECTOR VEHICLE MANAGEMENT - TRUCK & DOG - TURN IN			
SCALE 1:200	SIZE A1	SKETCH No. SK2025-052-001	REVISION 0
			DATE 20-05-25



**PRELIMINARY ONLY
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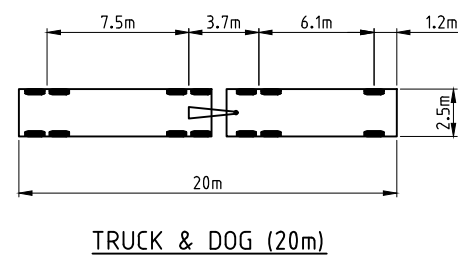
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DESIGNED:	D.P.
DRAWN:	B.S.
APPROVED:	D.P.

PAVEY CONSULTING SERVICES			
TITLE BARINA QUARRY, COLLECTOR ROAD, COLLECTOR VEHICLE MANAGEMENT - TRUCK & DOG - TURN OUT			
SCALE 1:200	SIZE A1	SKETCH No. SK2025-052-002	REVISION 0
		DATE 20-05-25	



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DESIGNED:	D.P.
DRAWN:	B.S.
APPROVED:	D.P.

PAVEY CONSULTING SERVICES				
TITLE BARINA QUARRY, COLLECTOR ROAD, COLLECTOR VEHICLE MANAGEMENT - TRUCK & DOG - QUARRY ROAD				
SCALE 1:200	SIZE A1	SKETCH No. SK2025-052-003	REVISION 0	DATE 20-05-25

Appendix 12 Risk Classification Matrix



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Risk Matrix

Barina Quarry

Contents

TABLES

TABLE A	QUALITATIVE CONSEQUENCE RATING.....	I
TABLE B	QUALITATIVE LIKELIHOOD RATING	II
TABLE C	RISK RATING MATRIX	II



JULY 2025

Risk is the chance of something happening that will have an impact upon the objectives of a task, which in this case is the development and operation of the proposed development without increasing the biosecurity risk posed to plants, animals and the community. Risk is measured in terms of consequence (severity) and likelihood (probability) of the event happening.

In accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004, environmental parameters that could be affected by the Proposal were identified. Risk sources, potentially affected receptors or environments and potential consequences were then discussed and determined. For each risk source, receptor and potential consequence, a specific potential impact was identified.

On identification of each potential environmental impact associated with the Proposal, a review of the Proposal design, the local environment and other factors was undertaken to identify the likely consequence and likelihood.

The allocation of a consequence rating was based on the definitions contained in **Table A**. It is noted that the assigned consequence rating represents the highest level applicable, i.e. if a potential impact is assigned a level of 4 - Major based on impact to environment and 2 - Minor based on area of impact, the consequence level assigned would be 4 - Major.

Table A Qualitative Consequence Rating

Level	Severity Level	Area of Consequence				
		Animal Health and Production	Plant Health and Production	Human Health & Safety	Economic	Environmental
1	Insignificant	No loss.	No loss.	No injuries.	No economic loss.	No impact.
2	Minor	Limited illness / injuries and / or deaths on single enterprise.	Limited damage / loss on single enterprise.	Minor injuries, no public health risk, short term well being impact.	Few businesses locally affected or single / few properties.	Minor / recoverable short-term isolated / localised impact.
3	Moderate	Some illness / injuries / deaths on multiple properties.	Some damage / loss on single property – multiple paddocks.	Limited public health risk and / or injuries requiring treatment.	Widespread industry impact, multiple industries / properties.	Moderate, medium term, medium spread environmental impact.
4	Major	Considerable illness / injuries / deaths on multiple properties.	Considerable damage / loss on multiple properties across a region.	Major public health risk and / or major injuries / well-being impact.	High economic / trade risk to region and / or state.	Serious, long term widespread environmental impact.
5	Severe	Significant illness / injuries / deaths on multiple regions.	Considerable damage / loss across multiple regions.	Significant public health risk and / or human deaths.	Major national economic implications.	Irreversible environmental impact.
Source: Modified after DPI (2014) – Task risk assessment template V2 – 20 Oct 08 (INT08/68291) (version date 4 November 2014)						

The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table B**.

Table B Qualitative Likelihood Rating

Level	Descriptor	Description
A	Almost Certain	May occur several times over short period or continuously.
B	Likely	May occur monthly to several times a year.
C	Possible	Might occur once in a period of one to three years.
D	Unlikely	Could occur over time (every five to ten years).
E	Rare	May occur in exceptional circumstances.
Source: Modified after DPI (2014) – Task risk assessment template V2 – 20 Oct 08 (INT08/68291) (version date 4 November 2014)		

The risk associated with each environmental impact was assessed without the inclusion of any operational controls or safeguards in place and is based on the qualitative assessment of consequence and likelihood, a risk ranking of: low, medium, high or very high was assigned to each potential impact based on the matrix presented in **Table C**.

Table C Risk Rating Matrix

		Consequences				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A	Almost Certain	M	M	H	X	X
B	Likely	L	M	H	H	X
C	Possible	L	L	M	H	H
D	Unlikely	N	L	M	M	H
E	Rare	N	N	L	M	H
Source: Modified after DPI (2014) – Task risk assessment template V2 – 20 Oct 08 (INT08/68291) (version date 4 November 2014)						

The five risk rankings are defined as follows.

Negligible (N): Acceptable risk.

Low (L): Ongoing monitoring. Manage by routine procedures, unlikely to need specific application of resources.

Medium (M): Active management. Manage by specific monitoring or response procedures, with management responsibility specified.

High (H): Intervention required. Urgent management attention needed, action plans and management responsibility specified.

Extreme (X): Urgent attention required. Immediate action needed, action plans and management responsibility specified.



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Appendix 13 Collector Road Pavement Assessment (2023)

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Traffic Impact Assessment – Barina Quarry

Proposal for Traffic Engineering Services

For Umwelt

31st October 2022

Indesco Reference: 9094

31 October 2022

Umwelt
Office 1, 3 Hampden Avenue
Orange NSW 2800

Attention: David McQueeney

Dear David,

BARINA QUARRY– TRAFFIC IMPACT ASSESSMENT FEE PROPOSAL

We refer to David McQueeney's phone call on the 16th of September 2022 requesting for a fee proposal for assistance in preparation of the Traffic Impact Assessment for the above project.

We understand that the quarry is located approximately 50 kilometres (km) north of Canberra and the subject expansion will increase the intensity of operations to a rate of up to 400,000 tonnes per annum (tpa). It is understood that Pit 1 is intended to convert to a Waste Management Facility (WMF), for building and construction (non-putrescible) waste.

The project location is shown in the figure below.



INDESCO

Indesco has been established as a professional services engineering consultancy for over thirty years. During this time, the company has worked on both private and public projects throughout Australia and Southeast Asia and has demonstrated extensive skills and experience in all areas in which it practices design. The company prides itself on the quality of its service delivery and has a proven record of delivering projects on time and within budget.

Indesco competently provides multidisciplinary services within the following fields:

- Estate Development;
- Project Management;
- Contract Documentation and Cost Management.
- Infrastructure Planning and Design;
- Structural Design;
- Façade Engineering;
- Traffic Engineering;
- Stormwater, Hydrological and Hydraulic Engineering;
- Water Sensitive Urban Design;
- Road, Intersection and Carpark Design;
- Contract Administration and Construction Surveillance; and
- Risk Management.

As a leading local consultant, Indesco believes that, if awarded this project, we will provide a comprehensive consultancy service to meet the scope of work specified.

TRAFFIC ENGINEERING WORKS – GENERAL SCOPE OF WORKS

Project Inception

An inception meeting will be held to discuss observations and for client background and critical considerations for the site. The meeting will serve to clarify project expectations and performance parameters. These clarifications will be captured within the Project Plan and program.

Existing Conditions

Details including the site's existing use, location, parking, access, haul routes and surrounding road network will be obtained, reviewed, and presented.

Historical crash data within the road network will be obtained from TfNSW Centre for Road Safety to identify any recurring crash types and existing safety deficiencies required to be addressed.

Site Visit

The project team will conduct a site visit and provide imagery documentation.

Traffic Survey

Upon the receipt of the Letter of Acceptance, our nominated subconsultant (Trans Traffic Survey) will be engaged to complete a traffic survey including traffic movement count for two intersections and tube counting for one location as figure below.



Traffic Modelling

The Traffic Engineer will develop a traffic model with SIDRA INTERSECTION 9 to identify and analyse the road performance issues before and after the development. Traffic Impact: Analysis of the traffic and parking impacts of the proposed development will be for the years 2022 (Year 0) and 2032 (year 10). For each scenario, two peak periods will be required:

- Weekday AM peak period; and
- Weekday PM peak period.

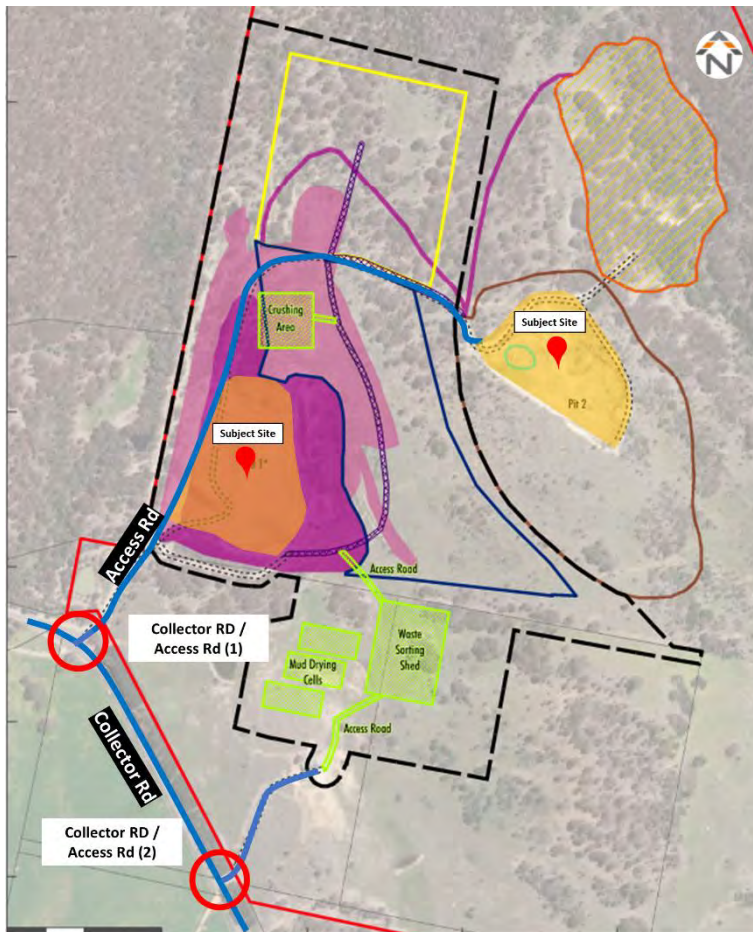
The traffic modelling will be based on the AUSTROADS Guide to Traffic Management Part 3: Transport Study and Analysis Methods including following steps:

- Traffic generation
- Trip distribution

Traffic Impact Assessment

Intersection modelling is proposed to be undertaken for the following intersections.

- Collector Road / Access Road (1) intersection.
- Collector Road / Access Road (2) intersection.
- Federal Highway / Collector Road intersection



Parking requirements: Determine parking numbers required by the RMS Guidelines as applicable.

Access and parking area design consideration: The Traffic Engineer will provide comment on the geometric design aspects of access to developments, as well as internal roads and parking areas within the subject development.

Swept Path Analysis

The assessment will include swept paths for B-double trucks in the Federal Highway / Collector Rd intersection.

The intersections layout will be provided by the client.

Report

The Draft Report will present the outcomes of the preliminary investigations and reviews. This includes modelling analysis and assessment, preliminary technical assessments on safety and traffic impacts, assumptions, and modelling results.

The final report will be provided as two individual report, one for each pit.

Following the presentation of the Draft Reports, comments will be addressed to advance the Report to a Final stage.

ALLOCATED PERSONNEL

A brief summary of the key roles of the nominated personnel is provided in the table below.

Nominated Candidate	Role
Michael Merange	Principal Civil Engineer
Behrouz Tavassoli	Senior Traffic Engineer
Mojdeh Hosseini	Traffic Engineer

PROGRAM

Our team is confident that the TIA is able to be delivered to a high quality within the 6 week timeframe allowed.

A breakdown of program by project milestone and deliverable is provided in the table below:

Item	Duration	Program Elapsed
Document Review, Traffic Survey, and site visit (if required)	2 Weeks	2 Weeks
Traffic Output Analysis and Draft TIA Report – Two Reports	2 Weeks	4 Weeks
Umwelt Review Period	1 Week	5 Weeks
Addressing Umwelt Comments and Finalise the Report	1 Week	6 Weeks

FEE FOR SERVICE

We propose to perform the Services for the Contract Price: **\$14,850.00** including GST.

Discipline	Stage	Total
Civil	Traffic Impact Assessment	\$11,720.00
	Traffic Survey	\$1,780.00
Total		\$13,500.00
GST		\$1,350.00
Total Fee including GST		\$14,850.00

FEE ASSUMPTIONS

The above fee:

- Response to public comments or attendance at public consultation can be provided at hourly rates; and
- Road Safety Audits, Traffic Management Plans or detailed design can be provided at hourly rates;

Should any of the above assumptions be incorrect we would appreciate the opportunity to discuss the proposed fee.

QUALITY ASSURANCE

Indesco is a third-party quality assured company, audited by DLCS international, and certified to Australian Standard AS/NZS ISO 9001:2015 for project management and consulting engineering services. Indesco also holds third party accreditation to AS/NZS ISO 45001:2018 for Occupational Health & Safety Management Systems. In addition, Indesco holds third party accreditation to AS/NZS ISO 14001:2015 for Environmental Management Systems.

INSURANCES

Indesco Pty Limited maintains insurances as shown in the table below. Copies of the insurance certificates can be provided upon request.

Policy	Details
Public and Products Liability Insurance	AON
Policy Number	1960973295LCP
Period of Insurance	30/06/2022 – 30/06/2023
Professional Indemnity Insurance	Arch Insurance
Policy Number	P0008348PI2022AU5
Period of Insurance	30/06/2022 to 30/06/2023

ATTACHMENTS

Please find the following attachments:

- Attachment A Our hourly charge out rates
- Attachment B Our terms and conditions of engagement
- Attachment C Fee Declaration Form

Yours faithfully,
Indesco Pty Limited.



Tavassoli

Behrouz Tavassoli
Senior Traffic Engineer

ATTACHMENT A

HOURLY CHARGE OUT RATES

ATTACHMENT B

TERMS & CONDITIONS OF ENGAGEMENT

ATTACHMENT C

FEE DECLARATION FORM

FEE DECLARATION FORM

To assist Indesco address tax invoices to the correct entity and forward to the person responsible for accounts we request that you complete and return the details below:

PROJECT DETAILS

Project Name:	Barina Quarry
Fee:	\$14,850.00 including GST
Indesco Project Number:	9094

CLIENT DETAILS:

Company:	
ACN:	ABN:
Contact:	
Phone:	Mobile:
Email:	

INVOICE DETAILS:

Company:	
ACN:	ABN:
Contact:	
Phone:	Mobile:
Email:	
Purchase Order No. (if applicable):	

CLIENT COMMENTS:

INSTRUCTION:

I/We instruct Indesco to undertake the work in accordance with the details outlined above. I/We agree to the above quoted fee along with any disbursements which may be necessary

Authorised signature:	
Print name:	
Date:	

