Appendix C – SUBMITTED EIS (AND ITS APPENDICES)

McNaught Earthworks Pty Ltd

ABN: 83 651 295 288

Environmental Impact Statement

for the

McNaught's Quarry

Prepared by:

RWCorkery&co

June 2024

ACKNOWLEDGEMENT

R.W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands in NSW and Australia on which our projects are located. We value the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.

McNaught Earthworks Pty Ltd
ABN: 83 651 295 288

Environmental Impact Statement

for the

McNaught's Quarry

Prepared for:	
McNaught Earthworks Pty Ltd ABN: 83 651 295 288 Telephone: 0418 766 691 Email: makk.mcnaughtearthworks@outlook.com	2019 Burrendong Way MULLION CREEK NSW 2800

Prepared by:	
R.W. Corkery & Co. Pty Limited Geological & Environmental Consultants ABN: 31 002 033 712 Telephone: (02) 9985 8511 Email: admin@rwcorkery.com Postal: PO Box 1796 CHATSWOOD NSW 2057	**Sydney | Orange | Townsville** **Sydney** Suite 12.01, 1-5 Railway Street CHATSWOOD NSW 2067 **Orange** 62 Hill Street ORANGE NSW 2800

Ref No. 1083/01 June 2024

This Copyright is included for the protection of this document

COPYRIGHT

© R.W. Corkery & Co. Pty Limited 2024
and
© McNaught Earthworks Pty Ltd 2024

All intellectual property and copyright reserved.

Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright Act, 1968, no part of this report may be reproduced, transmitted, stored in a retrieval system or adapted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without written permission. Enquiries should be addressed to R.W. Corkery & Co. Pty Limited.

Author's Certification

for the submission of an Environmental Impact Statement prepared in accordance with the *Environmental Planning and Assessment Act 1979*.

a) EIS prepared by:

name:	Mitchell Bland
qualifications:	BSc(Hons), MEconGeol, LLB(Hons)
address:	62 Hill Street ORANGE NSW 2800

b) Development application by:

applicant name:	McNaught Earthworks Pty Ltd
applicant address:	2019 Burrendong Way MULLION CREEK NSW 2800

c) Application Number: PAN-442538

d) Address/land details: Lot 2 DP1301356

Properties to be developed Land Description:

Lot Number	Deposited Plan
2	1301356

e) Project Outline: The proposal involves the development and operation of the McNaught's Quarry. Annual production would be a maximum of 150,000 tonnes per year with an average annual production of approximately 80,000 tonnes per year.

f) Assessment of Environmental Impact: The assessment of environmental impacts of this project includes the matters referred to in the Secretary's Environmental Assessment Requirements provided to the Applicant on 19 January 2024 under Part 8, Division 2 of the *Environmental Planning and Assessment Regulation 2021*.

g) Declaration: I, Mitchell Bland, hereby declare that I have overseen the preparation of the contents of this assessment and to the best of my knowledge:

i) this EIS has been prepared in accordance with the requirements of Part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021;*

ii) the document contains all available information that is relevant to the environmental assessment of the proposed development; and

iii) that the information contained in the document is neither false nor misleading.

Signature:

Name: Mitchell Bland Date: MBland

Contents

Page

EXECUTIVE SUMMARY ES-1

SECTION 1: INTRODUCTION..... 1-1

1.1 SCOPE 1-2

1.2 PROJECT SITE 1-4

1.3 THE APPLICANT 1-4

1.4 BACKGROUND TO THE PROPOSAL 1-4

1.5 PLANNING AND PERMISSIBILITY CONSIDERATIONS 1-4

1.5.1 State Planning Issues 1-4

1.5.2 Regional Planning Issues 1-11

1.5.3 Local Planning Issues 1-11

1.6 CONSULTATION 1-12

1.6.1 Community Consultation 1-12

1.6.2 Government Consultation 1-13

1.7 MANAGEMENT OF INVESTIGATIONS 1-13

SECTION 2: DESCRIPTION OF THE PROPOSAL..... 2-1

2.1 PROJECT SUMMARY 2-2

2.1.1 Objectives of the Proposal 2-2

2.1.2 Overview of the Proposal 2-2

2.2 APPROVALS REQUIRED 2-4

2.2.1 Development Consent 2-4

2.2.2 Consideration of Other Approvals, Licences or Permits 2-4

2.2.3 Activities for which Consent is Not Required 2-4

2.3 GEOLOGY AND RESOURCE REVIEW 2-5

2.3.1 Geology and Geological Properties 2-5

2.3.2 Quarry Reserve 2-5

2.4 SITE PREPARATION 2-5

2.5 EXTRACTION OPERATIONS 2-6

2.5.1 Layout of the Extraction Area 2-6

2.5.2 Extraction Operations 2-6

2.5.3 Extraction Equipment 2-9

2.5.4 Extraction Rate 2-9

2.6 TRANSPORTATION 2-9

2.6.1 Site Entrance 2-9

2.6.2 Site Access Road 2-11

2.6.3 Off-site Transport Operations 2-11

2.7 SIGNAGE, AMENITIES, SERVICES AND WASTE MANAGEMENT 2-12

2.7.1 Signage 2-12

2.7.2 Amenities and Storage 2-12

2.7.3 Services 2-12

2.7.4 Waste Management 2-13

2.8 HOURS OF OPERATION AND LIFE OF PROPOSAL 2-13

2.8.1 Hours of Operation 2-13

2.8.2 Life of the Project 2-13

2.9 EMPLOYMENT, ECONOMIC CONTRIBUTION AND CAPITAL COST 2-14

2.9.1 Employment 2-14

2.9.2 Economic Contribution 2-14

2.9.3 Estimated Development Cost 2-14

2.10 SITE DECOMMISSIONING AND REHABILITATION 2-14

2.10.1 Introduction 2-14

2.10.2 Rehabilitation and Final Land Use Objectives 2-15

2.10.3 Final Landform and Land Use 2-15

2.10.4 Rehabilitation Methods and Procedures 2-17

SECTION 3 ENVIRONMENTAL SETTING 3-1

3.1 TOPOGRAPHY 3-2

3.1.1 Regional Topography and Drainage 3-2

3.1.2 Local Topography and Drainage 3-2

3.1.3 Project Site Topography and Drainage 3-2

3.1.4 Constraints 3-2

3.2 METEOROLOGY 3-6

3.2.1 Introduction 3-6

3.2.2 Source of Data 3-6

3.2.3 Temperature 3-6

3.2.4 Rainfall 3-6

3.2.5 Wind 3-7

3.3 LAND OWNERSHIP AND LAND USE 3-7

3.3.1 Land Ownership and Surrounding Residences 3-7

3.3.2 Land Use 3-7

3.4 NOISE 3-11

3.4.1 Introduction 3-11

3.4.2 Local Setting 3-11

3.4.3 Proposed Changes to Noise Generating Activities 3-11

3.4.4 Constraints 3-11

3.5 BIODIVERSITY 3-12

3.5.1 Introduction 3-12

3.5.2 Survey Methodology 3-12

3.5.3 Local Setting 3-13

3.5.4 Constraints 3-15

Contents

Page

3.6 TRAFFIC 3-16
3.6.1 Introduction 3-16
3.6.2 Local Setting 3-16
3.6.3 Constraints 3-18
3.7 HERITAGE 3-19
3.7.1 Introduction 3-19
3.7.2 Heritage Study Area 3-19
3.7.3 Assessment Approach and Local Setting 3-19
3.7.4 Constraints 3-21
3.8 VISUAL AMENITY 3-22
3.8.1 Introduction 3-22
3.8.2 Local Setting 3-22
3.8.3 Constraints 3-22
3.9 WATER RESOURCES 3-24
3.9.1 Introduction 3-24
3.9.2 Local Setting 3-24
3.9.3 Constraints 3-25
3.10 AIR QUALITY 3-26
3.10.1 Introduction 3-26
3.10.2 Local Setting 3-26
3.10.3 Proposed Changes to Air Quality 3-26
3.10.4 Constraints 3-26
3.11 SOILS AND LAND CAPABILITY 3-27
3.11.1 Introduction 3-27
3.11.2 Local Setting 3-27
3.11.3 Constraints 3-27
3.12 SOCIO-ECONOMIC PROFILE 3-29
3.12.1 Introduction 3-29
3.12.2 Community Profile 3-29
3.12.3 Socio-economic Adverse and Beneficial Impacts Provided by the Proposal 3-35
3.12.4 Constraints 3-36

SECTION 4 ENVIRONMENTAL FEATURES, SAFEGUARDS AND IMPACTS 4-1

4.1 NOISE AND BLASTING 4-2
4.1.1 Introduction 4-2
4.1.2 Assessment Methodology 4-2
4.1.3 Assessment Criteria 4-8
4.1.4 Management and Mitigation Measures 4-10
4.1.5 Assessment of Impacts 4-11
4.2 BIODIVERSITY 4-13
4.2.1 Introduction 4-13
4.2.2 Management and Mitigation Measures 4-13
4.2.3 Assessment of Impacts 4-14

Page

4.3 TRAFFIC 4-16
4.3.1 Introduction 4-16
4.3.2 Road Network Efficiency and Intersection Assessment 4-16
4.3.3 Management and Mitigation Measures 4-16
4.3.4 Assessment of Impacts 4-17
4.4 HERITAGE 4-18
4.4.1 Introduction 4-18
4.4.2 Management and Mitigation Measures 4-18
4.4.3 Assessment of Impacts 4-18
4.5 VISUAL AMENITY 4-19
4.5.1 Introduction 4-19
4.5.2 Management and Mitigation Measures 4-19
4.5.3 Assessment of Impacts 4-19
4.6 WATER RESOURCES 4-26
4.6.1 Introduction 4-26
4.6.2 Management and Mitigation Measures 4-26
4.6.3 Assessment of Impacts 4-27
4.7 AIR QUALITY 4-28
4.7.1 Introduction 4-28
4.7.2 Management and Mitigation Measures 4-28
4.7.3 Assessment of Impacts 4-28
4.8 SOILS AND LAND CAPABILITY 4-29
4.8.1 Introduction 4-29
4.8.2 Management and Mitigation Measures 4-29
4.8.3 Assessment of Impacts 4-29
4.9 HAZARDS 4-30
4.9.1 Electricity Lines 4-30
4.9.2 Bushfire 4-30
4.9.3 Hazardous or Dangerous Goods 4-30
4.9.4 Waste 4-31
4.10 SOCIO-ECONOMIC IMPACTS 4-32
4.10.1 Introduction 4-32
4.10.2 Management and Mitigation Measures 4-32
4.10.3 Assessment of Impacts 4-32

SECTION 5 EVALUATION AND JUSTIFICATION OF THE PROPOSAL 5-1

5.1 ECOLOGICALLY SUSTAINABLE DEVELOPMENT 5-2
5.1.1 Introduction 5-2
5.1.2 The Precautionary Principle 5-2

Contents

Page

5.1.3 Social Equity 5-3
5.1.4 Conservation of Biological Diversity and Ecological Integrity 5-3
5.1.5 Improved Valuation, Pricing and Incentive Mechanisms 5-3
5.1.6 Conclusion 5-4
5.2 JUSTIFICATION OF THE PROPOSAL 5-4
5.2.1 Introduction 5-4
5.2.2 Biophysical Considerations 5-4
5.2.3 Socio-economic Considerations 5-7
5.2.4 Planning Considerations 5-7
5.2.5 Section 79C Considerations 5-8
5.2.6 Consequences of Not Proceeding with the Proposal 5-9

SECTION 6: REFERENCES 6-1

SECTION 7: GLOSSARY OF TECHNICAL TERMS, ACRONYMS, SYMBOLS AND UNITS 7-1

APPENDICES

Appendix 1 Coverage of Secretary's Environmental Assessment Requirements and Government Agency Assessment Requirements for Consideration in the EIS
Appendix 2 Noise Assessment
Appendix 3 Biodiversity Assessment Report
Appendix 4 Road Transport Assessment
Appendix 5 Canowindra Road Quarry Access Intersection Design
Appendix 6 Aboriginal Due Diligence Assessment Report

FIGURES

Page

Figure 1.1 Locality Plan and Local Setting 1-3
Figure 1.2 Project Site and Land Zoning 1-5
Figure 2.1 Proposed Project Site Layout 2-3
Figure 2.2 Proposed Extraction Area and Sections 2-7
Figure 2.3 Preliminary Intersection Design 2-10
Figure 2.4 Proposed Final Landform 2-16
Figure 3.1 Regional Topography and Drainage 3-3
Figure 3.2 Local Topography, Drainage and Groundwater Bores 3-4
Figure 3.3 Project Site Topography and Drainage 3-5
Figure 3.4 Wind Roses 3-8
Figure 3.5 Land Ownership and Residences 3-9
Figure 3.6 Surrounding Land Uses 3-10
Figure 3.7 Vegetation Communities and Threatened Species 3-14
Figure 3.8 Proposed Site Access and Transportation Route 3-17
Figure 3.9 Heritage Study Area 3-20
Figure 3.10 Visual Transect – R3 3-23
Figure 3.11 Landscapes and Land Capability 3-28
Figure 3.12 Census Collection Areas 3-30
Figure 4.1 Noise Modelling Scenario – Year 1 Operational 4-4
Figure 4.2 Noise Modelling Scenario – Year 5 Operational 4-5
Figure 4.3 Noise Modelling Scenario – Year 10 Operational 4-6
Figure 4.4 Noise Modelling Scenario – Year 20 Operational 4-7
Figure 4.5 Photomontage – Residence R3 4-21
Figure 4.6 Photomontage – Road Side 4-22
Figure 4.7 Visual Transect – Residence R3 4-23
Figure 4.8 Visual Transect – Road Side 4-24
Figure 4.9 Visibility Catchments 4-25

TABLES

Table 1.1 Mandatory Matters for Consideration under the EP&A Act 1-6
Table 1.2 Application of the Resources and Energy SEPP 1-8
Table 1.3 Application of the Resources and Energy SEPP 1-9
Table 1.4 Cabonne Council Requirements 1-13
Table 2.1 Proposed Heavy Vehicle Traffic Levels 2-11
Table 2.2 Proposed Hours of Operation 2-13
Table 3.1 Meteorological Data 3-6

Contents

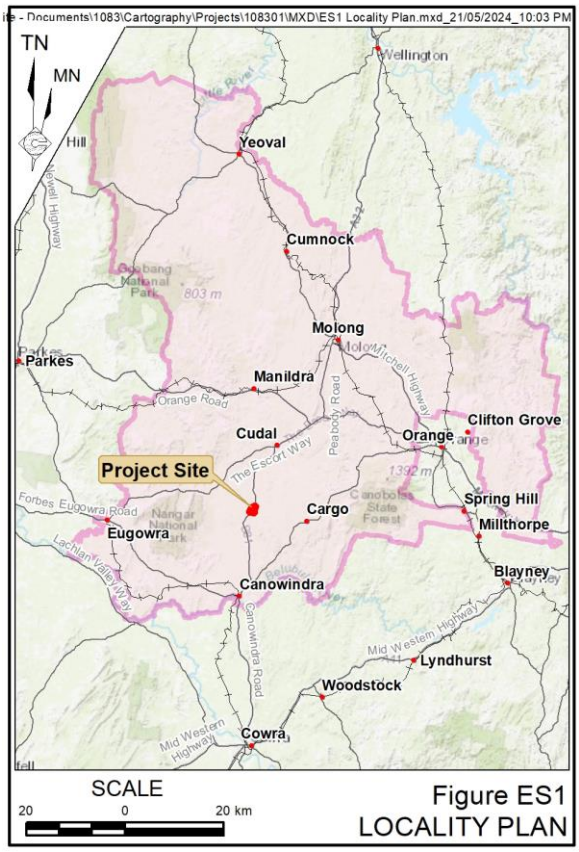
Page Page

Table 3.2 Surveyed Traffic Volumes on Canowindra Road 3-16
Table 3.3 Surveyed Traffic Composition on Canowindra Road 3-18
Table 3.4 Surveyed Vehicle Speeds on Canowindra Road 3-18
Table 3.5 Due Diligence Process Summary 3-19
Table 3.6 Surrounding Registered Bores 3-24
Table 3.7 2016 and 2021 Census Population Statistics 3-31
Table 3.8 2021 Census Age Statistics 3-31
Table 3.9 2021 Census Employment Statistics 3-32
Table 3.10 2021 Census Industry of Employment Statistics 3-33
Table 3.11 2021 Census Income Statistics 3-34
Table 3.12 2021 Census Cost of Housing and Household Size Statistics 3-34
Table 3.13 2021 Census Post School Level of Education 3-35
Table 4.1 Modelled Sound Power Levels 4-3
Table 4.2 Operational Noise Criteria 4-9
Table 4.3 Construction Noise Management Levels 4-9
Table 4.4 Predicted Construction Noise Levels 4-11
Table 4.5 Predicted Operational Noise Levels 4-11
Table 4.6 Operational Road Traffic Noise Levels 4-12
Table 4.7 Predicted Decommissioning Noise Levels 4-12
Table 4.8 Predicted Blast Emissions 4-12

Executive Summary

Introduction

This Environmental Impact Statement (EIS) has been prepared by R.W. Corkery & Co. Pty Limited (RWC) on behalf of McNaught Earthworks Pty Ltd (the Applicant), to support a development application for the McNaught's Quarry (the Proposal), located approximately 13km southwest of Cudal, NSW on the Canowindra Road (**Figure ES1**).



The Proposal would comprise:

- extraction of up to 960,000m^3 or approximately 2.3 million tonnes (Mt) of material at an average rate of 80,000 tonnes per annum (tpa) and a maximum rate of 150,0000tpa for a period of approximately 30 years;
- crushing, screening and stockpiling of the extracted material as required;
- transportation of the extracted material from the Project Site; and
- construction of site infrastructure (site ablutions, office, etc.).

The Proposal is classified as:

- Designated Development under Section 26 of Schedule 3 of the *Environmental Planning & Assessment Regulation 2021* (EP&A Reg), as it would exceed the 2ha disturbance and 30,000bcm/78,000tpa extraction criteria; and,
- Regionally Significant Development under Section 7 of Schedule 6 of the *State Environmental Planning Policy (Planning Systems) 2021*, as the Proposal is an extractive industry that is classified as a Designated Development.

As a result, the determining authority for the Proposal will be the Western Regional Planning Panel (WRPP).

In addition, the Proposal is also classified as Integrated Development under Section 4.46 of the EP&A Act. as, the Applicant also anticipates that the following additional approvals will be required in addition to development consent.

- An Environmental Protection Licence under the *Protection of the Environment Operations Act 1997.*
- A Section 138 Permit under the *Roads Act 1993.*

The Applicant

The Applicant, McNaught Earthworks Ltd Pty, is a privately-owned family company established in 2021 and based in Mullion Creek, NSW. The Applicant currently provides a range of civil construction and earthworks services, including, excavation and leveling, trenching and irrigation, road construction and maintenance, dam construction and cleaning, and tree and paddock clearing.

The directors and management of McNaught Earthworks Ltd Pty include Mr Makk McNaught and Mr Paul McNaught who have operated the Company since 2021.

Objectives of the Proposal

The Applicants principal objectives for the Proposal are as follows:

- To provide an ongoing source of high-quality gravel for a variety of construction and earthworks products including road construction and maintenance and select fill.
- To minimise, to the maximum extent practicable, the impact on the local environment and community, and other stakeholders.
- To provide for a final landform amenable to future use for agricultural activities.
- To ensure the operation of the Quarry in a safe, reliable and cost-effective manner, contributing to the local economy of the Cabonne LGA.

Description of the Proposal

Overview

The Proposal would comprise the following activities (**Figure ES2**).

- Extraction of 960,000m^3 or approximately 2.3Mt of material at an average rate of 80,000tpa and a maximum rate of 150,0000tpa for a period of 30 years on a campaign basis.
- Crushing, screening, and stockpiling of extracted material within the proposed Extraction Area or Stockpile Area.
- Loading and transportation of stockpiled material from the Project Site via Canowindra Road.
- Construction of a Site Access Road, including a suitable intersection with Canowindra Road.
- Installation of demountable lunch, ablutions and storage facilities.
- Rehabilitation of the Project Site to achieve a final land use of agricultural grazing and native ecosystem areas.

Site Preparation

The Applicant would commence the following site establishment and construction activities following receipt of development consent and other necessary approvals and licences.

- Survey and mark out of all areas of approved disturbance.
- Establish the site access road and site access intersection upgrades.
- Establish tree/vegetated screens on the northwest boundary of the Stockpile Area and Access Road and southwestern boundary of the Extraction Area as soon as practicable.

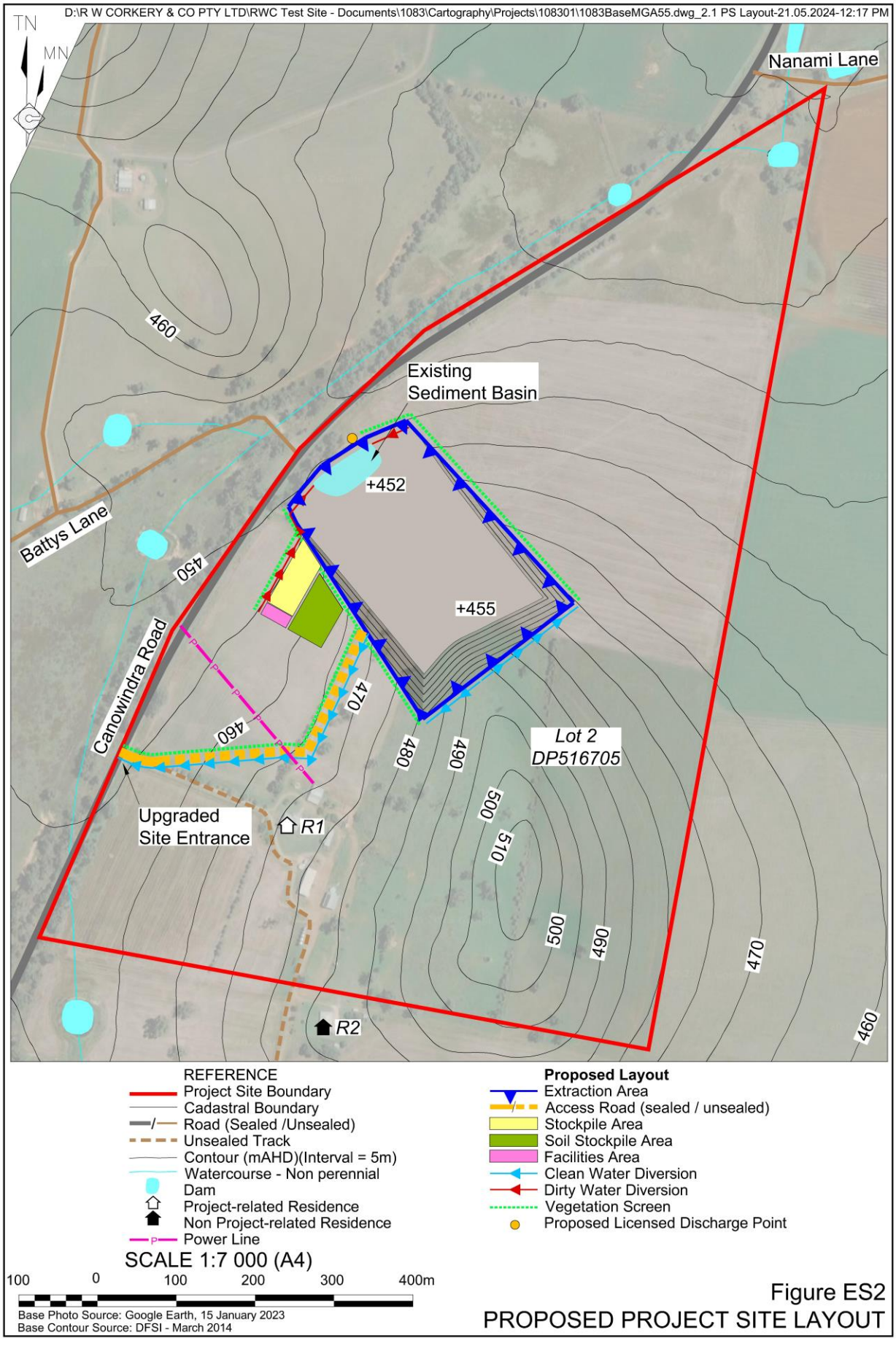


Figure ES2
PROPOSED PROJECT SITE LAYOUT

- Establish surface water controls comprising clean and dirty water diversions, and sediment basins.
- Removal of vegetation would be avoided where possible within the initial Extraction Area or would be removed using a chainsaw or bulldozer.
- Removal of topsoil and growth medium using a bulldozer.

Extraction Operations

The proposed Extraction Area would have a generally flat floor, sloping slightly toward the north and would drain toward the sediment basins to the north of the Extraction Area. The Extraction Area would extend no further than 452m AHD and would incorporate a perimeter bund on the highwalls and maximum slopes of approx. 60º from the horizontal.

Extraction would be undertaken using a bulldozer or excavator to rip and push the gravel material into stockpiles. More competent material would be blasted as required. All blasting operations would be supervised by a suitably qualified and experienced blasting engineer or shot firer.

Blasting is expected to be required infrequently only when material that is too competent to be ripped is encountered.

Extraction and transportation operations would be undertaken on a campaign basis and would not exceed 150,000tpa, with the annual average extraction level expected to be approximately 80,000tpa.

Processing and Stockpiling Operations

Extracted material would either be loaded directly onto road-registered trucks or processed using a mobile crushing plant. Produced materials not immediately transported from the Project Site would be stockpiled either within the Extraction Area or the Stockpile Area.

Processing and stockpiling operations would initially be undertaken outside the active extraction area, but within the footprint of the proposed Extraction Area.

Once a sufficiently large area has been established for the operation of the processing plant and stockpiling of materials within the active extraction area, all extraction, processing and stockpiling operations would be undertaken within that area.

Transportation Operations

The Applicant would construct a standard BAL/BAR intersection at the site entrance, and a Site Access Road to permit access for heavy vehicles from the Canowindra Road to the Project Site.

Material would be transported from the Project Site using truck and dogs trucks, up to a maximum of 44 laden trucks per day. All product would be transported via Canowindra Road either to the southwest towards Canowindra or to the northeast towards Cudal.

Hours of Operation

The Applicant would undertake all on-site activities between 7:00am and 6:00pm, Monday to Friday, and between 8:00am and 1:00pm on Saturday.

Life of the Project

The Proposal would have a life of approximately 30 years.

Employment and Economic Contribution

The Proposal would require two to three employees to manage the extraction, processing and product dispatch operations during each campaign. Additional contract truck drivers would be engaged by the Applicant or its customers.

The Applicant anticipates that the Proposal would directly contribute approximately $455,000pa to the local and regional economy. Indirect contributions would include wages for contract drivers, and fees paid to locally based suppliers.

Rehabilitation and Final Landform

The proposed final landform would include the following.

- A free draining, Extraction Area with a largely flay floor very gently sloping toward the sediment basins located in the northwest section of the Extraction Area.
- A vegetated landform consisting of trees on the benches and terminal faces and grasses or shrubs on the floor of the Extraction Area.
- A retained Site Entrance and Site Access Road suitable for agricultural use.

The final land use would be consistent with the existing land use, namely agricultural uses and native ecosystems, principally used for intermittent grazing.

Planning Context

Planning Instruments

The Project Site is situated on land zoned Zone RU1 – Primary Production under the *Cabonne Local Environment Plan 2012* (Cabonne LEP). Extractive industries are identified as permissible with consent within this zone.

The Proposal would be developed and operated in accordance with a number of State planning instruments and regional strategies, namely:

- *State Environmental Planning Policy (Resources and Energy) 2021;*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021;*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021;*
- *State Environmental Planning Policy (Resilience and Hazards) 2021;*
- *State Environmental Planning Policy (Planning Systems) 2021and,*
- *Sub-Regional Rural and Industrial Land Use Strategy* (applying to the Blayney, Cabonne and Orange LGAs).

The Environmental Impact Statement addresses each of the above documents, and also addresses the following local planning documents:

- Cabonne Local Environment Plan 2012.
- Cabonne Community Strategic Plan 2022-2032
- Development Control Plan No. 5 – General Rural Zones

Approvals Required

In addition to development consent, the Applicant anticipates the following approvals, licences and leases would be required.

- An Environmental Protection Licence under the Protection of the Environment Operations Act 1997.
- A Section 138 Permit under the Roads Act 1993.

Environmental Features Safeguards And Impacts

The components and features of the existing environment within and surrounding the Project Site have been studied in detail and the Proposal designed to avoid or minimise impacts on that environment.

A brief overview of the main components of the surrounding environment, the proposed safeguards and the assessed level of impact are set out in the following sections.

Noise

Proposal-related noise impacts would include the following.

- Operational, blasting, and road transport noise levels are not anticipated to exceed the relevant criteria at any residence.
- Noise emissions would be limited to the daytime only.

As a result, there would be no significant noise-related adverse impacts as a result of the Proposal.

Biodiversity

OzArk (2024a) completed a Biodiversity Assessment Report (BAR) for the impacts of the Proposal. The BAR determined that the following vegetation communities would be disturbed.

- 0.054ha of PCT 53
- 0.218ha of PCT 266[1]
- 0.078ha of PCT 277[1]
- 2 habitat trees within PCT266 containing 3 small hollows.
- Previously disturbed land/non-native vegetation totalling 9.191ha.
- 0.01ha of the Box Gum CEEC occurs in the Canowindra Road corridor that will be disturbed for the site entrance upgrade. Previously, Cabonne Council has trimmed mature vegetation and no further vegetation clearing is required in this area.

OzArk (2024a) determined that the Proposal was considered unlikely to have a significant impact on biodiversity, including on predicted populations of threatened species and threatened ecological communities.. OzArk (2024a) also identified that no biodiversity offset would be required.

Traffic

The Transport Planning Partnership (TTPP) conducted a transport and traffic assessment of the Proposal and determined;

- the Proposal would not result in a reduction in the existing level of service on Canowindra Road; and
- the Applicant should construct the required BAL/BAR intersection between the Site Access Road and Canowindra Road prior to commencement of operations.

In light of these findings, there would be no significant traffic-related impacts as a result of the Proposal.

[1] PCT 266 and 277 are associated with the Critically Endangered Ecological White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland, in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions Community (Box Gum CEEC) listed under the BC Act.

Heritage

OzArk (2024b) completed an Aboriginal Heritage Due Diligence Assessment for the Proposal. No objects of Aboriginal Heritage were identified and no objects were considered likely to occur within the Project Site, thus, the Proposal is unlikely to have a significant heritage-related impact.

Visual Amenity

The Applicant contends that the Proposal would not adversely impact on visual amenity surrounding the Project Site for the following reasons.

- All active extraction, processing, stockpiling, and loading operations would be undertaken within either the Extraction Area or Stockpiling Area which are located at a higher elevation than most of the surrounding lands, limiting the potential for site activities to be visible.
- The proposed perimeter vegetation screens would provide a long term screen that would prevent visual impact to surrounding lands.
- The proposed bund during the initial stages of extraction, would act as a visual screen from surrounding lands until the Extraction Area is more fully developed and would provide additional shielding.
- The Applicant would manage dust emissions to ensure dust does not impact on the visual amenity of the surrounding area.
- There would be no night-time operations, thus no nighttime visual amenity would be impacted.

Water Resources

The Applicant would not permit sediment laden water to be discharged from the Project Site. In addition, the Extraction Area would not intersect groundwater. As a result, the Proposal would not result in significant surface water or groundwater impacts.

Air Quality

Particulate emissions generated by the Proposal would not result in significant air quality-related impacts at any privately-owned residence.

Other Impacts

Bushfire, soil and land capability and agricultural impacts associated with the Proposal would be negligible.

Socio-Economic Impacts

Potential beneficial impacts relating to socio-economic issues are as follows.

- Direct establishment of employment for between 2 and 3 persons, with additional employment for contract transportation personnel.
- Ongoing contributions to the local, regional, State and National economies, including contributions of approximately $455,000pa through wages and salaries and purchase of goods and services respectively, with additional indirect contributions.
- Continued support for local community organisations and services.
- Finally, the Proposal would also produce a product that would benefit the local and surrounding community through the supply of a cost effective, high quality road base for the maintenance and construction of the local road network.

Adverse socio-economic impacts are likely to be negligible.

Assessment of the potential socio-economic impacts demonstrates the beneficial impacts of the Proposal far outweigh any minor adverse impacts associated with the operations.

Proposal Evaluation And Justification

The Proposal has been evaluated and justified principally through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

An evaluation of the Proposal has been undertaken by firstly re-assessing the risks posed to the local environment by Proposal-related activities following the implementation of all operational controls, safeguards and/or mitigation measures, and secondly through consideration of the principles of ecologically sustainable development. This evaluation has found that, with the implementation of the proposed operational controls, safeguards and/or mitigation measures, the residual risk posed by each potential environmental impact has been reduced to either moderate, low, or as low as reasonably practicable, and therefore acceptable.

Further, the design of the Proposal has addressed each of the sustainable development principles, and on balance, it is concluded that the Proposal achieves a sustainable outcome for the local and wider environment.

The Proposal and associated activities have been assessed in terms of a wide range of biophysical, social, and economic issues. Potential residual impacts can be justified in terms of the positive economic and social benefits to the local surrounding towns, villages and regional centres and the Cabonne and surrounding LGAs.

Conclusion

The Proposal has been, to the extent feasible, designed to address all issues raised by the local community and all levels of government, as well as the principles of ecologically sustainable development.

The Proposal provides for the quarrying and transportation of gravel products which would enable the maintenance and construction of roads within the Cabonne and surrounding LGAs. The Proposal would also result in the creation of local employment and expenditure within the regional economy. The socio-economic impacts of the Proposal are considered to be positive.

Finally, the post-quarrying landform would integrate the re-establishment of vegetation conducive to a land use consistent with the current land use, namely grazing and native ecosystem areas.

In light of the conclusions included throughout the Environmental Impact Statement, it is assessed that the Proposal could be constructed and operated in a manner that would satisfy all relevant statutory goals and criteria, environmental objectives and reasonable community expectations.

Section 1

Introduction

PREAMBLE

This section introduces the proposed McNaught's Quarry (the Proposal) and includes:

- *an outline of the scope and format of the document;*
- *a description of the Project Site:*
- *an introduction to the Applicant;*
- *relevant background information about the Proposal;*
- *an overview of relevant planning and permissibility considerations;*
- *a summary of consultation with the community, Cabonne Council and relevant government agencies;*
- *the personnel involved in the design of the Proposal, document preparation and specialist consultant investigations and assessments.*

1.1 Scope

This *Environmental Impact Statement* (EIS) has been prepared by R.W. Corkery & Co. Pty Limited (RWC) on behalf of McNaught Earthworks Pty Limited (the Applicant). This document has been prepared to accompany a development application for the development of the McNaught's Quarry (the Proposal). All activities associated with the Proposal would be undertaken within Lot 2, DP1301356 (the Project Site), located approximately 13km southwest of Cudal, NSW and approximately 18km northeast of Canowindra, NSW on the Canowindra Road (**Figure 1.1)**.

The Proposal would comprise:

- extraction of up to 960,000m^3 or approximately 2.3 million tonnes (Mt) of material at an average rate of 80,000 tonnes per annum (tpa) and a maximum rate of 150,0000tpa for a period of approximately 30 years;
- crushing, screening and stockpiling of the extracted material as required;
- transportation of the extracted material from the Project Site via an upgraded site entrance on Canowindra Road; and
- construction of site infrastructure (site ablutions, office, etc.).

The Proposal is classified as a Designated Development as it would exceed the 2ha disturbance and 30,000bcm/78,000tpa extraction criteria identified by Section 26 of Schedule 3 of the *Environmental Planning & Assessment Regulation 2021* (EP&A Reg). As a result, this EIS has been prepared to support the application for development consent.

As the Proposal is an extractive industry that is classified as a Designated Development, the Proposal is also be classified as Regionally Significant Development under Section 7 of Schedule 6 of the *State Environmental Planning Policy (Planning Systems) 2021*. As a result, Cabonne Shire Council is to accept, exhibit and assess the application and the determining authority will be the Western Regional Planning Panel (WRPP).

In addition to development consent, the following additional approvals will also be required.

- An Environmental Protection Licence under the *Protection of the Environment Operations Act 1997*.
- A Section 138 Permit under the *Roads Act 1993*.

As a result, the Proposal is also classified as Integrated Development under Section 4.46 of the EP&A Act.

This EIS outlines the Proposal, its resources, describes the existing environment within and surrounding the Project Site and assesses the environmental impacts of the Proposal after a range of design and operation environmental safeguards are adopted.

Assessment requirements for the Proposal were sought from the Department of Planning, Housing and Infrastructure (DPHI) and provided on 19 March 2024 under Secretary's Environmental Assessment Requirements Number (EAR) 1862. **Appendix 1** presents the matters required to be addressed and reference to the relevant section of the EIS.

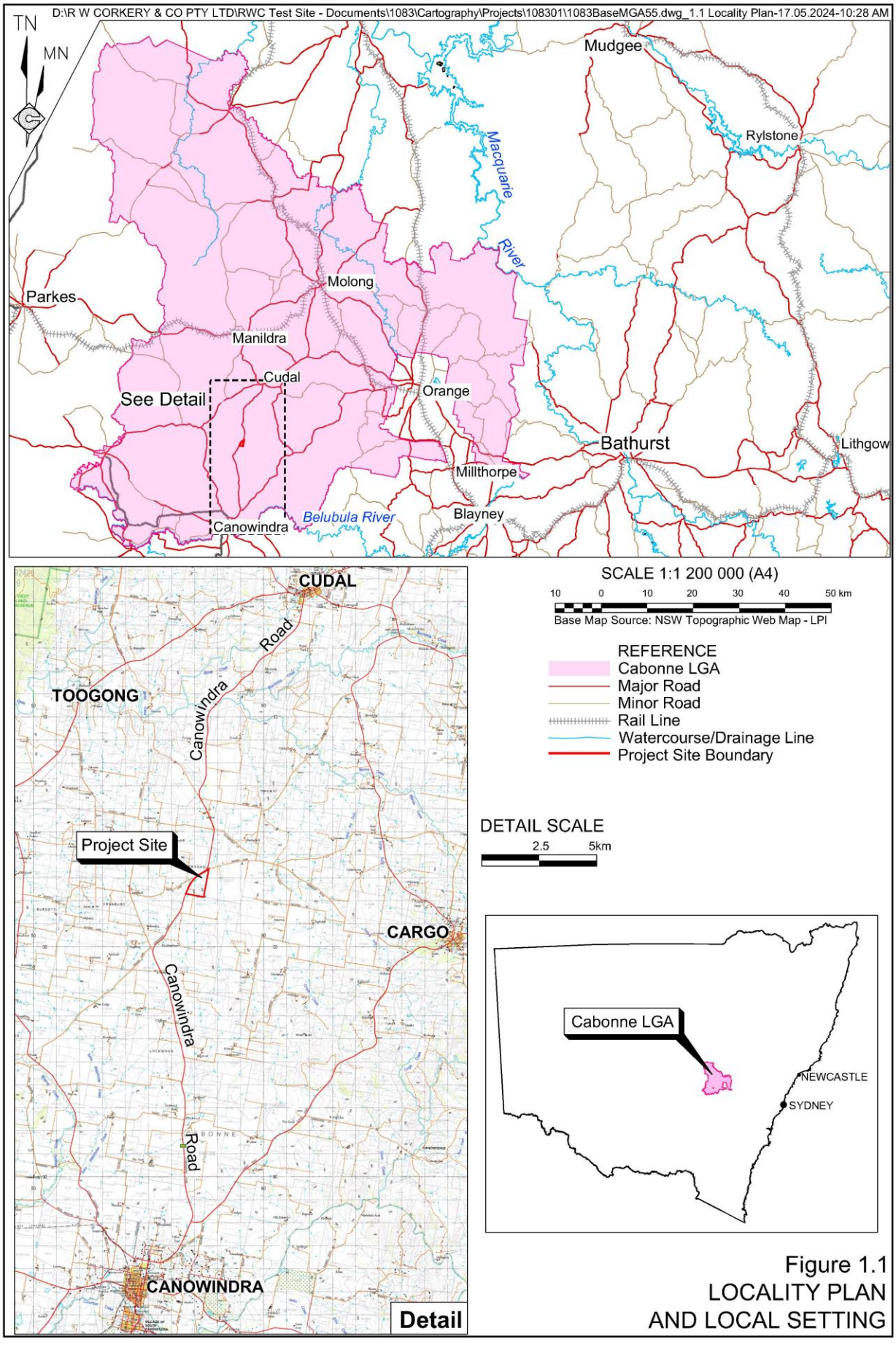


Figure 1.1
LOCALITY PLAN
AND LOCAL SETTING

1.2 Project Site

The Project Site is located on land within Lot 2, DP1301356 (**Figure 1.2**). The Project Site is owned by McNaught Family Capital, a party related to the Applicant. Works for the upgraded Site Entrance would also be undertaken with the road reserve for Canowindra Road.

1.3 The Applicant

The Applicant, McNaught Earthworks Ltd Pty, is a privately-owned family company established in 2021 and based in Mullion Creek, NSW. The Applicant currently provides a range of civil construction and earthworks services, including, excavation and leveling, trenching and irrigation, road construction and maintenance, dam construction and cleaning, and tree and paddock clearing.

The directors and management of McNaught Earthworks Ltd Pty include Mr Makk McNaught and Mr Paul McNaught who have operated the Company since 2021.

1.4 Background to the Proposal

Quarrying operations have existed within the Project Site between the 1930's and 2000's, with Cabonne Shire Council extracting gravel between 1964 and 1995 and private operators between 1985 and 2006. Consent for the previous quarrying operation has ceased to have effect.

More recently, previous landholder engaged the Applicant to extract a limited quantity of material for use on the landholder's own land. This activity was undertaken as an ancillary activity related to the landholder's agricultural operations.

Based on this work and additional drilling undertaken in 2023 (see Section 2.3.2), the Applicant has identified a viable gravel resource located within the Project Site. The gravel resource has been tested by K & H Geotechnical Services Pty Ltd, with the material identified as suitable for road construction and other construction based products. Based on discussions with a range of potential customers, it is anticipated that a suitable market for the gravel material within the Project Site exists within and surrounding the Cabonne Local Government Area. The Proposal would provide local, high-quality materials for use in road construction and maintenance projects within and surrounding the Cabonne Local Government Area and for the Applicant's earthworks business.

1.5 Planning and Permissibility Considerations

1.5.1 State Planning Issues

1.5.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act provides the framework for the assessment and approval of development in NSW and is administered by the Department of Planning, Housing and Infrastructure (DPHI). The application for the Proposal is made under Division 4.2 of the EP&A Act. Permissibility of the Proposal is addressed in Section 1.5.3.1.

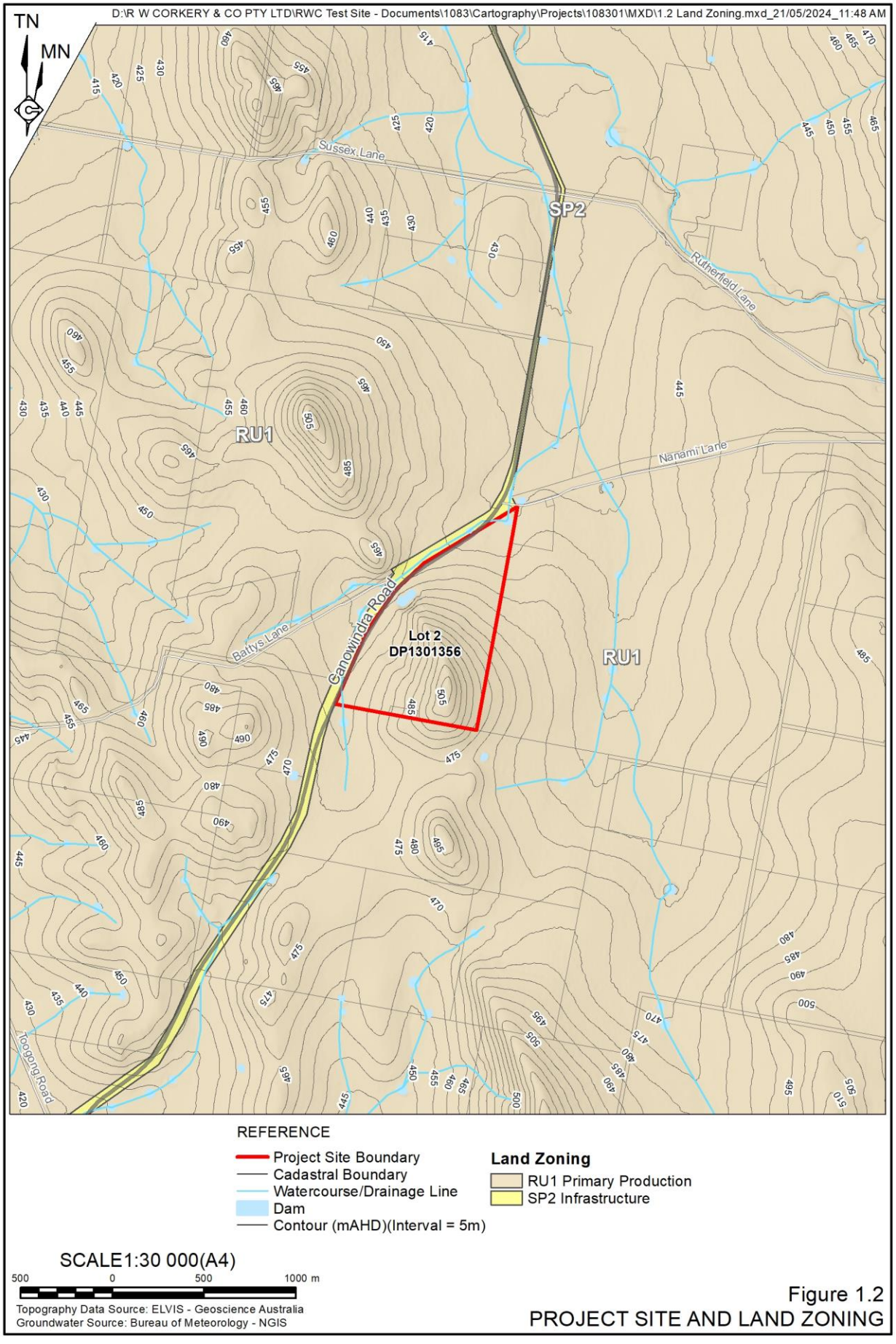


Figure 1.2
PROJECT SITE AND LAND ZONING

Table 1.1 provides a summary of the matters that the consent authority must consider when assessing a new or modified proposal, and where these have been addressed in this document.

Table 1.1
Mandatory Matters for Consideration under the EP&A Act

Statutory Reference	Pre-condition	Relevance	Report Section
Section 1.3	Relevant objects of the Act: • to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The Proposal would promote the social and economic welfare of the community by facilitating the provision of high-quality extractive materials for the maintenance of public infrastructure. These benefits would be achieved without additional adverse significant social or environmental impacts.	5
	• to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	The Proposal does not impact the biodiversity of the Project Site and would not result in result in significant adverse environmental outcomes.	5.1
	• to promote the orderly and economic use and development of land,	The Proposal would be undertaken in an orderly way to maximise the economic benefit to the community and State while minimising other adverse outcomes.	5.1
	• to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The Proposal would not result in significant adverse environmental outcomes. Section 4 presents a detailed analysis of the key environmental aspects that may be affected by the Proposal.	4
	• to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	Nil. No heritage items have been identified within the Project Site.	NA
	• to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	This is a matter for Council.	Not Applicable
	• to provide increased opportunity for community participation in environmental planning and assessment.	This is a matter for Council.	Not Applicable
Section 4.15(1)	• Relevant environmental planning instruments.	See Section 1.5.3	1.5.3
	• Proposed planning instrument	Nil. No additional planning instruments are proposed.	Not Applicable
	• Development Control Plan	See Section 1.5.3.3	1.5.3.3
	• Any planning agreement.	No Planning Agreement exists between the Applicant and Cabonne Shire Council	Not Applicable
	• The EP&A Regulation	The Regulations have been considered throughout this document.	Entire document
	• The likely impacts of the development, including environmental impacts on both the natural and built environment, and social and economic impacts in the locality.	Section 4 presents an assessment of relevant impacts on the natural and built environment and social and economic impacts.	4

Table 1.1 (Cont'd)
Mandatory Matters for Consideration under the EP&A Act

Statutory Reference	Pre-condition	Relevance	Report Section
Section 4.15 (Cont'd)	• The suitability of the site for the development.	The Proposal would be located wholly within the RU1 zone within which Extractive Industries are permissible with consent. The Project Site would be located on substantially disturbed land as the result of previous agriculture operations.	Not Applicable
	• Any submissions made in accordance with the EP&A Act or the regulations.	This is a matter for Council, however, the Applicant anticipates preparing a *Submissions Report* following completion of the exhibition period.	Not Applicable
	• The public interest.	This is addressed in Section 5. In summary, however, the Applicant contends that the Proposal is in the public interest.	5

1.5.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides a framework for the prevention and regulation of pollution, and pollution causing development, within NSW. Schedule 1 of the POEO Act identifies activities for which an Environment Protection Licence (EPL) is required. The proposed Quarry would exceed the thresholds identified in Section 19(3)(b) of Schedule 1, namely extraction of more than 30,000tpa. As a result, an EPL will be required.

Sections 2.2 and Section 4 provide an assessment of matters relevant to the POEO Act.

1.5.1.3 Roads Act 1993

The *Roads Act 1993* provides for the management and operation of public roads within NSW. Section 138 of the Act requires a person to obtain a permit from the Roads Authority to carry out a work in a public road. As the upgraded site entrance would require works to be undertaken within the road reserve for Canowindra Road, a Section 138 permit will be required from Cabonne Shire Council as the Roads Authority. As Canowindra Road is a Regional Road, concurrence of Transport for NSW will be required prior to issuing of that permit.

1.5.1.4 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) facilitates a system for assessing impacts on threatened species, populations and endangered or critically endangered ecological communities (EEC/CEEC). The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.

The Applicant has considered opportunities to minimise Proposal-related impacts to native vegetation. Residual impacts to biodiversity would include disturbance of approximately 0.35ha of native vegetation. This impact does not trigger the Biodiversity Offset Scheme and therefore

the residual impacts are not required to be assessed in accordance with the Biodiversity Assessment Method. However, mitigation measures for the area of native vegetation that will be disturbed have been documented in a Biodiversity Assessment Report (BAR) prepared by OzArk (see Section 3.5 and 4.2 and **Appendix 3**).

1.5.1.5 State Environmental Planning Policy (Resources and Energy) 2021

The *State Environmental Planning Policy (Resources and Energy) 2021* (Resources SEPP) was gazetted in recognition of the importance to New South Wales of mining, petroleum production and extractive industries.

The Resources SEPP specifies matters requiring consideration in the assessment of any extractive industry development. A summary of the matters that the consent authority must consider when assessing a new or modified proposal, and where these have been addressed in this document, is provided in **Table 3**.

Table 1.2
Application of the Resources and Energy SEPP

Page 1 of 2

Relevant SEPP Clause	Description	Section
2.17: Compatibility with other land uses	Consideration is given to: • the existing uses and approved uses of land in the vicinity of the development; • whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and • any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	3.3.2, 2.10
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared. Measures proposed to avoid or minimise any incompatibility are considered.	
2.19: Compatibility with mining, petroleum production or extractive industry	Consideration is given to the existing uses and approved uses of land in the vicinity of the development, and whether the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials and ways in which the development may be incompatible. The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared. Measures taken by the Applicant to avoid or minimise any incompatibility are considered.	3.3.2, 2.10
2.20: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure: • impacts on significant water resources, including surface and groundwater resources, are avoided or minimised; • impacts on threatened species and biodiversity are avoided or minimised; and • greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	4 generally
2.21: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.3.2

Table 1.2 (Cont'd)
Application of the Resources and Energy SEPP

Relevant SEPP Clause	Description	Section
2.22: Transportation	The following transport-related issues are considered. • The transport of some or all of the materials from the site by means other than public road. • Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools. • The preparation of a code of conduct for the transportation of materials on public roads.	2.6, 3.6
2.23: Rehabilitation	The rehabilitation of the land affected by the development is considered including: • the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated; • the appropriate management of development generated waste; • remediation of any soil contaminated by the development; and • the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.10

1.5.1.6 State Environmental Planning Policy (Transport and Infrastructure)

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Infrastructure SEPP) identifies, amongst other things, the matters to be considered in the assessment of development adjacent to or in the vicinity of particular types of infrastructure.

As the Proposal fronts onto and is located immediately adjacent to a classified road, namely Canowindra Road, and an upgraded Site Entrance will be required, Section 2.119 of the Infrastructure SEPP is relevant (**Table 1.3**).

Table 1.3
Application of the Resources and Energy SEPP

Relevant SEPP Clause	Description	Section
2.119 Development with frontage to classified road	(2) The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that— (a) where practicable and safe, vehicular access to the land is provided by a road other than the classified road, and	2.6, 4.3
	(b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of— (i) the design of the vehicular access to the land, or (ii) the emission of smoke or dust from the development, or (iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and	2.6.1, 4.3.2
	(c) the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.	2.6, 3.6, 4.3

1.5.1.7 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 4 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity SEPP) aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

The Cabonne Local Government Area is listed under Schedule 2 of the Biodiversity SEPP and as an area within the known distribution the species and that therefore could provide habitat for Koalas.

Since the Proposal would not result in any impact to potential Koala habitat, this SEPP is not considered further.

1.5.1.8 State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 3 of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) aims to manage the development of hazardous and offensive industries, or potentially hazardous and offensive industries.

Chapter 3 of the *Resilience and Hazards SEPP* requires a consent authority to consider whether a development is or potentially is a hazardous or offensive development. As no potentially hazardous goods will be stored within the Project Site (i.e. diesel/other hydrocarbons or explosives), the Proposal would not pose a significant risk from hazardous or offensive development and therefore a risk screening is not necessary.

Chapter 4 of the *State Environmental Planning Policy (Resilience and Hazards) 2021* requires that consent for any development cannot be granted unless the consent authority has considered whether the land is contaminated. The Project Site was previously used for agricultural grazing, which is unlikely to result in land contamination, and the operations of the Proposal will not result in any contamination.

In light of the above, this SEPP is not considered further.

1.5.1.9 State Environmental Planning Policy (Planning Systems) 2021

The *State Environmental Planning Policy (Planning Systems) 2021* (Planning SEPP) identifies Projects that are classified as State or Regionally significant. As identified in Section 1.1, the Proposal is classified Designated Development for the purposes of an extractive industry. As a result, the Project is classified as Regional Development under Clause 7(1(a)) of Schedule 6 of the SEPP.

1.5.2 Regional Planning Issues

The Sub-Regional Rural and Industrial Land Use Strategy[1] (SRILUS) published on behalf of the Councils of Blayney, Cabonne and Orange City in July 2008 presents a regional strategy document which should be considered in the planning and assessment of any development within the area managed by those Councils.

The key issues addressed by the SRILUS include the following.

- Agriculture.
- Industry.
- Residential and rural subdivision.
- Natural and scenic environment.
- Heritage and culture.

Those key issues relevant to the Proposal are considered within Sections 3 and 4 of this document.

1.5.3 Local Planning Issues

1.5.3.1 Cabonne Local Environmental Plan 2012

The Project Site is situated within land zoned as Zone RU1 - Primary Production under the *Cabonne Local Environment Plan 2012* (Cabonne LEP) (**Figure 1.2**). Extractive industries are permissible with consent within that Zone.

Under the Cabonne LEP, portions of the Project Site are listed as having Terrestrial Biodiversity (**Figure 1.2**). Impacts to the biodiversity located within the Project Site are further discussed in Section 3.5 and Section 4.2.

No heritage items or conservation areas are identified within the Project Site under the Cabonne LEP.

Under the Cabonne LEP, the Project Site is located near a watercourse identified on the Riparian Lands and Watercourses Map (**Figure 1.2**). However, the Project Site is located approximately 1km from this watercourse, therefore no further consideration is required in relation to watercourses under the Cabonne LEP.

1.5.3.2 Cabonne Community Strategic Plan 2022-2032

The *Cabonne Community Strategic Plan 2022-2032* presents the vision, aspirations and priorities of the Cabonne community for their future. The Plan's Vision Statement includes the following statement.

> "Our Cabone community recognise and acknowledge our rich culture, heritage, and history. We strive to protect and value our environment, and the rural aspects of the region."

[1] https://www.cabonne.nsw.gov.au/files/sharedassets/public/planning-and-development/rural-and-industrial-land-use-strategy/sub-regional-rural-and-industrial-land-use-strategy-2008.pdf

Strategic Direction 5 – Environment identifies the following strategic goals.

- Cabonne's natural beauty and landscapes- lookouts, rivers, creeks, lakes, parks - are healthy and preserved for the enjoyment of our community and visitors to Cabonne.
- The natural Cabonne environment is protected from pest and weeds.
- The Cabonne community are working responsibly to mitigate and, where necessary, adapt to the impacts of climate change.
- Cabonne residents have access to secure, quality and reliable water supply.

Based on the small scale of the Proposal and minimal environmental impacts expected, it is not anticipated that the Proposal would limit the success of natural resource management-related goals for the Cabonne community. The Applicant is committed to sustainably managing the natural resources within the Project Site in a planned manner.

1.5.3.3 Development Control Plan No. 5 - General Rural Zones

Development Control Plan No. 5 - General Rural Zones (DCP 5) was approved by Council on 16 November 1992. Relevant objectives of the Plan may be summarised as follows.

- "To provide controls and guidance to achieve the objectives of Cabonne LEP with respect to the General Rural Zones.
- To promote innovative and imaginative development while conserving the important natural assets the 'right to farm'.
- To ensure that adequately documented development applications which address the development principles and standards in the DCP.
- To enable development is in keeping with the rural character of the locality and are compatible with the existing or likely future rural land uses.
- To protect and conserve land which has been identified as being environmentally sensitive."

The Proposal would be compatible with the rural character of the locality and is consistent with existing land uses within the RU1 zone. The Proposal would therefore be consistent with the objectives, principles and standards identified within the DCP 5.

1.6 Consultation

1.6.1 Community Consultation

The Applicant has consulted with surrounding landowners and residents, particularly with the owners of "Trelawney" (R3) who responded positively to the Proposal. The surrounding landowners will be kept up to date with the progress of the Proposal. The Applicant will maintain an open-door policy regarding complaints, questions and feedback to the local community.

1.6.2 Government Consultation

A *Briefing Paper* was circulated to the following government agencies on 29 November 2023 with a request for assessment requirements for the Proposal.

- Cabonne Council.
- Department of Planning, Housing and Infrastructure.

Subsequently an onsite inspection and pre-lodgement meeting was held on 22 February 2024 with Cabonne Shire Council representatives. **Table 1.4** presents the matters discussed at the meeting and where each is addressed in this document.

Table 1.4
Cabonne Council Requirements

Requirement	Where Addressed
The requirements for a BAL/BAR and whether sufficient sight distances exist from the proposed entrance (or requirements regarding alteration/reshaping within the road reserve to achieve this);	2.6.1, 3.6, 4.3.2
Proposed future maintenance within the road reserve by the proponent to ensure sight distances are maintained;	4.3.3
Proposed sealing of the initial length of internal road to reduce dust together with other proposed methods to reduce tracking of dirt onto external roads (shaker grid/beds);	2.6.2
Proposed vegetation screening of parallel section of internal gravel road to reduce dust to vehicles travelling along the adjacent Canowindra Road;	2.4, 4.5.3
Consideration of the powerline traversing the site (height above natural ground level), particularly over the proposed internal road;	4.9.1
The impact of blasting and procedures to ensure safe management. Due to the proximity to Canowindra Road council is of the opinion that blasting will necessitate closure of the road at such times and that the nearest neighbour may also need to be evacuated.	2.5.2.2, 4.1

An application for Secretary's Environmental Assessment Requirements (SEARs) for the Proposal was submitted on 29 November 2023, accompanied by the *Briefing Paper*. SEARs were issued on 19 March 2024. **Appendix 1** presents a summary of the SEARs and where the nominated requirements for the EIS are addressed.

1.7 Management of Investigations

This document has been prepared by Indigo Devane (BSc (Environment)), Environmental Consultant with RWC, Grace Scullett-Dean (BSc (Hons)(GeoScience), PhD (Environmental Geology)) and Elizabeth Macarounas (B Advanced Science (Hons)), both Graduate Environmental Consultants with RWC. Mr Mitchell Bland (BSc (Hons), MEconGeol, LLB(Hons), FIQA, REAP) Principal Environmental Consultant with RWC undertook peer review of the document.

The following personnel associated with the Applicant provided information in relation to the existing and proposed activities and reviewed and approved this document for release.

- Mr Makk McNaught – McNaught Earthworks Pty Ltd.

A range of environmental investigations have been initiated to identify the environmental constraints associated with the Proposal. These studies are being undertaken by a team of specialist consultants managed by RWC including the following key individuals and companies.

- Noise and Vibration – Muller Acoustic Consulting Pty Ltd.
  - Mr Oliver Muller (B.Sc (Resource Environmental Management and Human Geography, Cert IV (Environmental Practice, MAAS)
  - Mr Rod Linnet (Ass. Dip (Mechanical Engineering), MAAS, MIOA).
- Ecology and Heritage – OzArk Environment & Heritage.
  - Dr Jodie Benton (PhD Archaeology, BA (Hons) Archaeology)
  - Mr Ben Churcher (BA (Hons) Dip Ed)
  - Ms Stephanie Rusden (BA Archaeology, BSc Land and Heritage Management)
  - Ms Tenae Robertson (B Archaeological Practices)
  - Dr Crystal Graham (PhD Biology, B(Hons) Biology)
  - Ms Jane Book (M Environmental & Business Management, B App Sci. (Hons))
  - Dr David Orchard (PhD Botany, Grad Dip Science (Botany), B Arts (Hons))
  - Mr Jeff Lewis (B Sc. Ecology & Biodiversity).
- Traffic and Transport – The Transport Planning Partnership.
  - Ms Penny Dalton (BE Civil (Honours))
  - Mr Charbel Hanna (BE Civil and Environmental).

Section 2

Description of the Proposal

PREAMBLE

This section describes the Proposal including:

- *the objectives of the Proposal;*
- *an overview of the Proposal and the approvals required;*
- *the geological setting of the Project Site;*
- *site establishment works to be undertaken;*
- *the proposed extraction operations;*
- *the proposed transportation operations and anticipated upgrades that would be required to the surrounding road infrastructure;*
- *onsite services and infrastructure that would be established;*
- *the proposed employment and economic contributions that would result; and*
- *proposed rehabilitation activities.*

The Proposal is described in sufficient detail to provide an overall understanding of the nature and extent of the activities, how the various activities would be undertaken and to enable an assessment of the potential impacts on the surrounding environment. The level of detail provided is sufficient to enable an assessment of Proposal's environmental impacts to be made.

Details of the safeguards and management measures that the Applicant proposes to implement to minimise or negate the potential impacts on components of the local environment are provided in Section 4 of this document.

2.1 Project Summary

2.1.1 Objectives of the Proposal

The Applicant's principal objectives for the Proposal are as follows:

- To provide a source of high-quality gravel for a variety of construction and road-related projects.
- To minimise, to the maximum extent practicable, the impact on the local environment and community, and other stakeholders.
- To provide for a final landform amenable to future use for agricultural activities.
- To ensure the operation of the Quarry in a safe, reliable and cost-effective manner, contributing to the local economy of the Cabonne LGA and the financial viability of the Applicant.

These objectives would be achieved by:

- planning and extracting the resource in a manner that maximises the quality of materials removed and ensures efficient resource utilisation;
- undertaking all activities in an environmentally responsible manner that enables compliance with all relevant requirements;
- planning and undertaking activities in consultation with surrounding residents and relevant government agencies; and
- regular monitoring, reviewing and reporting on the environmental performance of the approved operations.

2.1.2 Overview of the Proposal

The Proposal would include the following activities (**Figure 2.1**).

- Extraction on a campaign basis of 960,000m^3 or approximately 2.3Mt of material at an average rate of 80,000tpa and a maximum rate of 150,0000tpa for a period of 30 years.
- Crushing, screening, and stockpiling of extracted material within the proposed Extraction Area or Stockpile Area.
- Loading and transportation of stockpiled material from the Project Site via Canowindra Road.
- Construction of a Site Access Road, including a suitable intersection with Canowindra Road.
- Installation of demountable lunch, ablutions and storage facilities.
- Rehabilitation of the Project Site to achieve a final land use of agricultural grazing and native ecosystem areas.

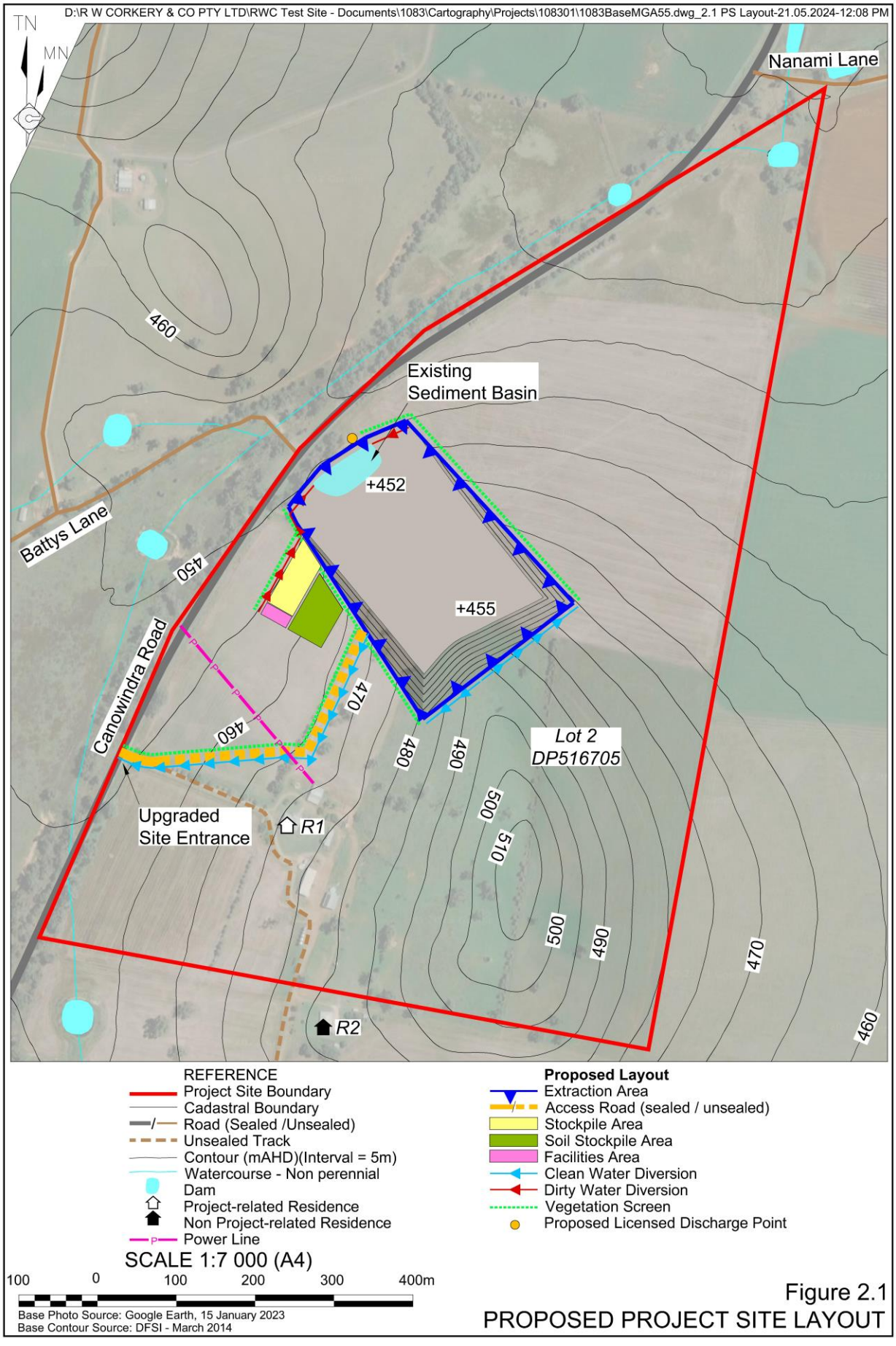


Figure 2.1
PROPOSED PROJECT SITE LAYOUT

2.2 Approvals Required

2.2.1 Development Consent

In order to undertake the proposed activities within the Project Site, the Applicant requires development consent in accordance with the provisions of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project Site is zoned RU1 – Primary Production under the *Cabonne Local Environment Plan 2012* (Cabonne LEP). Development for the purposes of extractive industries is permissible within that zone.

The Proposal is classified as a Designated Development as it would exceed the 2ha disturbance criteria identified by Clause 19 of Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg). As a result, this Environmental Impact Statement has been prepared to support the application for development consent.

As the Proposal is an extractive industry that is classified as Designated Development, it is also classified as Regional Development under Section 7 of Schedule 6 of the *State Environmental Planning Policy (Planning Systems) 2021*. As a result, Council will accept, exhibit and assess the application which will be determined by the Western Regional Planning Panel.

2.2.2 Consideration of Other Approvals, Licences or Permits

The Proposal may also be classified as Integrated Development under Section 4.46 of the EP&A Act as the following additional approvals will also be required.

- Section 138 Permit under the *Roads Act 1993*

  Consent from Cabonne Shire Council under Section 138 of the *Roads Act 1993* for works to be undertaken within the road reserve for Canowindra Road. In addition, the concurrence from Transport for NSW for works within the road reserve for the Canowindra Road will be required under Section 138(2) of the Act.

- Environment Protection Licence under the *Protection of the Environment Operations Act 1997* (POEO Act), issued by the EPA.

  An Environment Protection Licence under Section 47 of the *Protection of the Environment Operations Act 1997* will be required because the proposed annual production rate exceeds the 30,000t criteria identified in Clause 19(3)(b) of Schedule 1 of the Act. The activity as proposed will be a schedule Activity (Extractive Industry and Crushing Grinding and Separating) under the *Protection of the Environment Operations Act 1997.*

2.2.3 Activities for which Consent is Not Required

The Applicant currently and would continue to undertake extensive agriculture within the Project Site. In addition, the Applicant may continue to store or park equipment or plant related to its wider earthmoving business within the Project Site.

2.3 Geology and Resource Review

2.3.1 Geology and Geological Properties

The NSW seamless geology database[1] indicates that the proposed Quarry is hosted by the Gospel Oak Shale, a Silurian-aged siltstone and shale unit.

The Applicant drilled 12 exploration holes to identify the preferred location for the Extraction Area and confirm the nature of the material to be extracted. That program confirmed that the materials within the area tested are dominated by variably weathered to fresh shale and siltstone, with rare shallow intrusive or volcanic/volcaniclastic units. Testing of the material by K & H Geotechnical Services Pty Ltd identified that the material within the Extraction Area is suitable for the manufacture of a high quality road base.

2.3.2 Quarry Reserve

The Applicant undertook an assessment of the preferred size of the Extraction Area, taking into account constraints imposed by high value vegetation communities and the objective to achieve a free draining, gently sloping final landform. Based on these constraints, the Applicant has identified an Extraction Area with a volume of 960,000 bank cubic metres (bcm) or approximately 2.3Mt of material (**Figure 2.1**). The Applicant anticipates that all material extracted, with the exception of material retained for rehabilitation operations, would be saleable material.

2.4 Site Preparation

Site preparation activities would include the following (**Figure 2.1**).

- Survey and mark out of all areas of approved disturbance using permanent markers.
- Establish the site access road and site access intersection upgrades.
- Establish vegetation screens on the northwestern boundary of the Stockpile Area and Access Road and southwestern and northeastern boundary of the Extraction Area as soon as practicable.
- Establish surface water controls to prevent clean water flowing into disturbed areas and direct sediment laden to the existing sediment basin.
- Removal of vegetation would be avoided where possible. Where unavoidable, larger would be removed using a chainsaw or bulldozer. Prior to removal, each tree would be inspected for nesting or roosting fauna and, if present, the tree would not be removed until the individuals, including juveniles, have vacated the tree. Any hollows would be relocated to undisturbed sections of the Project Site

[1]https://minview.geoscience.nsw.gov.au/#/(report:strat-unit/Scuo)?lon=148.6772&lat=-33.4099&z=14&bm=bm1&l=ge611:n:100,ge610:n:100,ge69:n:100,ge68:n:100,ge67:n:100,ge66:n:100,ge65:n:100,ge64:n:100,ge63:n:100,ge62:n:100,ge61:n:100,ge612:y:100,hi1:n:25,wa1:y:100,ut1:y:50,ad0:y:100

within areas of existing native vegetation. The remainder of the felled vegetation would be used for firewood or stockpiled for later use during revegetation operations.

- Removal of topsoil and growth medium using a bulldozer. The Applicant would remove between 100mm and 150mm of topsoil and any underlying subsoil and stockpile this material within the soil stockpile area. Topsoil would be stockpiled to no more than 2m high and subsoil to no more than 4m high. Soil stockpiles would be stabilised with grass or pasture species and would be retailed for subsequent used during rehabilitation operations (see Section 2.10).

2.5 Extraction Operations

2.5.1 Layout of the Extraction Area

Figure 2.2 presents the proposed Extraction Area layout. In summary, the Extraction Area would have the following design criteria.

- Length – approximately 320m
- Maximum width – approximately 250m
- A floor gently sloping to the northwest toward the sediment basin(s) with an elevation between 455m AHD and 452m AHD.
- Approximate area – 7ha
- Indicative angle of final faces – approximately 60º from the horizontal, pending geotechnical assessment.
- Number of benches – two, up to 10m high
- Safety bund and clean water diversion - minimum 1m high.
- An internal processing and stockpiling area
- An existing Sediment Basin, with all sediment-laden or dirty water directed to that structure

2.5.2 Extraction Operations

2.5.2.1 Rip and Push

Extraction would be undertaken on a campaign basis, typically as contracts for particular projects are awarded to the Applicant.

The following methods would be used to extract gravel material.

- Extraction would be undertaken using a bulldozer or excavator to rip and push the gravel material into stockpiles.
- Material not requiring further processing would be loaded into road trucks for transportation offsite.

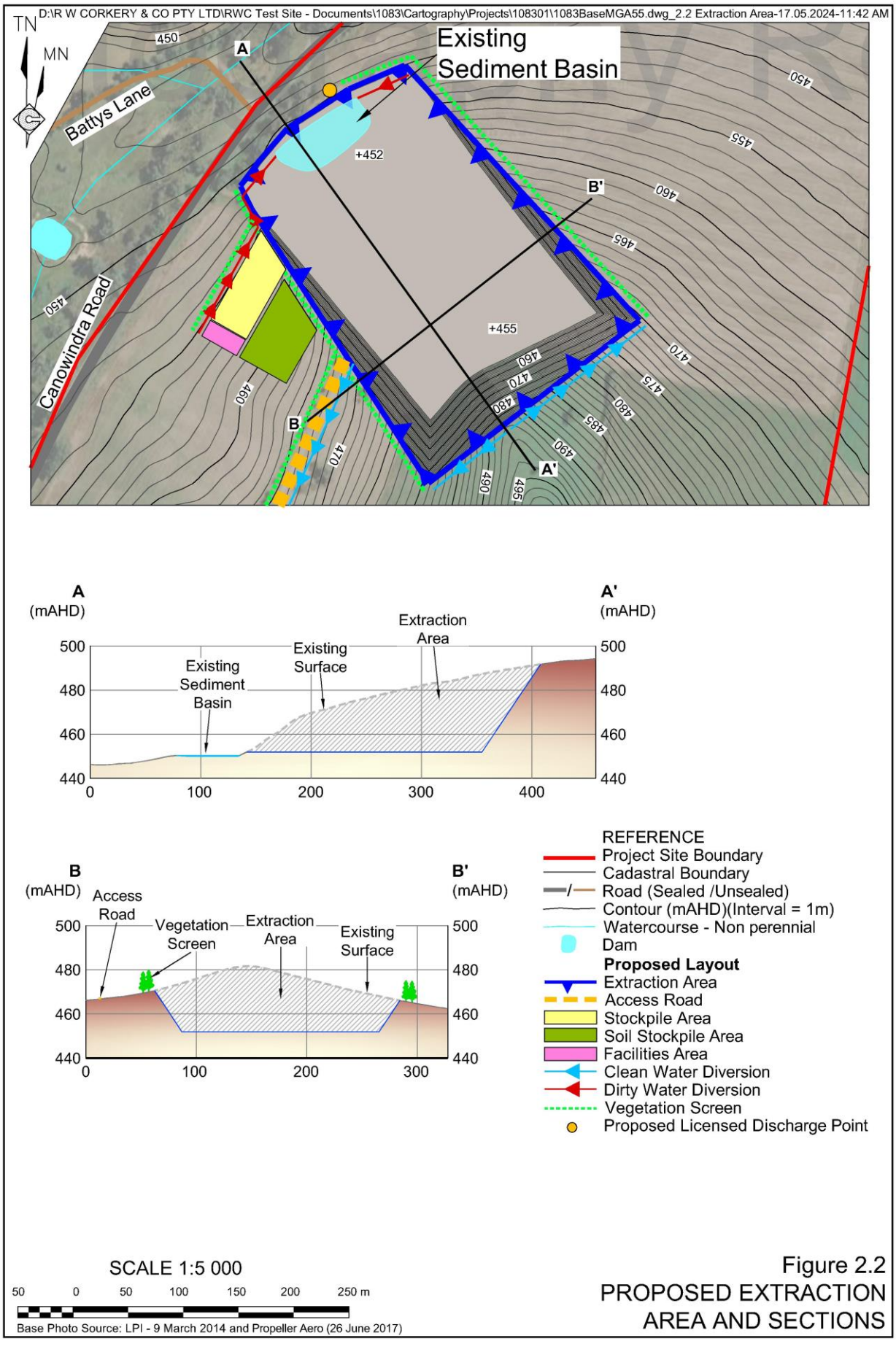


Figure 2.2
PROPOSED EXTRACTION AREA AND SECTIONS

2.5.2.2 Drill and Blast

More competent material would be blasted as required. All blasting operations would be supervised by a suitably qualified and experienced blasting engineer or shot firer.

Blast holes would be drilled using a drill rig equipped with dust and noise suppression equipment. These holes would then be filled with explosives and the blast initiated, fragmenting the *in situ* shale.

Blasting is expected to be required infrequently, only when material that is too competent to be ripped is encountered. Generally blasting would not exceed one occurrence per month, although this would be strongly informed by the demand for product from the Quarry.

The Applicant would initially notify all residents within 2km of the Project Site of its intention to commence blasting operations and would offer to include any resident on a blast notification register. On the day prior to blasting operations all residents who registered to be notified of blasts would be notified by text message, email or telephone call.

The Applicant would monitor all blasts at a nominated location identified prior to blasting commencement.

Finally, bulk explosives, detonators and boosters would not be stored within the Project Site. Rather they would be bought to site on the day of the blast.

2.5.2.3 Crushing, Screening, Blending and Importation of Materials

Where required, stockpiled material would be crushed and screened to produce products with the required specification. Different materials may be blended to ensure the required specification are achieved.

If required, limited volumes of materials may be imported to the Project Site for blending with the onsite materials. Imported materials would be limited to Virgin Excavated Natural Materials, subject to a resource recovery order or similar, or purchased materials from other quarry operations. Imported materials would preferentially be transported as backloads and would not result in additional vehicle movements. Except where imported for rehabilitation operations (see Section 2.10), all imported materials would be transported from the Project Site as soon as practicable after receipt.

2.5.2.4 Stockpiling and Loading Operations

Produced materials not immediately transported from the Project Site would be stockpiled either within the Extraction Area or the Stockpile Area. Stockpiled material would not exceed a height of 4m above ground level. Product and soil stockpiles would be identified through the use of signage to ensure the correct material is placed where required.

A dirty water diversion would be located downslope of the stockpiles to ensure all sediment laden water is directed to a storage dam instead of offsite.

Quarry products would be loaded into road trucks using a front-end loader for transportation offsite as described in Section 2.6.

2.5.3 Extraction Equipment

The following mobile plant would be used during extraction operations. It is noted that as extraction and processing would be campaign based, mobile plant may be bought to and from site using a low-loader for each campaign.

- A bulldozer, excavator or scraper.
- A front-end loader for loading of trucks and stockpile management.
- A mobile crusher and screen.
- A water cart.
- Blast-hole drill rig (infrequent).

Hydrocarbons, including fuel and oils, would be transported to the Extraction Area daily as required.

2.5.4 Extraction Rate

Extraction and transportation operations would not exceed 150,000tpa, with the annual average extraction level expected to be approximately 80,000tpa.

2.6 Transportation

2.6.1 Site Entrance

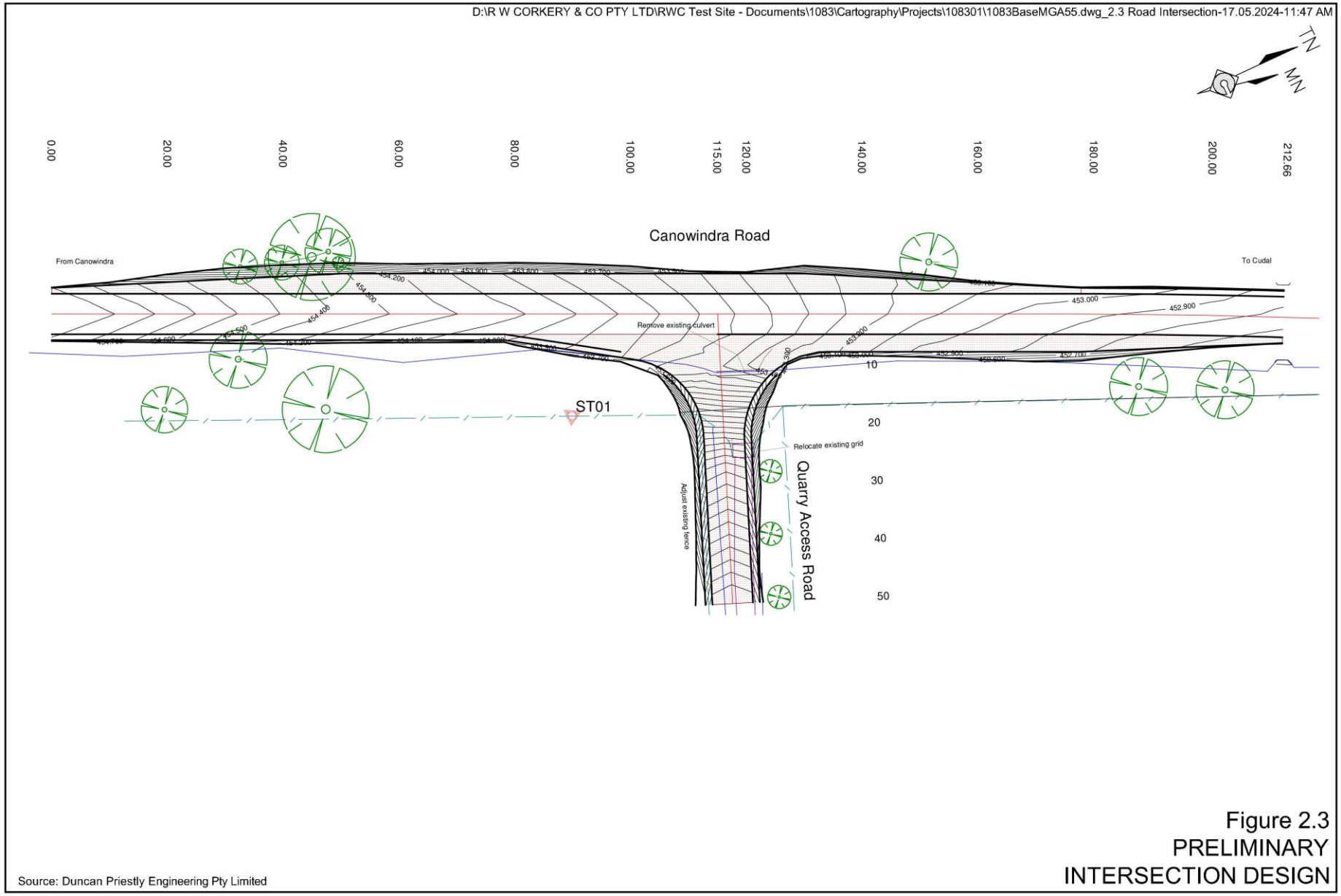
Access to the Project Site would be via the proposed upgraded Site Entrance. The existing rural entrance to the Project Site would be upgraded to cater for Quarry-related vehicles.

The Transport Planning Partnership (TTPP) were engaged to undertake an assessment of the traffic and transportation-related aspects of the Proposal (TTPP, 2024). That assessment is presented in **Appendix 4** and is summarised in Section 3.6 and 4.3. In summary, TTPP (2024) recommend that a standard Basic Auxiliary Left/Basic Auxiliary Right (BAL/BAR) intersection be installed.

The Applicant engaged Duncan Priestley Civil Engineering Pty Limited to prepare a preliminary design for a BAL/BAR intersection at the Site Entrance. That design was prepared in accordance with the Austroads Guide to Road Design. That design is presented as **Figure 2.3** and the full design report is presented as **Appendix 5**.

In summary, the proposed intersection would have the following design features.

- Two 3.5m wide lanes for through traffic.
- A 3.5m wide slip lane for north-bound traffic with a length of approximately 180m, including tapers.
- A 3.0m wide deceleration lane for traffic turning left with a length of approximately 90m long, including tapers.
- A widened site entrance.



Source: Duncan Priestly Engineering Pty Limited

Figure 2.3
PRELIMINARY
INTERSECTION DESIGN

2.6.2 Site Access Road

The Applicant would construct an Access Road to permit safe, convenient access from the Site Entrance to the Extraction Areas for heavy vehicles (**Figures 2.1** and **2.2**). The Access Road would be sealed for a minimum distance of 50m from the intersection with Canowindra Road to prevent tracking of sediment onto the public road. The remainder of the road would be unsealed. Appropriate roadside drainage, including culverts and surface water management structures, would be constructed.

2.6.3 Off-site Transport Operations

Extracted material would be transported from the Project Site using truck and dog style vehicles or smaller. All vehicles transporting material from the Project Site would be required to cover their loads prior to leaving the Stockpile or Extraction Area.

Assuming an average of 33t per load, the Applicant anticipates that at an average production rate of 80,000tpa, 2,424 trucks would depart the Project Site annually. If distributed evenly throughout the year, this would equate to approximately 9 laden trucks per day. However, as production, and therefore product delivery, would be undertaken on a campaign basis, the typical daily transportation rate would be substantially higher than this. As a result and based on the time required for a single front-end loader to load a truck and the length of the typical operating day, the Applicant anticipates that no more than 44 laden trucks per day would depart the Project Site (**Table 2.1**).

Table 2.1
Proposed Heavy Vehicle Traffic Levels

Production Rate	Average Load/Vehicle	Laden Vehicle Movements		
		Annual	Average / day[1]	Maximum / day[2]
80,000tpa	33t	2,424	9	44
150,000tpa	33t	4,545	17	44

Note 1: Assumes transportation on 270 days per year
Note 2: Based on an 11-hour day and 4 laden vehicle movements per hour

Once loaded within the Extraction Area, trucks would exit the Project Site via the Site Access Road. Trucks would then turn either right, to the north, or left, to the south, onto Canowindra Road, a Classified Road (**Figure 1.1**). The Applicant notes that once on Canowindra Road, transportation routes would depend on the location that the material is to be delivered to and that this is likely to vary throughout the life of the Proposal.

The Applicant anticipates that at the start and finish of campaigns, a limited number of low loader loads may be required to mobilise and demobilise mobile plant. This would be an infrequent occurrence, typically four to six times per year assuming two to three production campaigns.

Finally, all drivers that regularly access the Project Site would be required to sign and abide by a Driver's Code of Conduct that would identify the Applicant's expectations in relation to driver behaviour and courtesy on the public road network.

2.7 Signage, Amenities, Services and Waste Management

2.7.1 Signage

The Applicant would install a sign at the Site Entrance stating:

- the name of the quarry and operator;
- contact details for the site supervisor and for lodging of complaints; and
- the approved hours of operations, including for heavy vehicles.

The sign would not be intended to act as "advertisement" as defined under the EP&A Act.

2.7.2 Amenities and Storage

The Applicant would install the following amenities within the Project Site. Alternatively, the Applicant may utilise the currently available amenities located in existing sheds near Residence R1. All structures installed would be temporary.

- Ablutions, including a chemical or pump out toilet.
- Vehicle parking area.
- Lunchroom and amenity facilities, including a potable water supply.
- A lockable storage shed, likely to be a shipping container.

In order to minimise the visual impact of the Proposal, a tree line / visual screen would be planted around the perimeter of the Extraction Area and to the west of the Site Access Road.

2.7.3 Services

The following services would be available on site.

- Communication: Mobile services and two-way radios would be used within the Project Site.
- Power: electricity, if required, would be supplied by an on-site generator.
- Water:
  - Potable water would be available within the lunchroom.
  - Water for dust suppression would be sourced from surface water storages within the Project Site. Alternatively, water for dust suppression would be purchased from appropriately licenced sources and transported to site.

2.7.4 Waste Management

The principal waste to be generated by the Proposal would include less than 25kg of general solid waste per week. The Applicant would maintain an easily accessible rubbish bin, including an animal-proof lid, near the site office for all rubbish generated by employees/truck drivers and for any containers for consumables etc. A separate recycling bin would also be kept on site for the collection of recyclables. Collected waste would be delivered as required to an approved waste facility. Alternatively, all personnel generating waste would be required to remove it from the Project Site on the day it is generated.

Any waste oil or oily rags would be removed from the site by a licensed waste oil contractor on the day that they are generated.

No waste would be accepted on site.

2.8 Hours of Operation and Life of Proposal

2.8.1 Hours of Operation

Table 2.2 presents the proposed hours of operation.

Table 2.2
Proposed Hours of Operation

Activity	Monday to Friday[1,2]	Saturday[1,2]	Sunday and Public Holidays[2]
Extraction Operations	7:00am to 6:00pm	8:00am to 1:00pm	-
Loading and Transportation Operations	7:00am to 6:00pm	8:00am to 1:00pm	-
Rehabilitation Operations	7:00am to 6:00pm	8:00am to 1:00pm	-
Note 1: Excludes public holidays which would operate as per the proposed hours of operation for Sunday Note 2: Except in the case of emergency works to be undertaken by the Applicant, Transport for NSW or other public authority			

Extraction and transportation operations would be undertaken on a campaign basis with production typically increasing in preparation to support the demands of particular road construction or maintenance programs.

2.8.2 Life of the Project

The Proposal would have a life of approximately 30 years, with extraction occurring on a campaign basis. Rehabilitation operations may continue after this date.

2.9 Employment, Economic Contribution and Capital Cost

2.9.1 Employment

The Proposal would require two to three employees to manage the extraction, processing and product dispatch operations during each campaign. Additional contract truck drivers would be engaged by the Applicant or its customers.

2.9.2 Economic Contribution

The Proposal would produce a high quality, competitively priced product for road construction, earthworks, and maintenance operations within and surrounding the Cabonne Local Government Area. This would contribute to the ongoing economic and social development of the Local Government Area.

2.9.3 Estimated Development Cost

The Applicant anticipates that the estimated development cost for the Proposal determined in accordance with Planning Circular PS 24-002 *Changes to how development costs are calculated for planning purposes* would be approximately $579,842.43 (incl GST).

2.10 Site Decommissioning and Rehabilitation

2.10.1 Introduction

The Applicant would adopt a progressive approach to the rehabilitation of disturbed areas to ensure that, where practicable, as extraction is completed, the proposed final landform is quickly shaped and vegetated to provide a stable landform. The Applicant would, where practicable, progressively rehabilitate completed sections of the Project Site. This would include:

- shaping and, where required, backfilling of the terminal benches of the Extraction Area;
- spreading of topsoil sourced either from onsite stockpiles or imported as Virgin Excavated Natural Material from off site;
- ripping and scarifying perpendicular to the slope to facilitate infiltration of water and seed retention; and
- stabilising and seeding the prepared landform using a hydromulch of native grass species suitable for the final land use of nature conservation and / or grazing agriculture.

In particular, the Applicant would establish native vegetation on the terminal benches as soon as practicable to screen final quarry faces from observers located to the west of the Project Site.

- the Applicant's rehabilitation and final land use objectives;
- the final landform that would be progressively formed;
- the rehabilitation procedures to be adopted throughout the life of the Quarry; and
- the implementation of proposed rehabilitation plans.

The procedures adopted would be regularly reviewed throughout the life of the Quarry and modified if appropriate, to reflect the operational experience gained.

2.10.2 Rehabilitation and Final Land Use Objectives

The following objectives have been adopted when developing the rehabilitation procedures.

- To produce a stable final landform that maintains the agricultural capability of the disturbed areas.
- To minimise disruption to existing drainage patterns, achieve a stable and functional drainage system and prevent any detrimental impacts on water quantity and quality.
- To ensure that the visual amenity from surrounding residences and publicly available vantage points is maintained.

2.10.3 Final Landform and Land Use

The proposed final landform would include the following (**Figure 2.4**).

- A free draining, Extraction Area with a largely flat floor very gently sloping toward the sediment basins located in the northwest section of the Extraction Area.
- A vegetated landform consisting of trees on the benches and terminal faces and grasses or shrubs on the floor of the Extraction Area.
- A retained Site Entrance and Access Road suitable for agricultural use.

The final land use would be consistent with the existing land use, namely agricultural uses and native ecosystems, principally used for intermittent grazing.

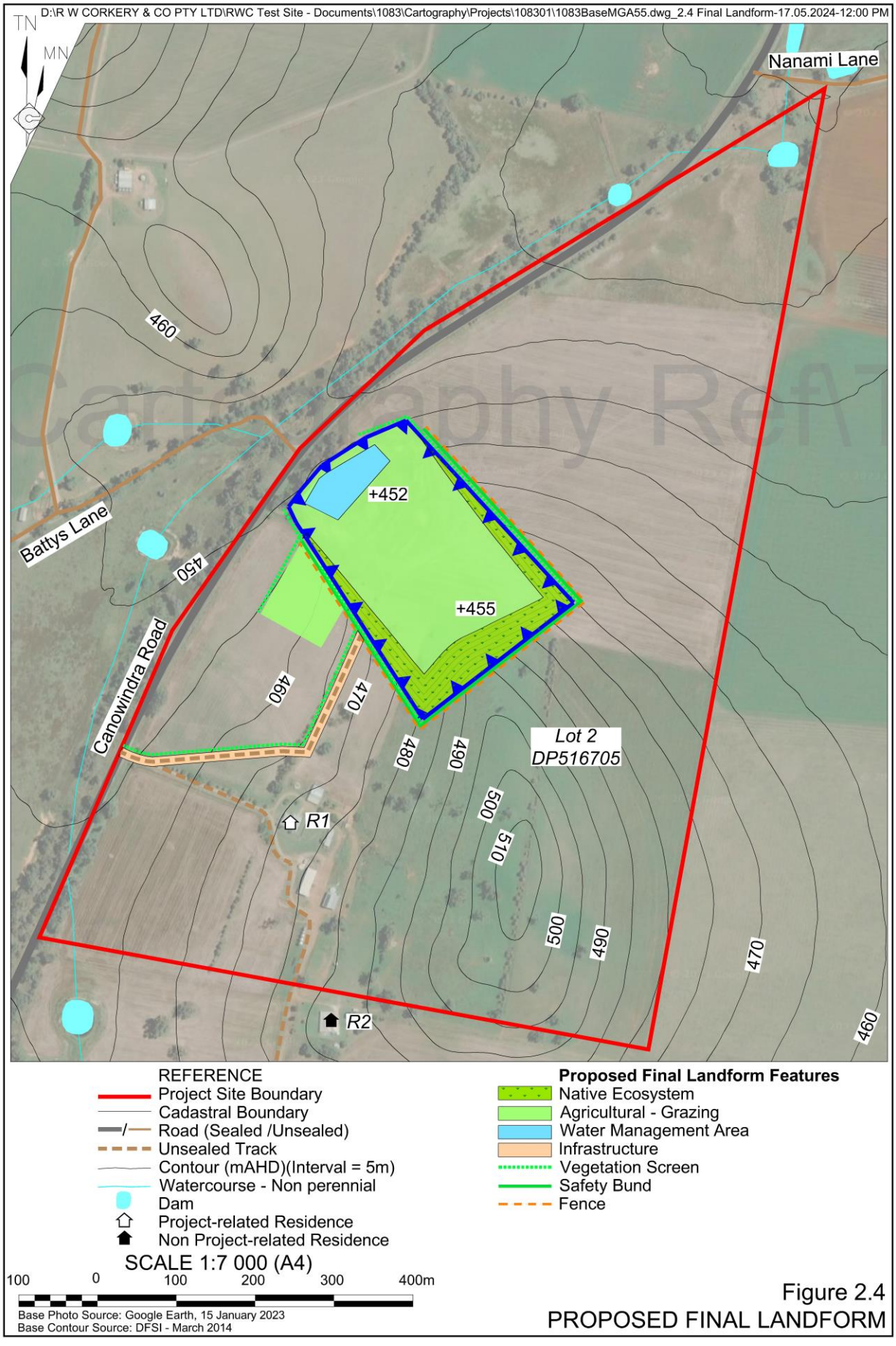


Figure 2.4
PROPOSED FINAL LANDFORM

2.10.4 Rehabilitation Methods and Procedures

2.10.4.1 Infrastructure Decommissioning and Removal

At the completion of extraction and processing activities, the Applicant would remove all infrastructure within the Project Site, including the following.

- All mobile plant and equipment.
- All temporary buildings and infrastructure.

As hydrocarbons would be transported to the Extraction Area daily as needed, it is unlikely that any contamination will occur.

Any concrete footings and foundations of temporary buildings or structures would be broken up and removed or covered.

2.10.4.2 Landform Establishment

The Applicant would shape the Extraction Area progressively throughout the life of the Proposal. Following completion of extraction and processing operations in sections of the Extraction Area, the Applicant would progressively implement the following.

- The floor of the Extraction Area would be shaped to achieve a gentle northwest-sloping surface to ensure that the final landform is free draining. The floor would be ripped and broken up to permit infiltration of rainfall and penetration of the roots of vegetation.
- Stockpiled or imported subsoil/growth medium and topsoil would be spread evenly over disturbed areas. Any imported material would be classified as Virgin Excavated Natural Material.
- Seed of suitable species of grasses and shrubs would be spread over the final floor. Tube stock of tree species representative of the surrounding vegetation community would be planted on the benches.

Section 3

Environmental Setting

PREAMBLE

This section describes the environmental setting within and surrounding the Project Site and provides information on those elements of the existing environment that would be affected by the Proposal or would influence other environmental impacts associated with the Proposal.

Information is first provided on the local and Project Site topography, meteorology, land ownership and land use. This is followed by descriptions of the local setting in terms of noise, biodiversity, traffic, heritage, visibility, water resources, air quality, and soils. This section then concludes with a review of the local socio-economic setting of the Project Site.

3.1 Topography

3.1.1 Regional Topography and Drainage

The topography of the region is variable (**Figure 3.1**), encompassing undulating hills creeks, specifically Mandagery, Bourimbla, Warree and Boree Creeks, each of which are located between 5km and 10km north of the Project Site.

The village of Toogong is located to the northeast of the Project Site at approximately 360m AHD, whilst Cudal is located to the north-northeast of the Project Site at an elevation of approximately 490m AHD.

3.1.2 Local Topography and Drainage

The area surrounding the Project Site is dominated by a line of north-northwest oriented hills with a maximum elevation of approximately 525m AHD (**Figure 3.2**). Land to the west cis typically undulating with elevations rising from approximately 420m AHD to 500m AHD at an unnamed hill west of the Project Site. Land to the east of the Project Site is dominated by a broad valley with elevations between 420m AHD and 500m AHD.

The Project Site is located between two small unnamed drainage lines that flow to the north toward Boree Creek, approximately 5km north of the Project Site. Boree Creek flows westwards and merges with Mandagery Creek approximately 1.5km west of Toogong.

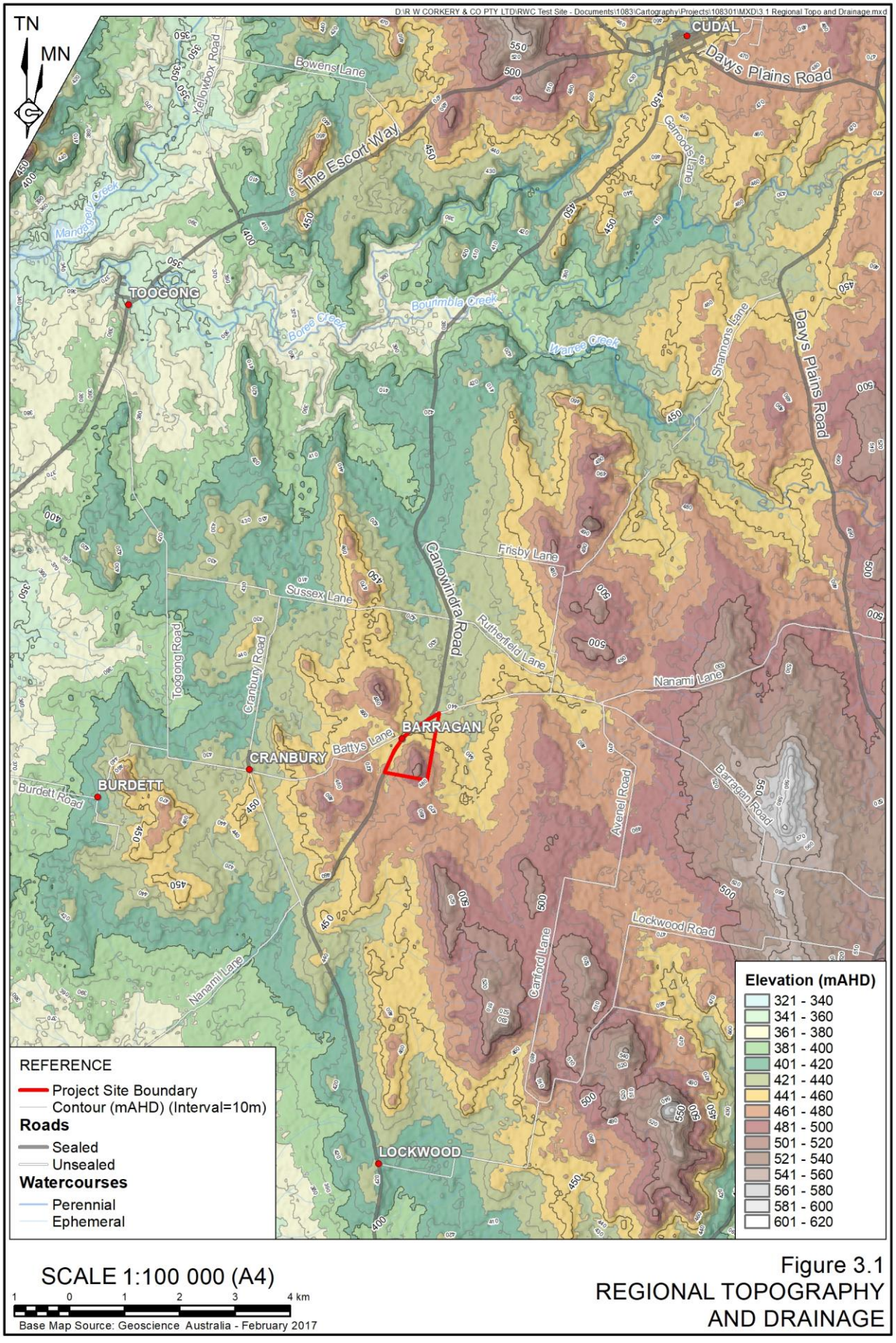
3.1.3 Project Site Topography and Drainage

Topography within the Project Site is dominated by a hill located southeast of the Extraction Area, with a maximum elevation of 514m AHD (**Figure 3.3**). A ridgeline runs northwest from the crest of the hill to a historic extraction area and farm dam at an elevation of approximately 450m AHD.

There are no watercourses within the Project Site, with surface water flows typically occurring as sheet flows. A farm dam occurs within an existing Extraction Area. A second farm dam occurs in the northernmost section of the Project Site. The unnamed watercourse, to the west of Canowindra Road, flows to the north and all surface water within the Project Site drains to this watercourse.

3.1.4 Constraints

The topography does not constrain the Proposal; however, local topography is an important consideration in the overall design of the quarry, i.e. the quarry is on a ridgeline, and some parts of the quarry are observable from surrounding land and residences.


D:\R W CORKERY & CO PTY LTD\RWC Test Site - Documents\1083\Cartography\Projects\108301\MXD\3.1 Regional Topo and Drainage.mxd
TN
MN
CUDAL
Days Plains Road
Bowens Lane
Yellowbox Road
The Escort Way
Ganoods Lane
Mandagery Creek
TOOGONG
Bourimbla Creek
Boree Creek
Warree Creek
Shannons Lane
Frisby Lane
Sussex Lane
Ganowindra Road
Rutherfield Lane
Nanami Lane
Toogong Road
Cranbury Road
BARRAGAN
Batty's Lane
CRANBURY
BURDETT
Burdett Road
Avenel Road
Barragan Road
Lockwood Road
Canford Lane
LOCKWOOD
REFERENCE
Project Site Boundary
Contour (mAHD) (Interval=10m)
Roads
Sealed
Unsealed
Watercourses
Perennial
Ephemeral
Elevation (mAHD)
321 - 340
341 - 360
361 - 380
381 - 400
401 - 420
421 - 440
441 - 460
461 - 480
481 - 500
501 - 520
521 - 540
541 - 560
561 - 580
581 - 600
601 - 620
SCALE 1:100 000 (A4)
1 0 1 2 3 4 km
Base Map Source: Geoscience Australia - February 2017
Figure 3.1
REGIONAL TOPOGRAPHY
AND DRAINAGE

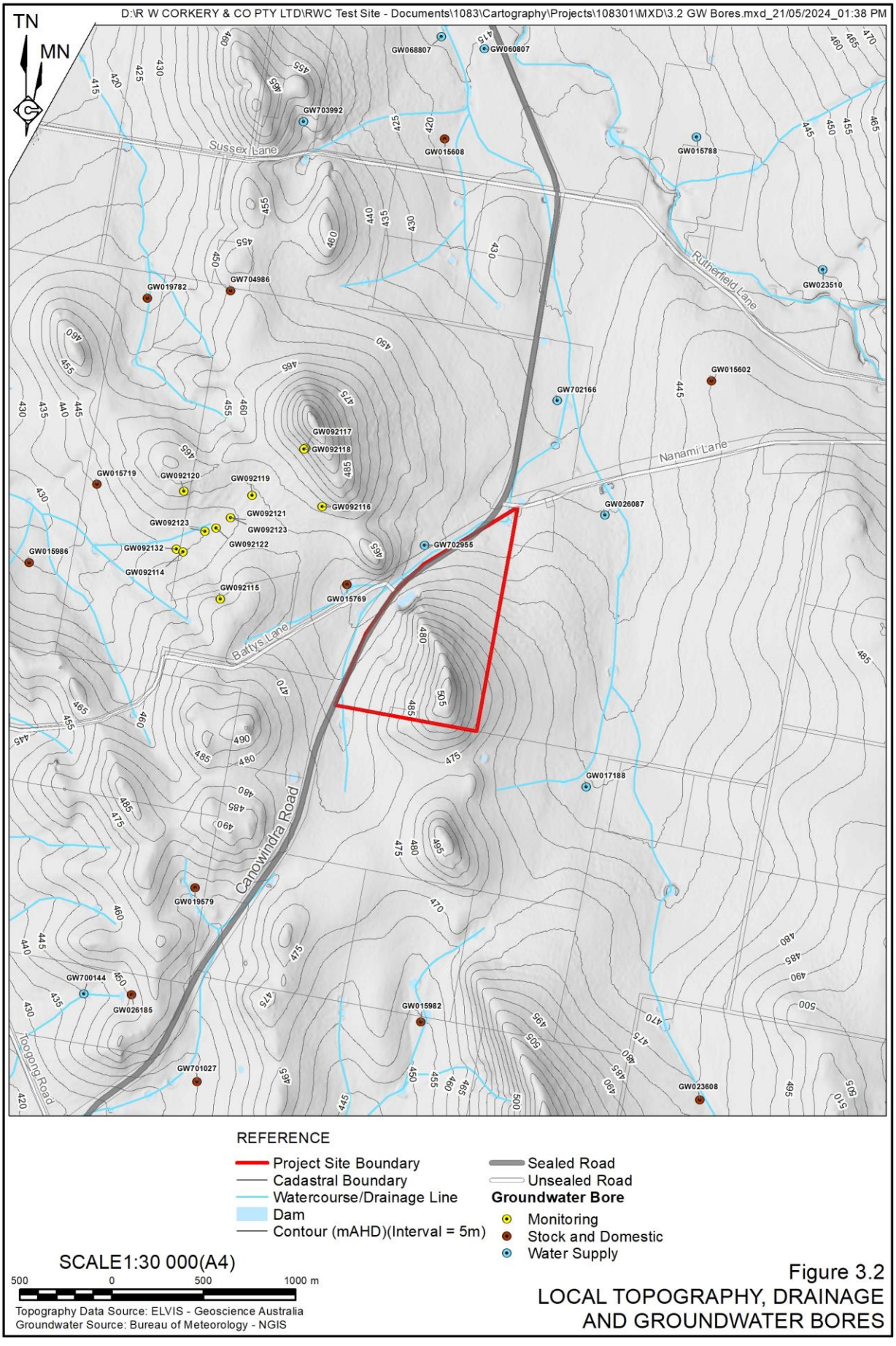


Figure 3.2
LOCAL TOPOGRAPHY, DRAINAGE AND GROUNDWATER BORES

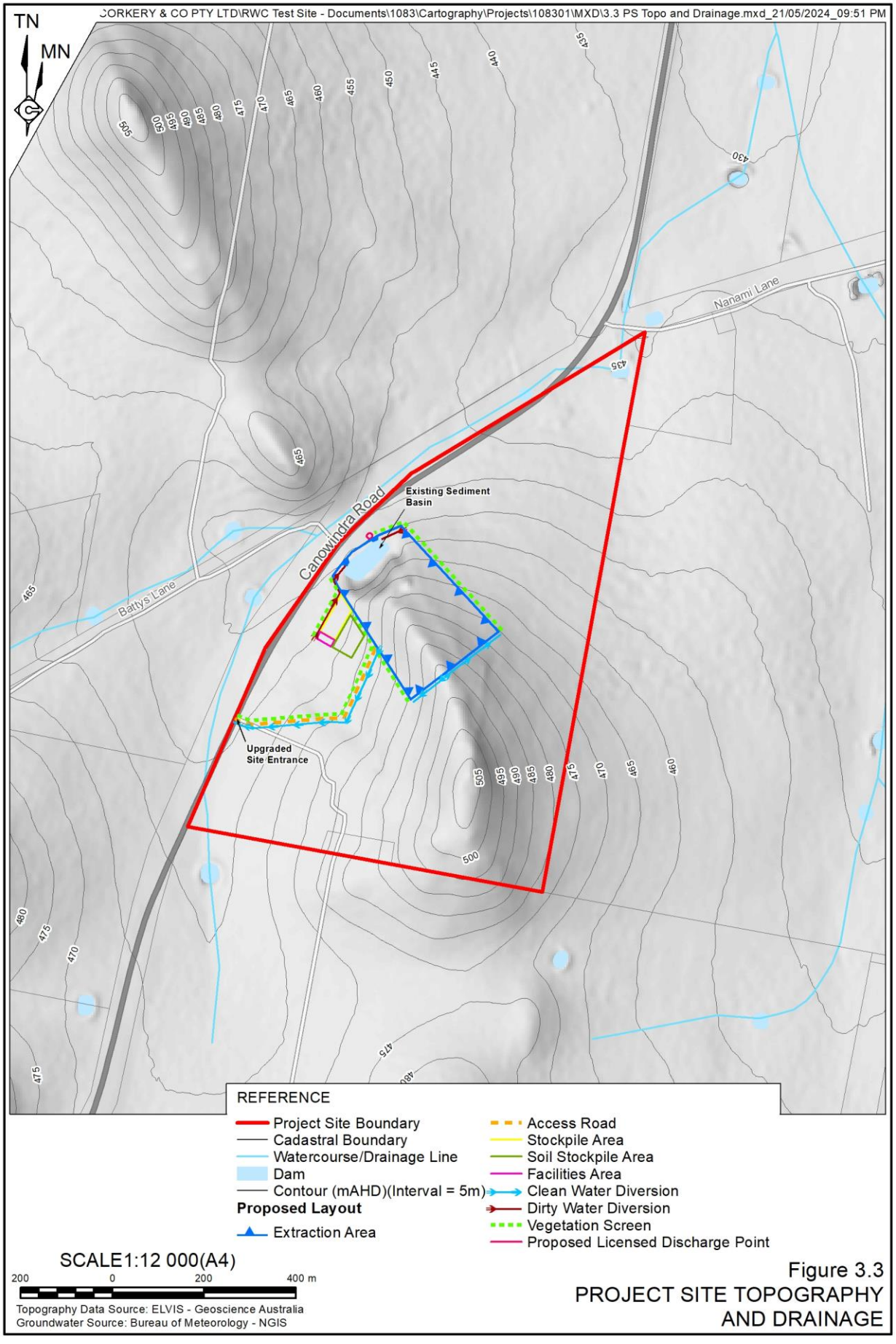


Figure 3.3
PROJECT SITE TOPOGRAPHY AND DRAINAGE

3.2 Meteorology

3.2.1 Introduction

This sub-section provides a summary of the meteorological conditions of the Project Site, focusing on those climatic aspects that are likely to influence the potential impacts of the Proposal. These conditions comprise temperature, rainfall, evaporation and flooding, wind and temperature inversions.

3.2.2 Source of Data

Meteorological data from the Parkes Airport AWS Bureau of Meteorology-operated stations (Station Number 065068) is presented in **Table 3.1**. This station provides the most complete meteorological data for the area and is located approximately 43km to the northwest of the Project Site at an elevation of 323m AHD, approximately 130m lower than the Project Site. While located slightly closer to the Project Site, the Orange Airport weather station is located at an elevation of 945m AHD, approximately 500m higher than the Project Site. Data from the Orange Airport weather station has therefore not been considered further in this assessment.

Table 3.1
Meteorological Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature (°C)													
Mean maximum	33.6	32.0	28.8	24.1	18.9	15.2	14.4	16.0	20.1	24.2	28.0	31.0	23.9
Mean minimum	17.8	17.0	14.2	9.6	5.2	3.7	2.4	2.4	4.5	7.8	12.0	14.6	9.3
Rainfall (mm)													
Mean	66.3	55.9	55.1	33.3	44.8	51.6	47.1	45.1	44.6	53.1	66.0	52.7	635.1
Highest monthly	244.8	225.8	195.4	154.8	179.5	176.4	110.8	95.8	187.4	160.2	203.4	239.4	1087.8
Lowest monthly	1.5	0.2	0.2	0.0	1.8	0.4	2.0	9.6	0.0	0.0	0.4	0.4	229.8
Mean number of days rain	6.7	6.4	6.0	5.0	8.0	12.0	13.2	10.9	7.6	8.2	7.4	6.8	98.2
Highest daily	105.0	91.0	94.4	68.6	94.0	68.0	35.0	43.2	49.0	45.0	130.0	105.6	130.0
Source: Bureau of Meteorology - Parkes Airport AWS (065068) – downloaded 16/5/2024													

3.2.3 Temperature

January is typically the hottest month, with an average maximum temperature of 33.6ºC. July is the coldest month with an average maximum temperature of 14.4ºC and an average minimum temperature of 2.4ºC (**Table 3.1**).

3.2.4 Rainfall

Average annual rainfall is 635.1mm. Rainfall is relatively evenly spread throughout the year, with the warmer months (November to March) typically having marginally higher rainfall than the cooler months (**Table 3.1**). The driest year on record was in 2019 when 229.8mm of rain was recorded. By contrast, the wettest year on record was 2010 when 1,087.8mm of rain was recorded.

3.2.5 Wind

Wind rose data from the Parkes Airport AWS is presented in **Figure 3.4**. On an annual basis, winds most frequently originate from the southwest and northwest, with less frequent winds coming from the south and west.

Seasonally, wind direction does not vary substantially, winds from the southwest are, however, more dominant in Winter and winds are typically stronger in Spring .

3.3 Land Ownership and Land Use

3.3.1 Land Ownership and Surrounding Residences

Figure 3.5 presents the land ownership and residences within and surrounding the Project Site. The closest non-Project related residence (Residence R2) is located approximately 500m to the south of proposed Extraction Area. The next closest non-Project related residences are Residence R3, located approximately 1km to the west of the proposed Extraction Area and Residence R4, located approximately 2km to the northeast of the Extraction Area.

3.3.2 Land Use

Land uses surrounding the Project Site are presented on **Figure 3.6** and include the following.

- Agriculture – principally grazing and cropping. Rural residences and farm buildings are also present
- Transport – namely along Canowindra Road.

The Applicant contends that there is no conflict between the existing and proposed land uses, including the historic use of the quarry.

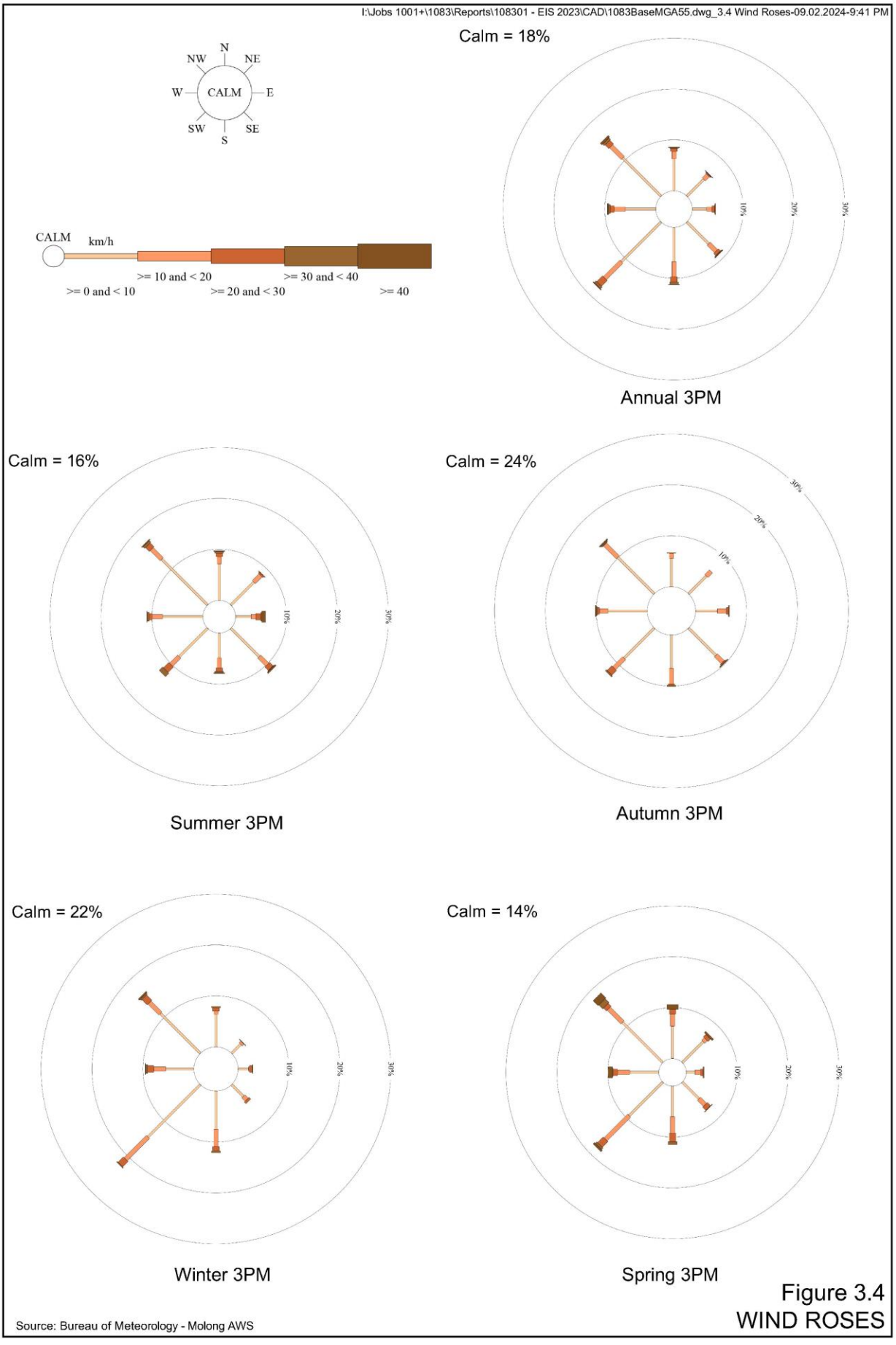


Figure 3.4
WIND ROSES

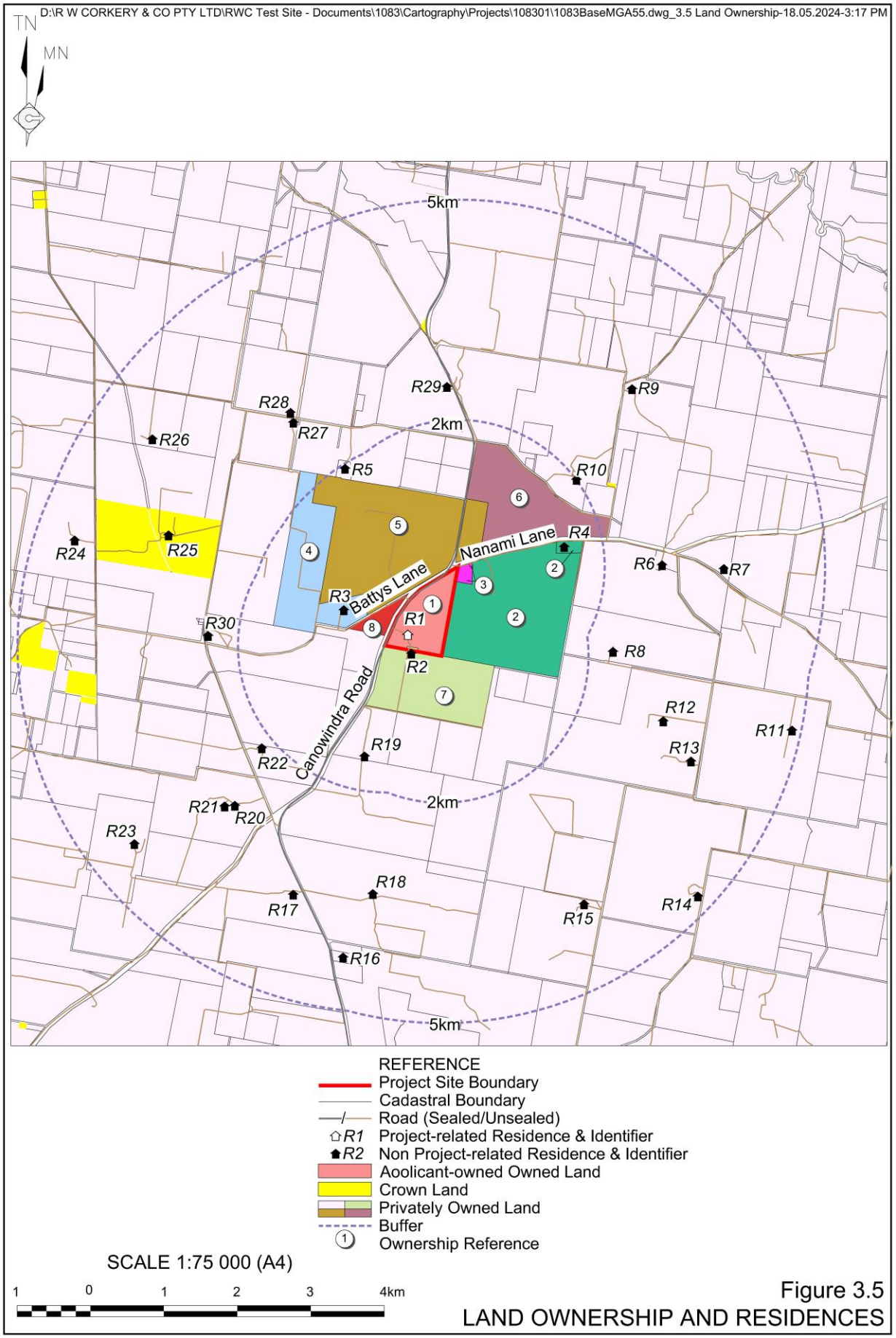


Figure 3.5
LAND OWNERSHIP AND RESIDENCES

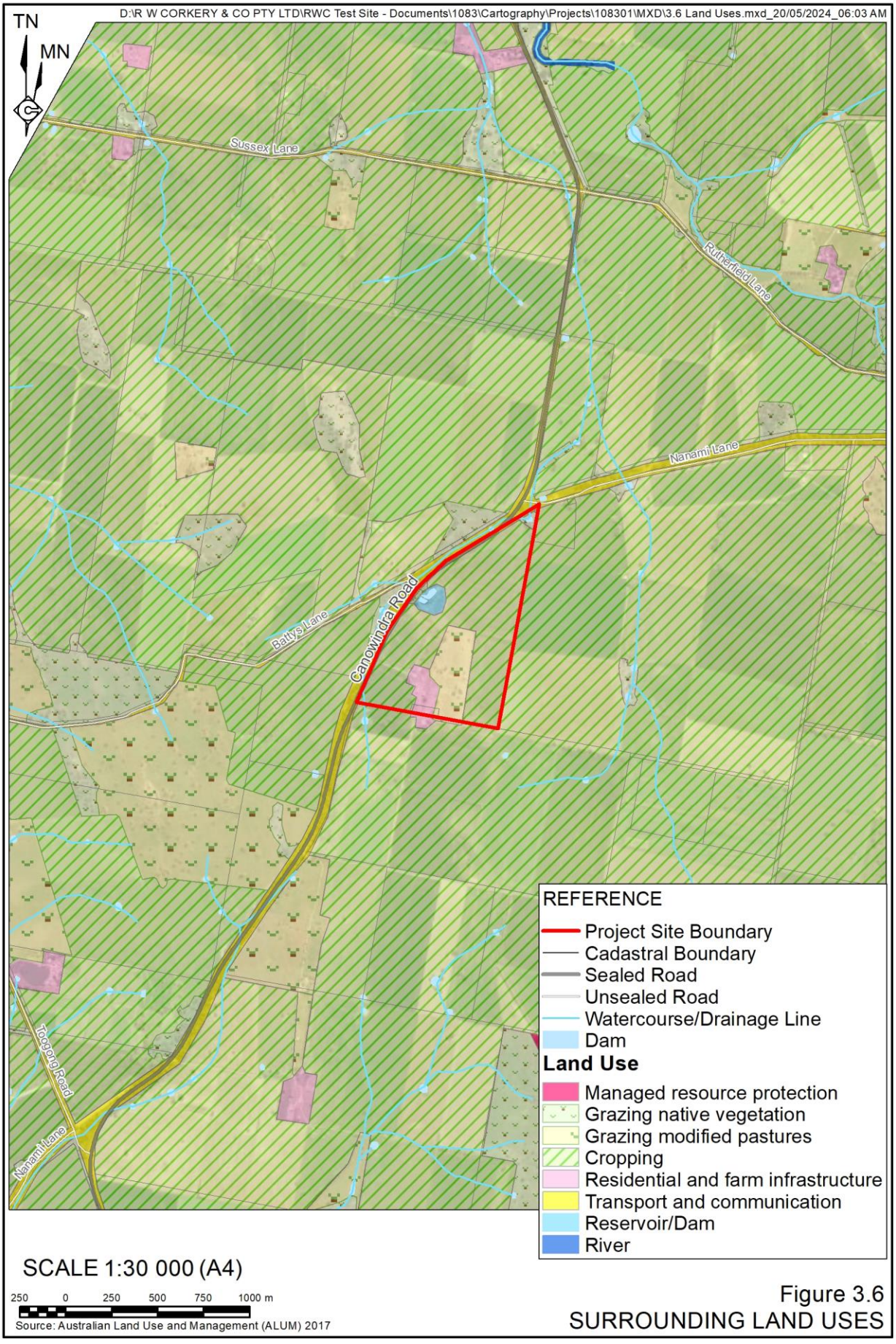


Figure 3.6
SURROUNDING LAND USES

3.4 Noise

3.4.1 Introduction

The Applicant engaged Muller Acoustic Consulting Pty Ltd (MAC) to undertake a noise assessment for the Proposal. The assessment report, dated 27 February 2024, is presented as **Appendix 2** and is hereafter referred to as MAC (2024). This subsection presents an overview of the local acoustic environment, anticipated additional noise generating activities and an overview of the likely constraints that noise may place on the Proposal. Section 4.1 presents an assessment of the noise impacts of the Proposal.

3.4.2 Local Setting

The Project Site is situated within a rural environment (**Figure 3.6**). Environmental noise at residences surrounding the Project Site is likely to include the following.

- Traffic on the local road network, particularly the Canowindra Road.
- Domestic noises such as garden equipment, children and dogs.
- Agricultural noises such as farm machinery and stock.
- Wildlife such as birds and insects.
- Wind generated noises such as wind in trees.

That report assumed the default *Noise Policy for Industry 2017* Rating Background Noise Level of 35dB LA_{90} during the day, namely 7:00am to 6:00pm Monday to Saturday. There would no Project-related activities outside these hours.

3.4.3 Proposed Changes to Noise Generating Activities

Changes to noise generating activities as a result of the Proposal would be as follows.

- Occasional small increases in ambient noise as a result of construction and operation of the Proposal.
- Occasional small increases in ambient noise as a result of blasting .
- A small increase in road traffic noise from trucks transporting quarry products.

3.4.4 Constraints

It is expected that the ambient noise level would not significantly increase due to the construction and operation of the Proposal.

3.5 Biodiversity

3.5.1 Introduction

The Applicant engaged OzArk Environment & Heritage (OzArk) undertake a biodiversity assessment for the Proposal. The resulting report, referred to hereafter as OzArk (2024a), is presented as **Appendix 3**. This subsection presents an overview of the survey methodology and the resulting biodiversity setting. Section 4.2 presents an overview of the significance of the impacts of the Proposal.

3.5.2 Survey Methodology

The biodiversity assessment was prepared as a *Biodiversity Assessment Report* (BAR) and not a *Biodiversity Development Assessment Report* (BDAR) because entry into the NSW Biodiversity Offsets Scheme (BOS) will not be triggered. Entry into the BOS is triggered when one, or more, of the following conditions are met:

- The Proposal exceeds the clearing threshold for the relevant property.
- The Proposal will impact a mapped area of biodiversity value on the state-wide Biodiversity Values Map.
- The Proposal will result in a significant impact to one or more listed threatened entities.

OzArk (2024a) state that the Proposal does not trigger any of these conditions.

For the purposes of the biodiversity assessment, the following terminology is used.

- Subject Site – comprising the footprint of the Proposal and the area directly affected by the proposed activities (**Figure 3.7**).
- Biodiversity Study – comprising area the area within a 1,500 m radius of the Subject Site.
- 10km Search Area – comprising the area within a 10km radius of the Subject Site.

The *Biodiversity Assessment Report* was completed in accordance Part 4 of the EP&A Act and Clause 171 of the EP&A Regulation. The assessment was undertaken in three stages as follows.

1. Desktop searches and review of ecological databases and information to identify threatened species, populations or ecological communities listed in the *Biodiversity Conservation Act 2016* (BC Act), *NSW Fisheries Management Act 1994* (FM Act), and/or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that have the potential to occur in the study area.
2. Field survey of the Subject Site for the purposes of:
   - Determining the extent of the proposed impact.
   - Collating lists of those plants present these being used to assist with the identification of the site's vegetation communities.
   - Determining habitat availability for fauna species recorded or expected to occur.

– Documenting the nature and extent of any protected matter, such as a threatened species or community or a significant habitat feature.

3. Preparation of a written BAR that describes the impacts of the proposed activity on native vegetation and threatened species, populations, and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts.

A field survey was undertaken on 25 October 2023. Section 3 of OzArk (2024a) provides a detailed description of the methods used when undertaking the field survey.

3.5.3 Local Setting

Existing Environment

The Project Site is located on the Canobolas Slopes landscape under the NSW (Mitchell) Landscapes 2002. The Project Site also occurs within the Inland Slopes subregion (North West Slopes Bioregion), as per the *Interim Biogeographic Regionalisation of Australia's categorisation* (IBRA) (Thackway & Cresswell, 1995).

No Groundwater Dependent Ecosystems associated with either the Lachlan or Central Tablelands catchments are mapped within the 10km Search Area.

Three species of significant weeds were encountered within the Project Site during the field survey, including Saffron Thistle, Soft Brome, and African Lovegrass. It was also determined that the Project Site is already likely to be inhabited by invasive fauna such as rabbits, foxes, cats, feral pigs, and wild dogs.

Plant Community Types

OzArk (2024a) identified forty-two flora species, three of which are associated with Threatened Ecological Communities. The vegetation community types (PCTs) identified within the Project Site included the following (**Figure 3.7**).

- PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.
- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.
- Disturbed/cleared land.

OzArk (2024a) identified that PCT 266 and 277 are associated with the Critically Endangered Ecological White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland, in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions Community (Box Gum CEEC) listed under the BC Act.

However, these communities did not satisfy the minimum criteria for listing under the EPBC Act.

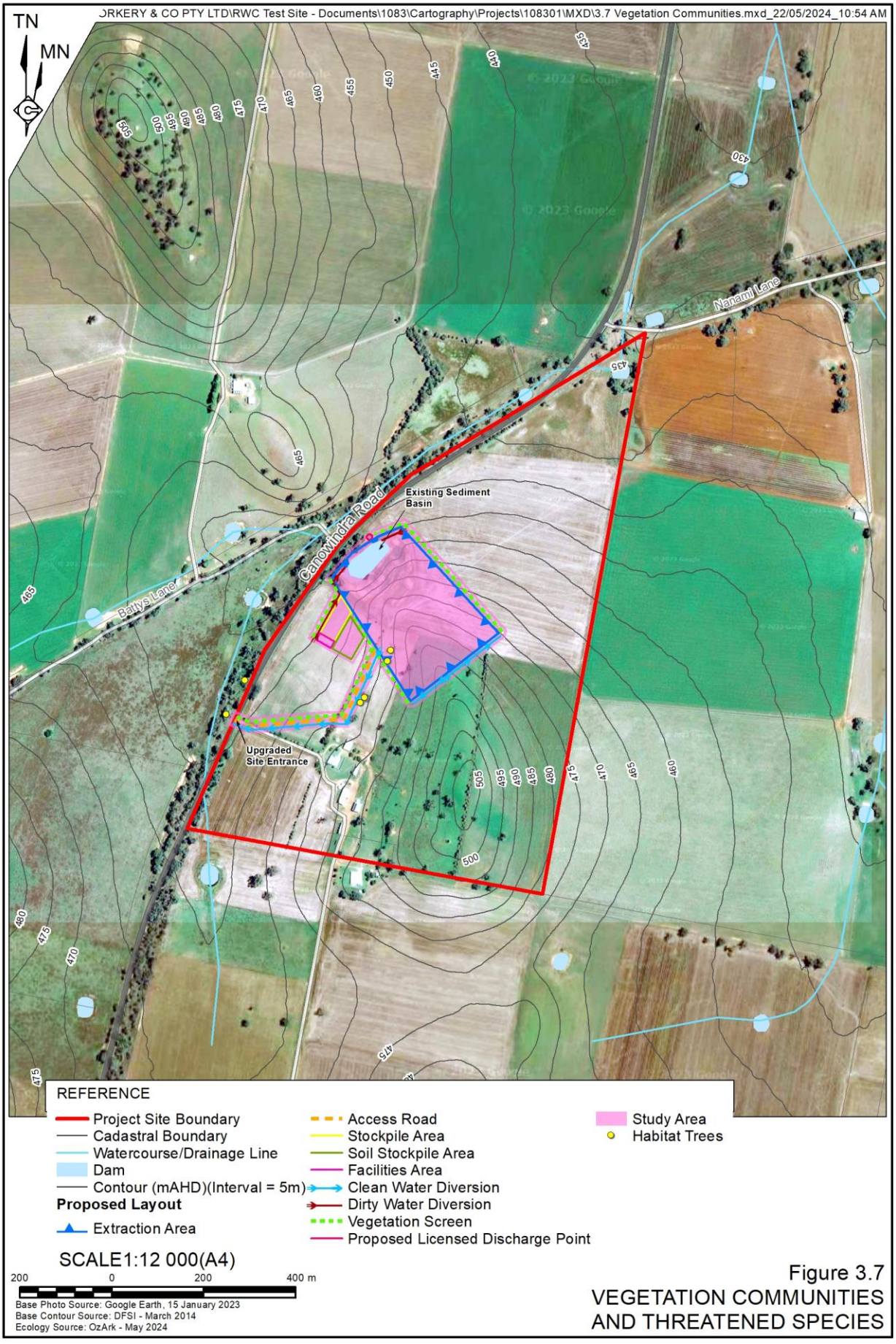


Figure 3.7
VEGETATION COMMUNITIES AND THREATENED SPECIES

Habitat

OzArk (2024a) identified two habitat trees within the Subject Site, namely two mature White Box trees (PCT 266), which contained a total of three small (<20cm diameter) hollows.

Additionally, OzArk (2024a) identified that the large rocks located next to the dam located to the south of the Extraction Area and the related PCT 53 may be of value to herpetofauna (amphibians and reptiles).

Fauna/Wildlife

OzArk (2024a) identified seven fauna species. None of the identified species are classified as threatened or migratory under the BC Act or the EPBC Act.

3.5.4 Constraints

The Proposal would likely result in the disturbance of the following vegetation communities.

- Approximately 0.054ha of PCT 53
- Approximately 0.218ha of PCT 266
- Approximately 0.078ha of PCT 277

The remainder of the land to be disturbed by the Proposal has been extensively disturbed by historic quarry operations, agriculture, and clearing.

A small area (0.01ha) of the Box Gum CEEC occurs in the Canowindra Road corridor that will be disturbed for the site entrance upgrade. Previously, Cabonne Council has trimmed mature vegetation and no further vegetation clearing is required in this area.

Potential impacts that could constrain the Proposal include the following.

- Disturbance of native vegetation.
- Loss of native fauna habitat.

Measures to minimise these impacts and an assessment of there is provided in Section 4.2.

3.6 Traffic

3.6.1 Introduction

The Transport Planning Partnership Pty Ltd (TTPP) were engaged to undertake a *Road Transport Assessment* for the Proposal. The resulting report, hereafter referred to as TTPP (2024), is presented as **Appendix 4**. This subsection presents an overview of the local traffic setting. Section 4.3 presents an overview of the results of the impact assessment for the Proposal.

3.6.2 Local Setting

Figure 3.8 presents the proposed transportation route for the Proposal. All Proposal related traffic would use the Canowindra Road to either travel north toward Cudal and Orange or south toward Canowindra. TTPP (2024) states that Canowindra Road (MR310) is a State Road connecting several key regions and towns, providing a north-south link between the Escort Way (MR377) at Cudal in the north and Mid-Western Highway (HW6) at Cowra in the south. The road has one travel lane in each direction and typically has a sign-posted speed limit of 100km/h. Canowindra Road is approved for use by 25/26m General Mass Limit B-doubles with no travel conditions.

Other roads in the vicinity of the Project Site include Nanami Lane and Batty's Lane which would, with the exception of local deliveries to properties along those roads, not be utilised for the Proposal.

Crash statistics were analysed for the period 1 January 2018 to 31 December 2022 along the section of Canowindra Road within the vicinity of the Project Site. One crash result was recorded involving a single light truck utility travelling northbound. Fatigue and speeding were nominated as contributing factors to the crash.

Traffic volumes of the Canowindra Road were quantified through the use of Automatic Tube Counts (ATC) for a period of one week between 10 and 16 November 2023 inclusive. Results of the ATC assessment are presented in **Table 3.2**.

Table 3.2
Surveyed Traffic Volumes on Canowindra Road

Direction	Average Weekday	Peak Weekday	Saturday
Daily Traffic (vehicles per day)			
Northbound	473	523	293
Southbound	469	511	343
Two-way	942	1,034	636
Peak Hour Traffic (vehicles per hour)			
Northbound	46	-	36
Southbound	48	-	40
Two-way	94	-	76
Source: TTPP (2024) – Table 2.1			

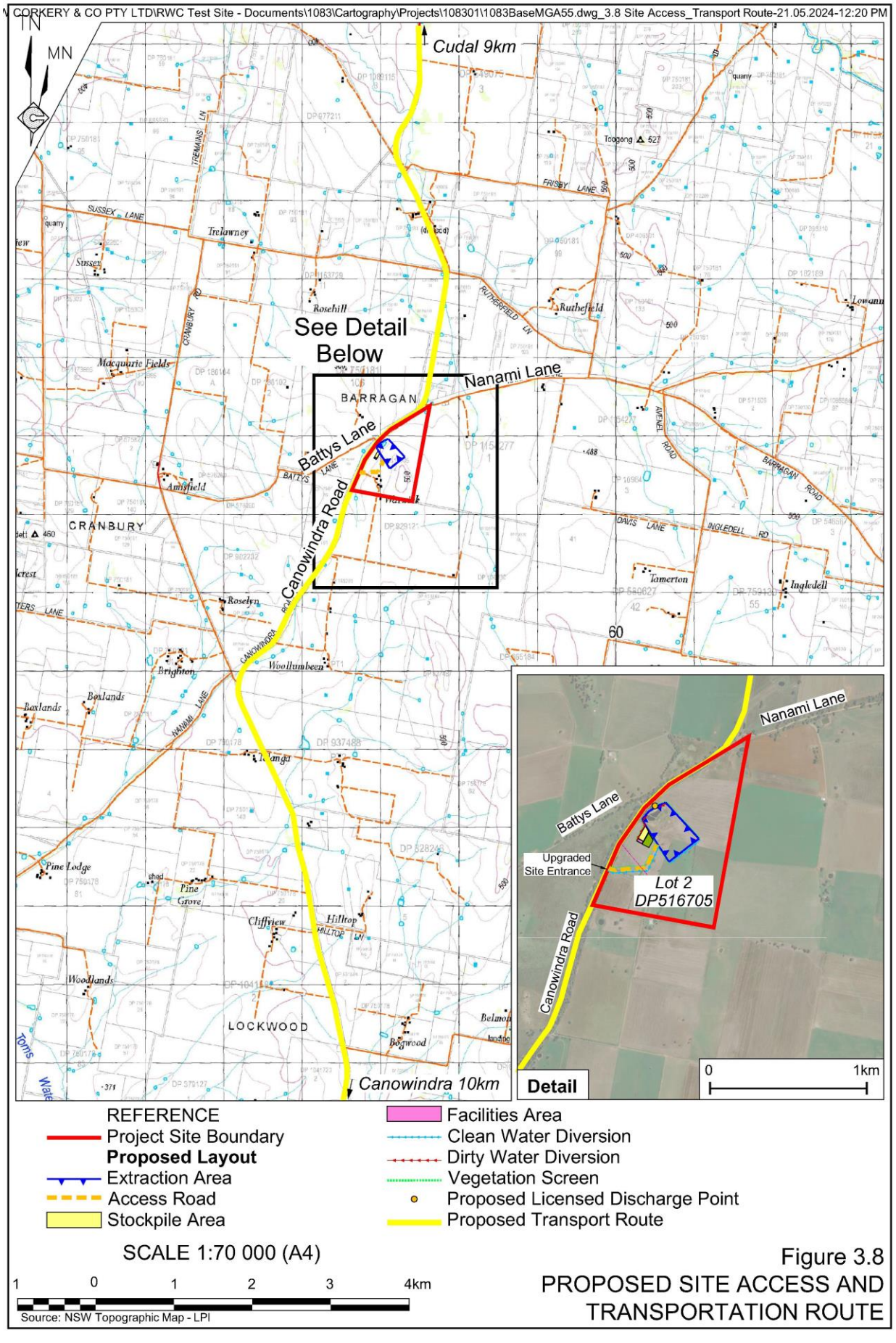


Figure 3.8
PROPOSED SITE ACCESS AND TRANSPORTATION ROUTE

The ATC collected details of the composition of the traffic based on the Austroads-94 Vehicle Classification System. **Table 3.3** presents the distribution of traffic volumes separated by classification of light vehicles, heavy vehicle, or articulated vehicle. Approximately 29% of vehicles on Canowindra Road are heavy vehicles. On Saturdays, this reduces to approximately 18%.

Table 3.3
Surveyed Traffic Composition on Canowindra Road

Day	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles	Percent Heavy Vehicles
Average Weekday	667	136	139	942	29.2
Saturday	522	59	55	636	17.9
Source: TTPP (2024) – Table 2.2					

Vehicle speeds were also recorded for the Canowindra Road and are presented in **Table 3.4**.

Table 3.4
Surveyed Vehicle Speeds on Canowindra Road (km/h)

Direction	Average Weekday		Saturday	
	Average Speed	85th Percentile Speed	Average Speed	85th Percentile Speed
Northbound	99.8	107.7	101.2	108.9
Southbound	98.3	107.3	99.9	108.9
Source: TTPP (2024) – Table 2.3				

Traffic growth for the Canowindra Road is expected to be constrained to the growth of the township of Canowindra as no major developments have been identified within the vicinity of the Project Site that may impact traffic levels within the region.

The Site Entrance has sight distances of approximately 280m from the north and in more than 500m from the south, in excess of that required for the Safe Intersection Sight Distance (SISD).

3.6.3 Constraints

The level of traffic on the Canowindra Road and intersection sight distance is unlikely to constrain the Proposal.

3.7 Heritage

3.7.1 Introduction

OzArk Environment & Heritage (OzArk) were engaged to undertake a due diligence assessment for the Proposal. The report, hereafter referred to as OzArk (2024b) is presented as **Appendix 6**.

The following subsections describe the heritage setting of the Project Site. The desktop and visual inspection component for the study area follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence Code; DECCW 2010). Section 57 of the *National Parks and Wildlife Regulation 2019* (NPW Regulation), details a due diligence process to determine likely impacts on Aboriginal objects as a result of the Proposal and is an important step in satisfying Aboriginal heritage obligations in NSW.

3.7.2 Heritage Study Area

The 9.3ha Heritage Study Area encompasses the impact footprint of the Proposal, including the Extraction Area, Access Road, and associated facilities, and stockpiling areas (**Figure 3.9**).

3.7.3 Assessment Approach and Local Setting

OzArk (2024b) determined that majority of the Heritage Study Area meets the Due Diligence criteria of 'disturbed land', including areas of ploughing, construction of infrastructure and vegetation clearing, and therefore does not require any further assessment (**Figure 3.9**). However, areas of remnant mature vegetation located within the Heritage Study Area are not considered disturbed and therefore, the due diligence process applies. In order to follow the due diligence process, a series of questions were answered to identify the proposed impacts on the Heritage Study Area. **Table 3.5** summarises the Due Diligence assessment process undertaken by OzArk (2024b).

Table 3.5
Due Diligence Process Summary

Process Step	Assessment Findings	Answer
Will the activity disturb the ground surface or any culturally modified trees?	• Extraction of material would disturb ground surface by bulldozer ripping and moving material which will be loaded for transportation offsite. • Quarry infrastructure (access track, facilities, stockpile area, roads) would also disturb the surface within the Heritage Study Area. • Mature trees and culturally modified trees, if present, may be impacted.	Yes
Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?	• A desktop search of the Aboriginal Heritage Information Management System (AHIMS) was completed on 20 October 2023 within a 40 x 40 km search area centred on the Heritage Study Area. • The search found 52 records for Aboriginal sites comprising of culturally modified trees (55.5%), artefact scatters (17.0%), isolated finds (13.5%) and burials. No previously recorded sites were found within the Heritage Study Area. • OzArk (2024b) determined that culturally modified tress and isolated finds are the most likely site type to be present in the study area.	No

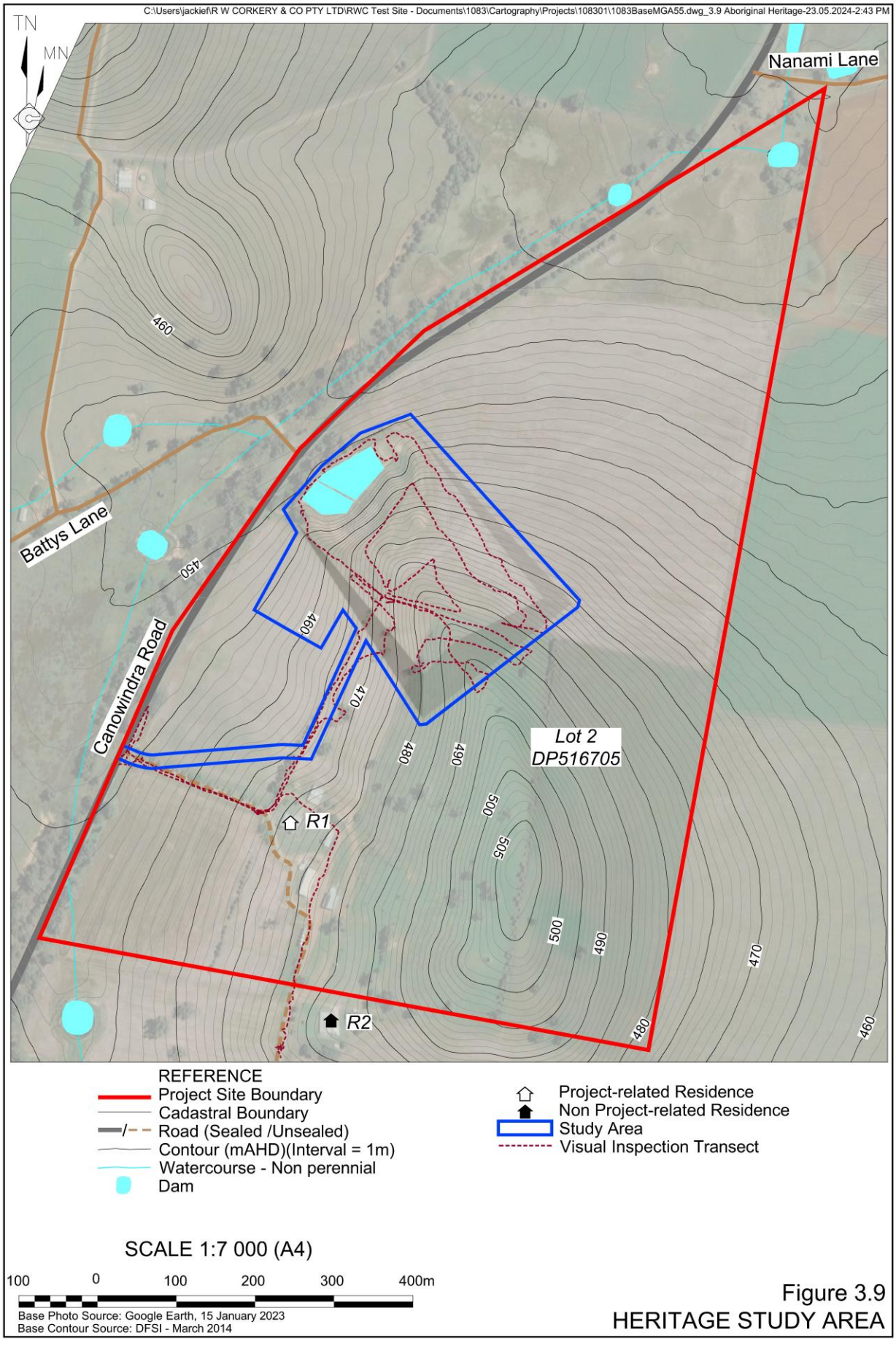


Figure 3.9
HERITAGE STUDY AREA

Table 3.5 (Cont'd)
Due Diligence Process Summary

Process Step	Assessment Findings	Answer
Are there any other sources of information of which a person is already aware?	• Previous local archaeological assessments by OzArk (2009, 2010) and Pardoe (2009, 2010) identified a number of culturally modified trees, isolated finds, artefact scatters and one open site outside the study area. Finds were generally found along ephemeral waterways. • Archaeological characteristics of the region suggest Aboriginal settlements are generally associated with reliable waterways. • OzArk (2024b) concluded that due to the distance of the Heritage Study Area from a reliable source of water, the likelihood of recording Aboriginal sites is significantly decreased.	No
Are there any landscape features that are likely to indicate presence of Aboriginal objects?	• The Due Diligence Code outlines a series of landscape features which are likely to contain Aboriginal objects, including any land within 200m of a body of water. • The western section of the Heritage Study Area is located within 200m of a non-perennial drainage line. OzArk (2024b) determined that this is unlikely to sustain a population of long-term inhabitants outside periods of increased rainfall. • The Heritage Study Area is also located within the Canobolas Slopes Landscape (Mitchell, 2002), comprised of sandy loam soils that support white, grey, and yellow box and stringybark species that are suitable for the extraction of bark for cultural purposes.	Yes
Can harm to Aboriginal objects or disturbance of archaeologically sensitive landscape features be avoided?	• Harm to identified archaeological sensitive landforms cannot be avoided as the Proposal required excavation of the surface.	No
Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?	• Visual inspection of the Heritage Study Area was undertaken by OzArk on the 25 October 2023 (**Figure 3.9**). • The inspection confirmed the proposed extraction area was located within highly disturbed landscape and assessed as having low archaeological potential. • No Aboriginal sites were identified within the Heritage Study Area. This is likely due to the distance from reliable water sources and extensive land disturbance.	No
Source: OzArk (2024b)		

3.7.4 Constraints

As no objects of Aboriginal heritage significance were observed within the Heritage Study Area heritage is unlikely to provide a constraint on the Proposal.

The Applicant states that there are no objects of historic heritage significance within the Project Site.

3.8 Visual Amenity

3.8.1 Introduction

The visual amenity assessment was undertaken by RWC. This subsection provides an overview of the visual setting of the Project Site and likely constraints that the visual amenity may impose upon the Proposal. Section 4.5 presents an assessment of the significance of the visual amenity impacts of the Proposal.

3.8.2 Local Setting

The visual setting of the Project Site is typical of rural settings throughout the Cabonne Local Government Area, with views dominated by:

- agricultural operations, including grazing and cropping;
- native vegetation;
- scattered houses and buildings; and
- local and regional roads and their associated vehicle movements.

The proposed Quarry is located on a ridgeline at approximately 450m AHD. The visual catchment of the Extraction Area, namely the areas that may have a view of the Extraction Area in the absence of vegetation, is presented in **Figure 3.10**. In summary, the Extraction Area is likely to be visible to observes on elevated sections of private land to the north of Battys Lane, with the extent of visibility limited by topography. The Extraction Area would also be visible to southbound motorists on Canowindra Road in the vicinity of the intersection with Nanami Lane. Finally, views of the Extraction Area from a distance of approximately 2km or more would be available from private land to the north of Rutherfield Lane.

Given the elevation of the Project Site and the presence of vegetation in the surrounding area, the Extraction Area is likely to be well screened from many of these vantage points.

3.8.3 Constraints

Visual amenity, if not managed appropriately, may pose a constraint upon the Proposal. Section 4.6 presents an assessment of impacts and proposed management and mitigation measures to be implemented to minimise the extent of those impacts.

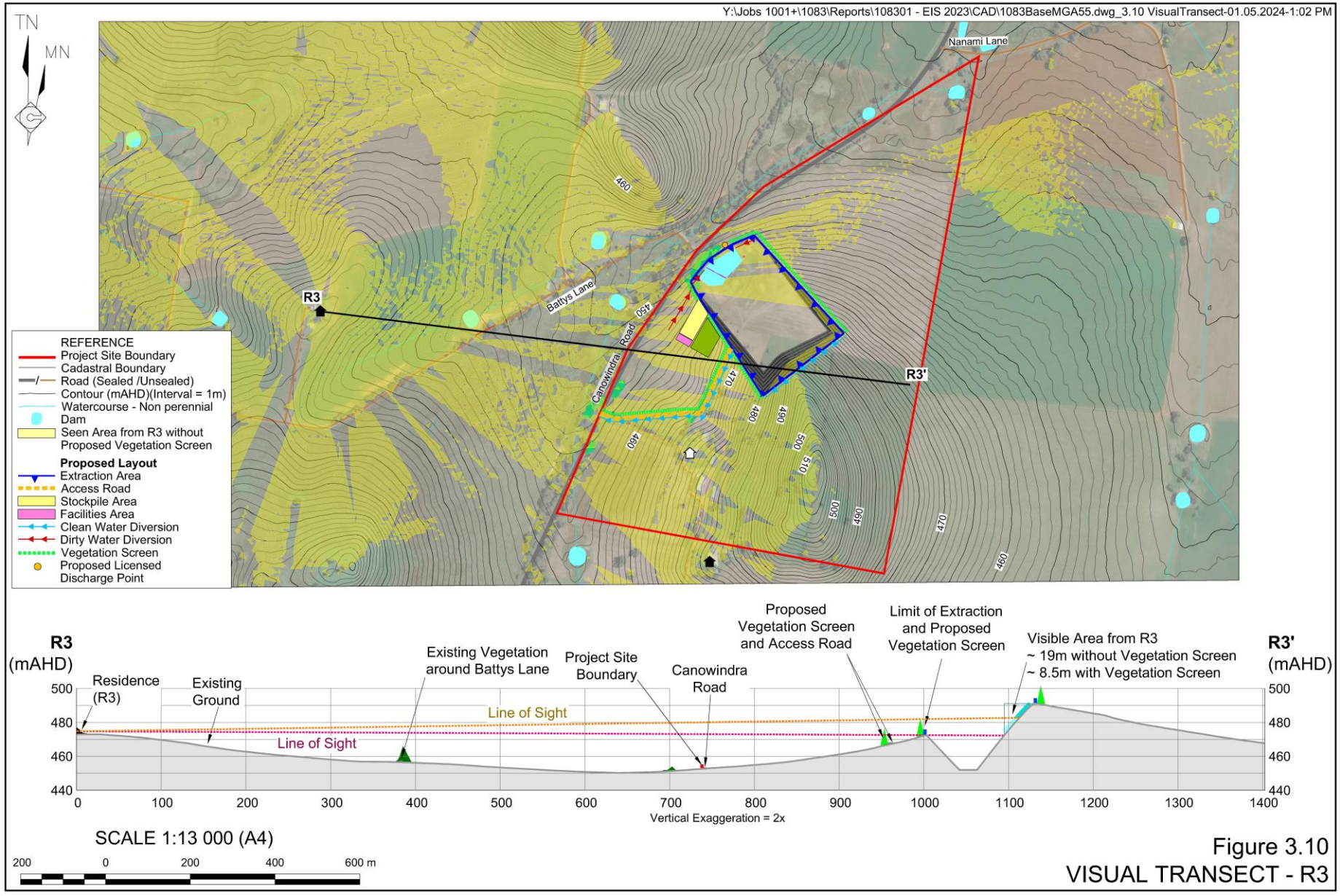


Figure 3.10
VISUAL TRANSECT - R3

3.9 Water Resources

3.9.1 Introduction

The water resources assessment was undertaken by RWC. This subsection provides an overview of the groundwater setting of the Project Site. The surface water setting is described in Section 3.1. This subsection also describes the likely constraints that water may impose upon the Proposal. Section 4.6 presents an assessment of water-related impacts of the Proposal.

3.9.2 Local Setting

A search of the Bureau of Meteorology groundwater database identified 20 registered bores within 2km of the Extraction Area (**Figure 3.2**). **Table 3.6** presents a summary of the recorded information for each bore. In summary, all registered bores are collared between 429m AHD and 463m AHD, with groundwater generally being encountered between 404m AHD and 437m AHD, or 15m below the proposed lowest point of the Extraction Area. As a result, and taking into consideration the location of the Extraction Area on a ridgeline, the proposed extraction operations are unlikely to intersect groundwater.

Table 3.6
Surrounding Registered Bores[1]

Bore Reference	Water bearing Zone	Standing Water Level (mbgl)	Geological Description	Yield (L/s)
GW015769	38.40 - 39.60, 43.90 - 45.10	-	Fractured / Granite	-
GW015719	31.40 - 35.10, 40.20 - 41.40	24.4	Fractured / Granite Weathered Water Supply	0.06 to 0.13
GW026087	22.90 - 25.00, 37.20 - 38.70, 41.50 - 41.80	18.3	Fractured / Shale Water Supply / Slate / Granite Weathered Water Supply	0.06 to 0.18
GW015602	40.20 - 51.50	30.5	Fractured / Granite Weathered Water Supply	0.16
GW015986	29.30 - 31.10, 35.40 - 37.80, 41.50 - 42.10	-	Fractured / Granite Weathered Water Supply / Slate Water Supply	-
GW017188	36.00 - 37.80, 41.10 - 44.10	18.3	Fractured / Shale Water Supply / Slate / Slate Dark Water Supply	0.28 to 0.63
GW019579	25.90 - 26.50	6.7	Fractured / Granite Weathered Water Supply	0.17
GW702166	19.40 - 21.00, 24.00 - 30.50, 33.50 - 36.50, 43.80 - 46.00	3.1	Silty clay / Ochre / Decomposed Granite / Andesite / Granite	0.44 to 1.00
GW702955	12.00 - 30.00	2.8	Red clay / Red weathered stone / Red and blue fractured stone / Blue fractured limestone	

Note 1: Bores with no groundwater information have been excluded from this summary.

Source: Australian Groundwater Explorer (BoM) (accessed 14/02/2024)

Schedule 4 of the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources* (NOW, 2012) identifies two springs, the Bogolong Springs and the Old Man Springs which are classified as High Priority Groundwater Dependent Ecosystems (GDEs). Those springs are not within the vicinity of the Project Site.

The Atlas of GDEs on the Bureau of Meteorology (BoM) website was also accessed to identify the occurrence or probability of occurrence of GDE's on or adjacent to the Project Site. The Atlas identifies low potential for GDE within the Project Site and surrounds.

3.9.3 Constraints

In light of the above, groundwater is unlikely to provide a constraint on the Proposal.

In relation to surface water, flows from disturbed sections of the Project Site would be directed to the existing sediment basin. Surface water flows from undisturbed sections of the Project Site would be diverted around the disturbed areas and would continue to flow to natural drainage. As a result, surface water is unlikely to provide a constraint on the Proposal.

3.10 Air Quality

3.10.1 Introduction

The air quality assessment was undertaken by RWC. This subsection provides an overview of the air quality setting of the Project Site and likely constraints that the air quality may impose upon the Proposal. Section 4.7 presents an assessment of the significance of the air quality impacts of the Proposal.

3.10.2 Local Setting

The air quality of the environs surrounding the Project Site is typical of a rural setting with airborne contaminants generated by existing land uses including:

- agricultural activities such as ploughing, cultivation and stock movements;
- vehicle movements on local unsealed roads;
- wind erosion from disturbed land.

3.10.3 Proposed Changes to Air Quality

Potential additional particulate matter generating activities as a result of the Proposal include the following.

- Extraction operations, including ripping and pushing with a bulldozer.
- Stockpile management and truck loading operations, including operation of a front-end loader.
- Processing operations, including crushing and screening operations.
- Transportation of quarry products, including vehicles traversing the unsealed section of the Site Access Road.

3.10.4 Constraints

Taking into account the distance from the Extraction Area to the closest residences and the low intensity nature of the proposed activities, air quality is unlikely to pose a significant constraint on the Proposal.

3.11 Soils and Land Capability

3.11.1 Introduction

The soils and land capability assessment was undertaken by RWC. This subsection provides an overview of the local setting of the Project Site and likely constraints that soils and land capability may impose upon the Proposal. Section 4.8 presents an assessment of the significance of the soils and land capability impacts of the Proposal.

3.11.2 Local Setting

A review of the NSW SEED database indicates the following in relation to the soils of the Project Site (**Figure 3.11**).

- Soil landscape – Canowindra Soil Landscape[1], comprising Non-Calcic Brown Soil. The Canowindra Soil Landscape originates from parent rock of quartz feldspar porphyry with sparse garnets, shale, limestone, and alluvium. Non-Calcic Brown Soil generally occurs on the upper slopes of hills and is a well-drained, moderately permeable soil. This soil is generally a dark reddish brown to fine sandy soil, of depth up to 20cm with increasing clayiness at depth. It has a low to moderate erodibility and is generally suitable for earthwork construction.
- Soil and land capability - Class 3 or high capability land with moderate limitations capable of sustaining high-impact land uses, such as cropping.

3.11.3 Constraints

Given the Project Site is located on Class 3 land, it is unlikely that land and soil capabilities will pose a constraint on the Proposal.

[1] Soil landscapes outline from espade.environment.nsw.gov.au © State of NSW and Department of Planning, Industry and Environment 2024.

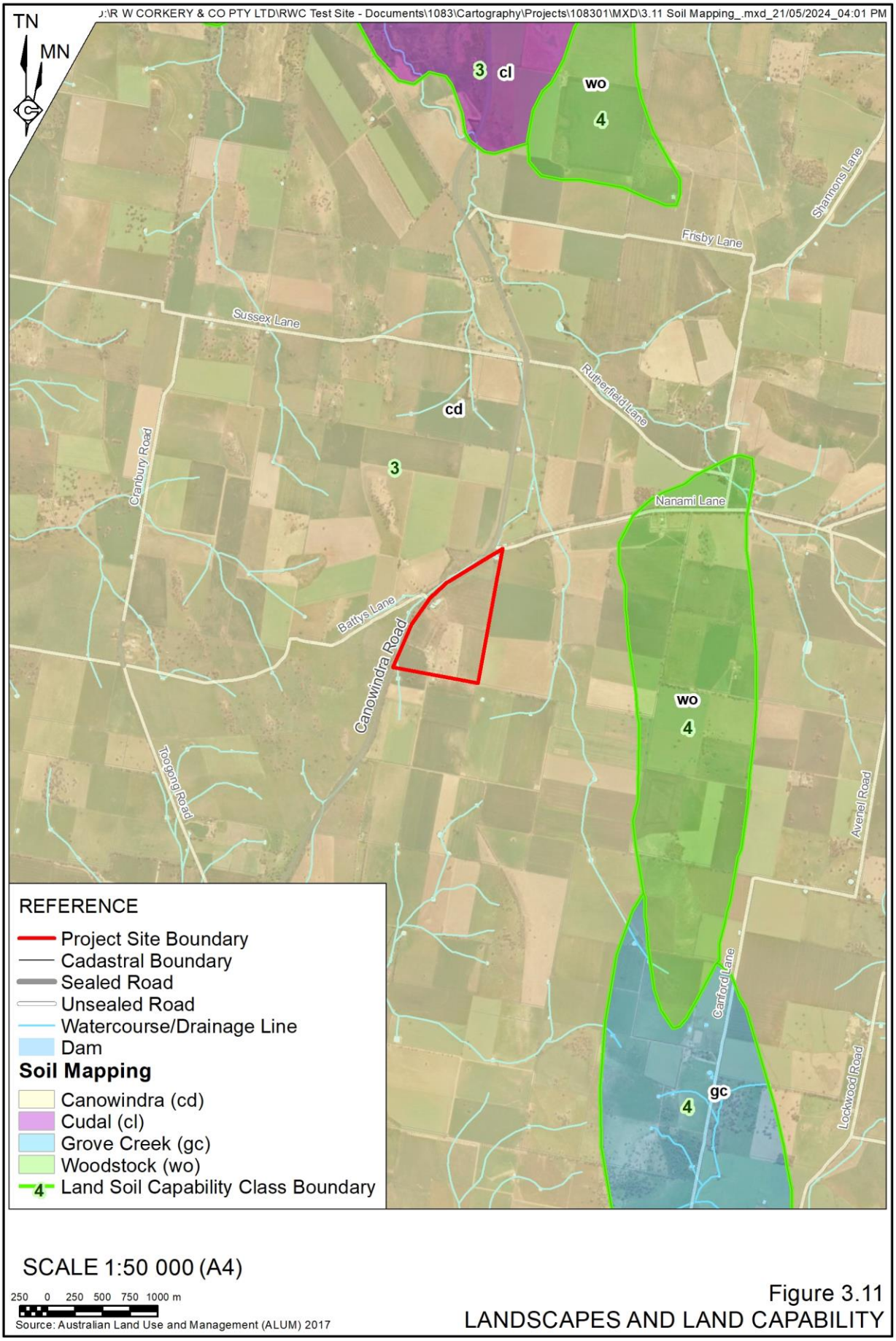


Figure 3.11
LANDSCAPES AND LAND CAPABILITY

3.12 Socio-economic Profile

3.12.1 Introduction

The socio-economic assessment was undertaken by RWC. This subsection describes the existing socio-economic setting, the social and economic contributions that would be made by the Proposal, identifies the management and mitigation measures. Section 4.11 assesses the residual impacts following the implementation of these management and mitigation measures.

3.12.2 Community Profile

3.12.2.1 Surrounding Communities

Communities surrounding the Project Site include the following.

- Immediate neighbours and local residents surrounding the Project Site.
- Residents of the township of Cudal, 16km northwest of the Project Site.
- Residents of the township of Canowindra, 20km south of the Project Site.
- Residents within the Cabonne LGA.

Each of these communities would be impacted to a greater or lesser degree depending on their proximity to the Project Site or transportation route, and the size, resilience, and cohesiveness of the relevant community and its economy. For the purpose of this assessment, particular focus is placed on those communities most likely to be impacted by the Proposal, including residents of the Cudal and Canowindra State Suburbs (SS), as defined by the Australian Bureau of Statistics (ABS), and the Cabonne LGA (see Figure 3.12).

Cudal is a small regional township established in the late 1860s, with a history of agricultural land uses and production of wool, wheat, angora goats and canola. The town is located 39km west of Orange and 66km north of Cowra, and supports a population of 580 as at the 2021 census.

Canowindra is a regional township, with a population of 2,433 people at the 2021 census. Canowindra is located approximately 59 km southwest of Orange, and approximately 32km north of Cowra.

The Cabonne LGA (**Figure 3.12**) is located within the Central West of NSW and is surrounded by the Cowra LGA to the south, the Weddin LGA to the southwest, the Forbes and Parkes LGAs to the west, the Narromine LGA to the northwest, the Dubbo and Wellington LGAs to the north, the Bathurst Regional LGA to the east, and the Blayney and Orange LGAs to the southeast. The population of the LGA was recorded at the 2021 census as 13,766. The LGA is generally supported by agricultural production, grazing of sheep and cattle, and cropping, primarily wheat, as well as mining activities.

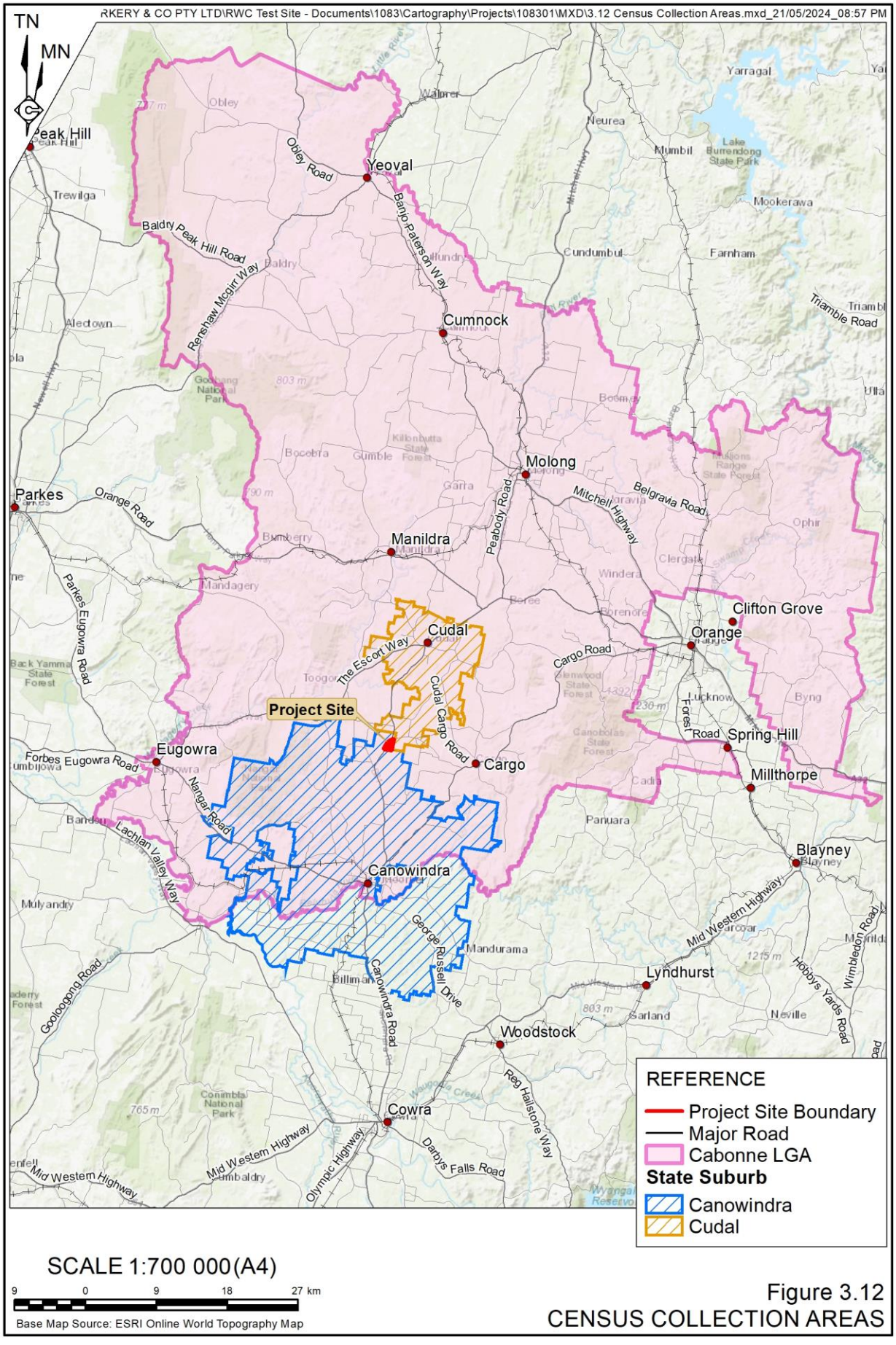


Figure 3.12
CENSUS COLLECTION AREAS

3.12.2.2 Community Statistics

The following demographic data was sourced primarily from the ABS 2021 census data, with supporting data from the 2016 census. All data has been gathered from the community profile tables and quick data sets from the ABS website (http://www.abs.gov.au/). Information is provided for the Cudal SS, Canowindra SS, and the Cabonne LGA, as well as utilising NSW data for comparison purposes.

Population and Age Characteristics

Table 3.7 presents the population data from both the 2016 and 2021 census. In summary, the population of Cudal SS, Canowindra SS and the Cabonne LGA in 2016 were 559, 2,257, and 13,391 respectively. Population growth within the Cabonne LGA between 2016 and 2021 was significantly lower than the NSW average, with a 2.7% population gain, compared with 7.3% gain for NSW as a whole.

Table 3.7
2016 and 2021 Census Population Statistics

	Cudal SS		Canowindra SS		Cabonne LGA			NSW		
	2016	2021	2016	2021	2016	2021	%	2016	2021	%
Total	559	580	2,257	2,433	13,391	13,766	2.7	7,480,223	8,072,163	7.3
Males	297	317	1,094	1,156	6,692	6,851	2.3	3,686,007	3,984,166	7.5
Females	262	263	1,163	1,277	6,699	6,915	3.1	3,794,216	4,087,995	7.2
Source: ABS 2021 Census										

Table 3.8 presents the 2021 Census population data broken down by age. In comparison to the Cudal SS and the Cabonne LGA, the Canowindra SS had a lower proportion of people aged between 0 and 14, and 35 and 44 years old, but a higher proportion of people aged between 45 and 64, and 75 years and older. In comparison to the whole of NSW, the Cabonne LGA had a higher proportion of people aged between 5 and 14 years old, 15 and 19 years old, and 45 years and older. The Cabonne LGA had a lower proportion of people between 19 and 44 years old. This potentially reflects limited economic and employment opportunities for those in the early stages of their working life, and increased proportion of school aged and retired residents within the Cabonne LGA.

Table 3.8
2021 Census Age Statistics

	Cudal SS		Canowindra SS		Cabonne LGA		NSW	
	No.	%	No.	%	No.	%	No.	%
Children								
0-4	33	5.7	120	4.9	751	5.5	468,056	5.8
5-14	86	15.5	302	12.4	2,043	14.8	1,001,950	12.4
Studying or Working								
15-19	31	5.3	146	6.0	876	6.4	457,896	5.7
20-24	25	4.3	102	4.2	628	4.6	496,185	6.1
25-34	48	7.9	207	8.4	1,139	8.3	1,142,026	14.2
35-44	71	12.4	229	9.3	1,539	11.2	1,103,170	13.7
45-54	65	11.2	299	12.5	1,832	13.3	1,016,948	12.6

Table 3.8 (Cont'd)
2021 Census Age Statistics

	Cudal SS		Canowindra SS		Cabonne LGA		NSW	
	No.	%	No.	%	No.	%	No.	%
Approaching Retirement or Retired								
55-64	81	13.4	366	15.1	1,987	14.4	961,784	11.9
65-74	91	14.4	358	14.2	1,677	12.2	788,725	9.8
75-84	45	8.1	227	9.6	960	7	451,521	5.6
85+	11	1.9	74	3.0	331	2.4	183,895	2.3
Total	580		2,433		13,766		8,072,163	

Source: ABS 2021 Census

Employment

Table 3.9 presents employment statistics from the 2021 Census. These indicate that the percentage of people within the Cudal SS, Canowindra SS and the Cabonne LGA that are involved in full-time work, and the total labour force as a whole, are slightly higher than the Canowindra SS and the NSW total labour force as a whole.

Table 3.9
2021 Census Employment Statistics

	Cudal SS	Canowindra SS	Cabonne LGA	NSW
	2021	2021	2021	2021
Employed				
Full-time	171 (60.2%)	596 (56.8%)	4,002 (61.3%)	2,136,610 (55.2%)
Part-time	93 (32.7%)	354 (33.7%)	2,151 (33.0%)	1,151,660 (29.7%)
Employed, away from work	11 (4.9%)	35 (4.8%)	262 (4.0%)	331,611 (10.7%)
Employed, hours not stated	6	17	121	64,276
Total	**277**	**1,005**	**6,525**	**3,684,158**
Unemployed, looking for:				
Full-time work	0	18	90	107,837
Part-time work	6	22	80	82,015
Total Unemployed	**6 (2.1%)**	**40 (3.8%)**	**174 (2.6%)**	**189,852 (4.9%)**
Labour Force Participation				
Total labour force	284	1,050	6,701	3,874,012
Not in labour force	160	762	3,462	2,341,417
Labour force status not stated	18	202	806	386,728
Total Persons	**467**	**2,012**	**10,970**	**6,602,157**
Labour force participation	**60.8%**	**52.2%**	**61.1%**	**58.7%**

Source: ABS 2021 Census

Industry of Employment

Table 3.10 presents employment by industry statistics from the 2021 Census. The most significant industry of employment in the Cudal SS, the Canowindra SS, and the Cabonne LGA is agriculture, forestry and fishing, with 13.7%, 25.2%, and 17.3%, respectively. In comparison, the State percentage of the labour force in this industry is 2.2%.

Table 3.10
2021 Census Industry of Employment Statistics

	Cudal SS		Canowindra SS		Cabonne LGA		NSW	
	2021	% of Labour Force	2021	% of Labour Force	2021	% of Labour Force	2021	% of Labour Force
Agriculture, forestry & fishing	38	13.7	253	25.2	1,129	17.3	74,728	2.2
Mining	11	3.9	20	2.0	251	3.8	35,406	0.9
Manufacturing	22	7.9	46	4.6	438	6.7	201,654	5.5
Electricity, gas, water & waste services	4	1.4	19	1.9	70	1.1	35,584	0.9
Construction	17	6.1	54	5.4	549	8.4	315,520	8.5
Wholesale trade	10	3.6	19	1.9	124	1.9	103,466	2.8
Retail trade	7	2.5	77	7.7	420	6.4	331,486	8.9
Accommodation & food services	18	6.5	51	5.1	312	4.8	227,466	6.1
Transport, postal & warehousing	15	5.4	44	4.4	234	3.6	169,608	4.6
Information media & telecommunications	0	0.0	9	0.9	28	0.4	68,068	1.8
Financial & insurance services	6	2.2	6	0.6	80	1.2	193,679	5.2
Rental, hiring & real estate services	0	0.0	9	0.9	61	0.9	62,633	1.7
Professional, scientific & technical services	8	2.9	27	2.7	275	4.2	326,595	8.8
Administrative & support services	14	5.1	20	2.0	143	2.2	117,988	3.2
Public administration & safety	26	9.4	38	3.8	420	6.4	222,909	6.1
Education & training	19	6.9	82	8.2	566	8.7	322,236	8.7
Health care & social assistance	32	11.6	136	13.5	882	13.5	529,176	14.3
Arts & recreation services	3	1.1	0	0.0	45	0.7	51,789	1.4
Other services	11	4.0	38	3.8	238	3.6	125,380	3.4
Inadequately described/Not stated	15	5.4	53	5.3	248	3.8	168,787	4.6
Total	**277**		**1,005**		**6,525**		**3,684,158**	

Source: ABS 2021 Census

Approximately 3.9%, 2% and 3.8% of residents of the Cudal SS, Canowindra SS, and the Cabonne LGA are employed within the mining industry, respectively. In comparison, 0.9% are employed in the mining industry in NSW as a whole.

Income

Table 3.11 presents income statistics from the 2021 Census. The data indicates that the median individual incomes and median household incomes are higher in Cudal SS and the Cabonne LGA compared to the Canowindra SS, and even higher in NSW as a whole.

Table 3.11
2021 Census Income Statistics

	Cudal SS	Canowindra SS	Cabonne LGA	NSW
Median individual income ($/weekly)	716	609	768	813
Median family income ($/weekly)	1,792	1,471	1,984	2,185
Median household income ($/weekly)	1,312	1,099	1,538	1,829
Source: ABS 2021 Census				

Housing Cost

Table 3.12 presents housing cost statistics from the 2021 Census. The data indicates that the median housing loan monthly repayment and median weekly rents are higher in Cudal SS and the Cabonne LGA compared to the Canowindra SS, and even higher in NSW as a whole.

Table 3.12
2021 Census Cost of Housing and Household Size Statistics

	Cudal SS	Canowindra SS	Cabonne LGA	NSW
Median housing loan repayment ($/monthly)	1,300	1,100	1,625	2,167
Median rent ($/weekly)	256	220	250	420
Average number of persons per bedroom	0.8	0.7	0.8	0.9
Average household size	2.4	2.3	2.6	2.6
Source: ABS 2021 Census				

Education

Table 3.13 presents post-school education statistics from the 2021 Census. The data indicates that a significantly higher proportion of people hold bachelor degrees and postgraduate degrees in NSW, and in the Cabonne LGA, compared to the Cudal and Canowindra SS. This is also the case for people with Graduate Diploma and Graduate Certificate Level, Bachelor Degree Level and Diploma Level qualifications.

In comparison, the proportion of people who hold certificate level qualifications is significantly higher in the Cudal SS, Canowindra SS and the Cabonne LGA compared to the NSW average. This may reflect the general lack of accessible universities for residents of the Cabonne LGA and limited professional opportunities for those with such qualification. By contrast, the higher proportion of TAFE-based qualification identifies that the TAFE located at Orange and Cowra are critical infrastructure for the local population.

Table 3.13
2021 Census Post School Level of Education

	Cudal SS	Canowindra SS	Cabonne LGA	NSW
Postgraduate Degree Level	8 (3.1%)	31 (2.7%)	354 (5.3%)	485,845 (11.5%)
Graduate Diploma and Graduate Certificate Level	10 (3.9%)	19 (1.6%)	185 (2.8%)	135,609 (3.2%)
Bachelor Degree Level	42 (16.3%)	200 (17.2%)	1,367 (20.4%)	1,217,048 (28.8%)
Advanced Diploma and Diploma Level	43 (16.6%)	155 (13.3%)	939 (14.0%)	616,322 (14.6%)
Certificate Level	134 (51.9%)	449 (38.6%)	2,644 (39.5%)	988,847 (23.4%)
Level of education inadequately described	0 (0.0%)	9 (0.8%)	52 (0.8%)	49,645 (1.2%)
Level of education not stated	26 (10.1%)	300 (25.8%)	1,152 (17.2%)	529,890 (12.5%)
Total	**258**	**1,163**	**6,686**	**4,231,474**

Source: ABS 2021 Census

3.12.3 Socio-economic Adverse and Beneficial Impacts Provided by the Proposal

In order to assess the overall impact of the Proposal on the socio-economic environment, the various adverse and beneficial impacts are considered as follows.

Adverse Impacts

Considering the relative isolation and the prior operation of the Project Site, the previously considered impacts on local noise, air quality and traffic would each have a minor impact on the properties within and adjacent to the Project Site.

The aesthetic appeal of the local setting, when viewed from the residences and properties surrounding the Project Site, may be reduced. It is noted, however, that the Project Site would only be visible from only one non-Project related dwelling, and that the proposed rehabilitation would return the disturbed areas to a landform and vegetation type similar to the pre-mining environment.

As a result, adverse socio-economic impacts are likely to be negligible.

Beneficial / Positive Impacts

The Proposal would provide direct full-employment for between 2 and 3 people during construction and operation of the Proposal. As it is the intention of the Applicant to source the workforce from the Cudal, Canowindra and surrounding areas, this would have a positive impact on economic activities within the Cabonne LGA and the Central West of NSW.

The Proposal would contribute approximately $455,000 in total to the local, regional, State and National economies through the purchase of consumables and payment of wages. This expenditure is likely to generate additional economic activity and flow on effects, providing further employment opportunities. The Proposal would also generate ongoing support for training and education of employees.

The Proposal would also contribute to the national and State economies through the payment of taxes and royalties and the purchase of goods and services from outside the local area.

3.12.4 Constraints

Given the small scale of the Proposal, the fact that the Project Site has previously been used for quarrying-related activities and that the Applicant has received broad support for the Proposal, socio-economic aspects are unlikely to constrain the Project.

Section 4

Environmental Features, Safeguards and Impacts

PREAMBLE

This section describes the environmental features of the Project Site and surrounds that would or may be affected by activities on the Project Site or associated with the Proposal. The proposed design and/or operational safeguards and an assessment of the level of impact the proposed activities may have after implementation of these safeguards is described. Where appropriate, monitoring programs are outlined.

4.1 Noise and Blasting

4.1.1 Introduction

Specific noise-related impacts that may result as a consequence of the Proposal (without the implementation of the management and mitigation measures presented in this assessment section) and therefore require assessment include:

- noise associated with construction and operational activities; and
- noise associated with Proposal-related traffic.

MAC (2024) has completed an assessment of the potential noise impacts associated with the Proposal in accordance with the requirements of the following guidelines (**Appendix 2**).

- Noise Policy for Industry
- Interim Construction Noise Guideline
- Road Noise Policy
- ANZEC Blasting Guidelines

The existing noise environment is described in Section 3.4. This subsection provides a brief description of the assessment methodology and criteria, the management and mitigation that would be implemented and the residual noise impacts associated with the Proposal.

4.1.2 Assessment Methodology

4.1.2.1 Introduction

MAC (2024) undertook the noise assessment using the DGMR (iNoise, Version 2024) noise modelling software to quantify Proposal-related noise emissions to neighbouring receivers. MAC (2024) states that the model calculation method used to predict noise levels was in accordance with:

- *ISO 9613:1 'Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere'.*
- *ISO 9613:2 'Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation'.*
- Including corrections for meteorological conditions using CONCAWE1.

In addition, MAC (2024) determined that there were no noise enhancing or prevailing winds that met the requirements for assessment. Given operations for the Proposal are limited to daytime hours, temperature inversions during the night-time are not relevant.

Table 4.1 presents the sound power levels assumed for each modelled item equipment for the noise scenarios.

Table 4.1
Modelled Sound Power Levels

Equipment	Number	Scenario(s)[1]	Modelled Sound Power Level dB LAeq(15min)
Bulldozer CAT D9	1	C, O, D	113
Excavator CAT 349	1	C, O	110
Front End Loader CAT 992	1	C, O, D	114
Mobile Crusher	1	C, O	118
Road Truck (Semi tipper, Truck & Dog)	1	C, O, D	108
Mobile Crane	1	C, D	109
Drill	1	O	114
Hydromulch Sprayer	1	D	104
Note 1: C: Construction, O: Operations (Years1, 5 and 10 and 20), D: Decommissioning and Rehabilitation			
Source: MAC (2024) modified after Table 14			

4.1.2.2 Assessment Scenarios

The Noise Assessment modelled noise emissions associated with the following scenarios at the closest three residences, namely R2, R3, and R4 (**Figure 3.5**).

Construction Scenario

The worst case construction scenario was assessed to determine the maximum noise emissions associated with:

- clearing and topsoil stripping:
- construction of a perimeter safety bund;
- development of the processing and stockpiling area and surface water infrastructure;
- construction of the upgraded Site Entrance; and
- installation of demountable buildings.

Operational Scenarios

Four operational noise scenarios were modelled as follows (**Figures 4.1** to **Figure 4.4**).

- Year 1 operations – Operations undertaken at 452m RL in the northern section of the Extraction Area with a 3m high bund to the west of the working area.
- Year 5 operations – Expansion of the working area, maintaining a 452m RL floor. The 3m high bund would be extended.
- Year 10 operations – Extraction operations across full width of the Extraction Area.
- Year 20 operations – Extraction operations across full extent of the Extraction Area.

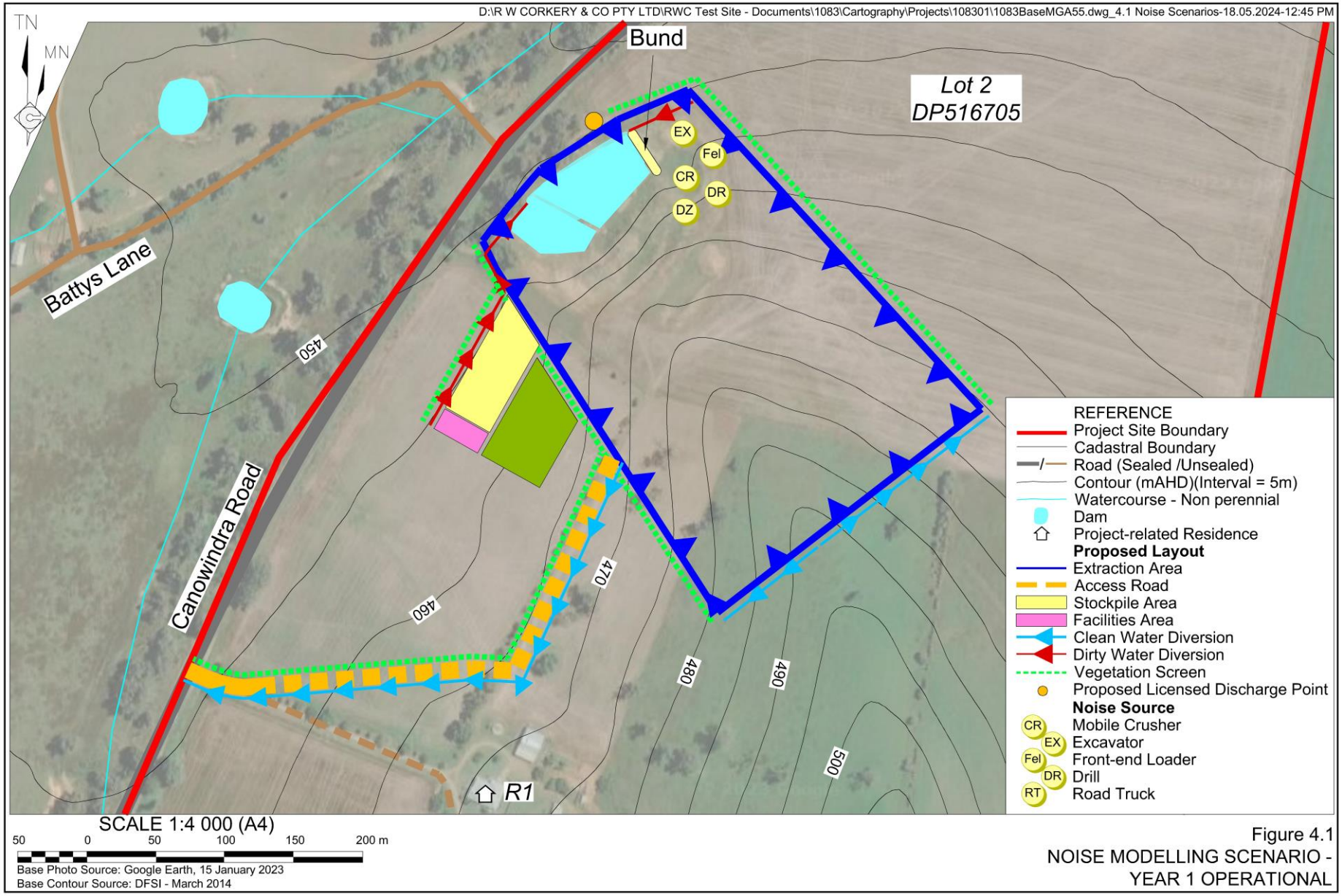


Figure 4.1
NOISE MODELLING SCENARIO - YEAR 1 OPERATIONAL

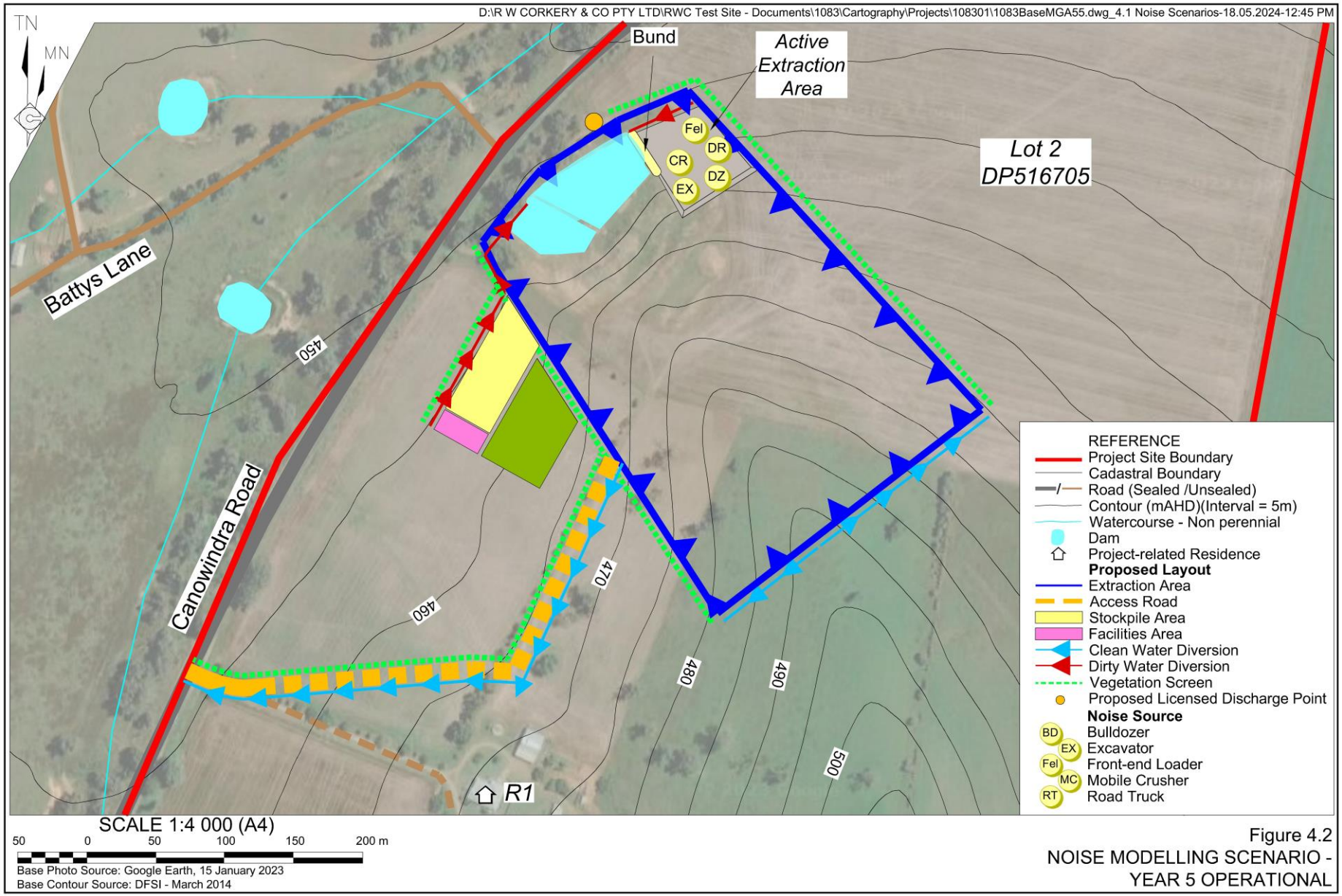


Figure 4.2
NOISE MODELLING SCENARIO - YEAR 5 OPERATIONAL

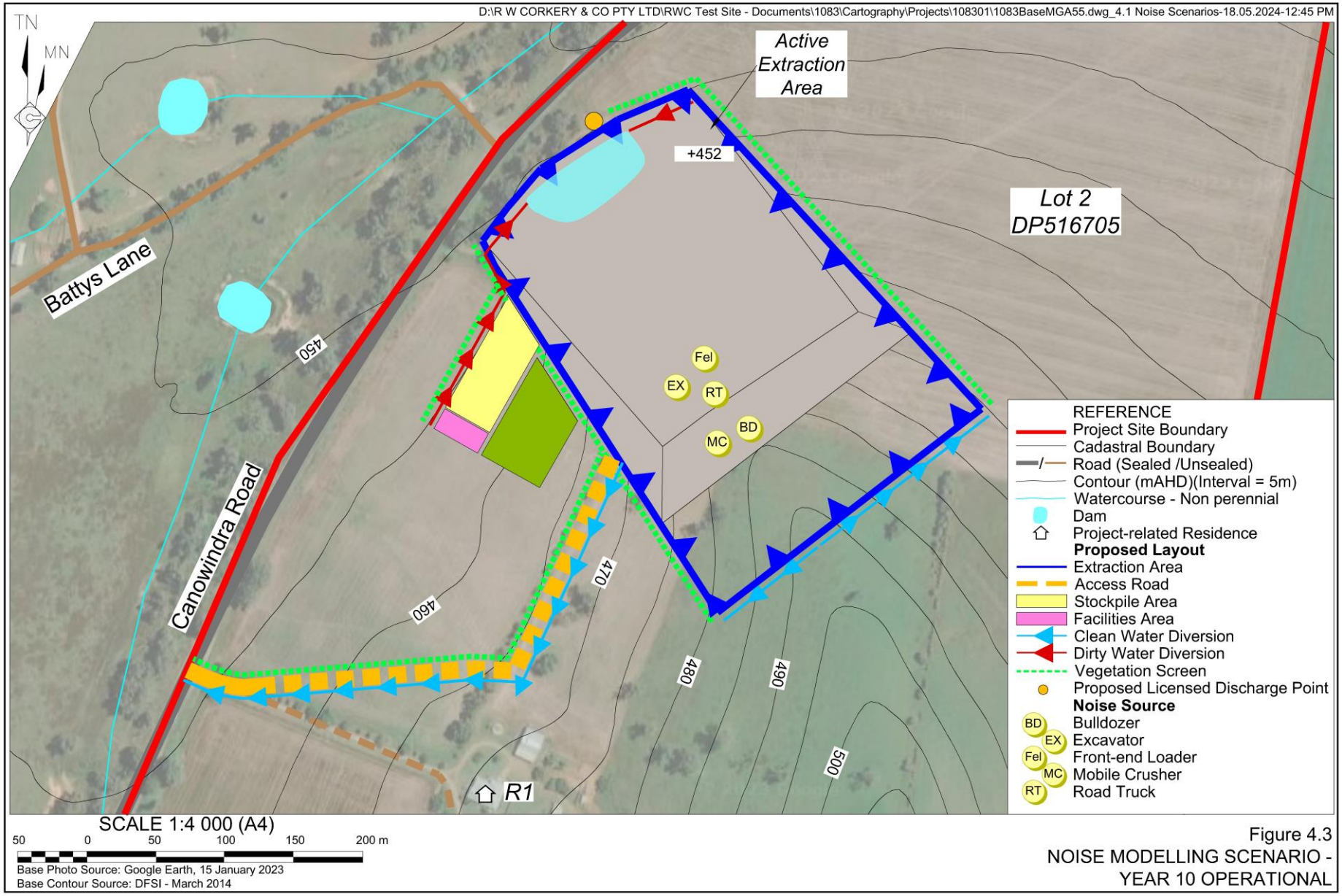


Figure 4.3
NOISE MODELLING SCENARIO - YEAR 10 OPERATIONAL

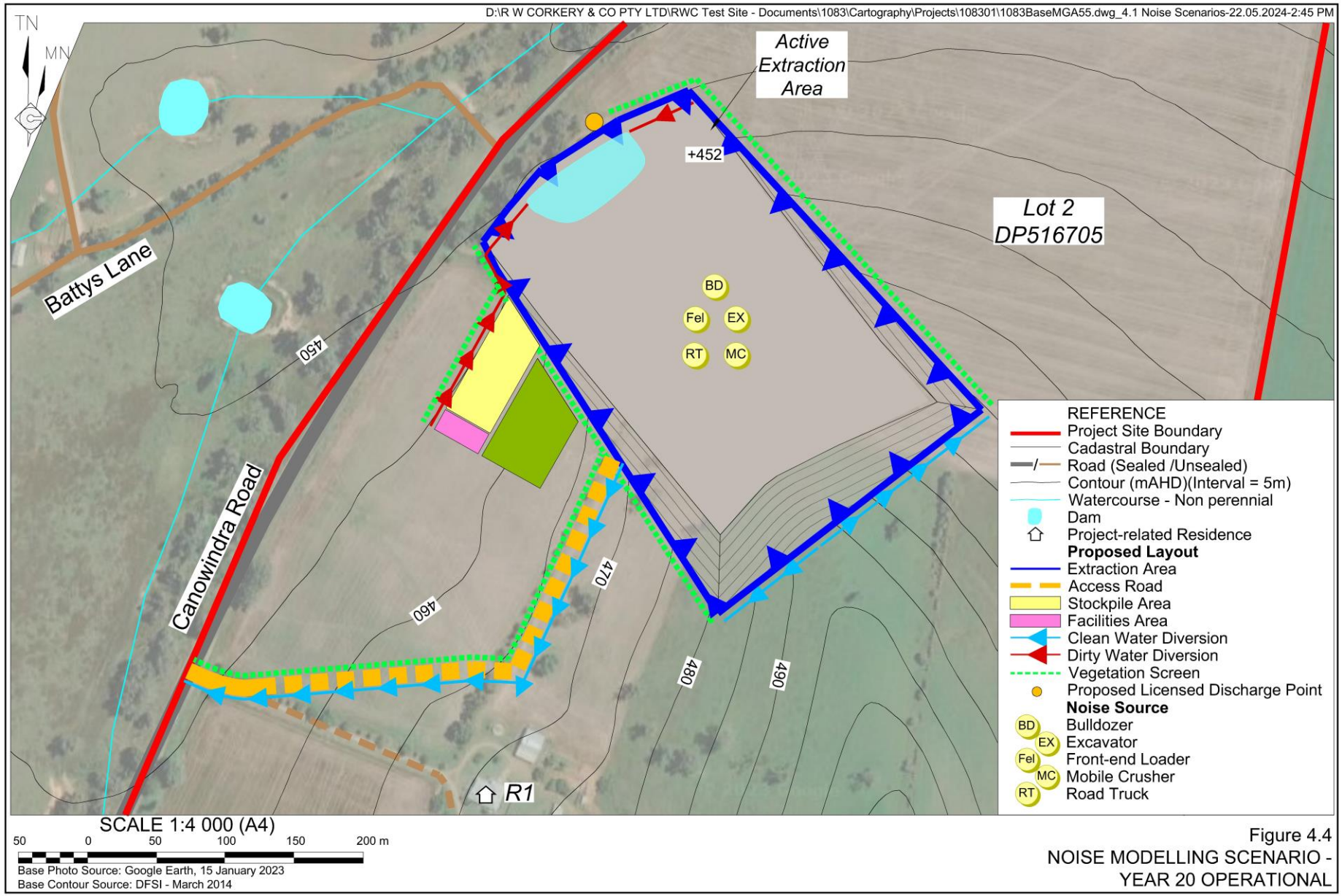


Figure 4.4
NOISE MODELLING SCENARIO - YEAR 20 OPERATIONAL

Road Traffic Noise Assessment

The road traffic noise assessment was undertaken in accordance with the Road Noise Policy (2011) based on the maximum proposed heavy vehicle movements of 44 laden trucks or 88 movements per day. The United States Environment Protection Agency's road traffic calculation method was used to predict the noise levels from site trucks travelling past receivers along public roads.

Decommissioning and Rehabilitation Scenario

The decommissioning and rehabilitation scenarios modelled all equipment operating at maximum capacity simultaneously following the completion of extraction operations, which would be the worst case scenario. Operations likely to occur during progressive rehabilitation would include the following.

- Shaping and, where required, backfilling of the terminal benches of the extraction area;
- spreading of topsoil sourced either from onsite stockpiles or elsewhere;
- ripping and scarifying perpendicular to the slope to facilitate infiltration of water and seed retention; and
- stabilising and seeding the prepared landform using a hydromulch of native grass species suitable for the final land use of nature conservation and / or agriculture.

Following completion of extraction, operations would include the following.

- Removal of all mobile plant and equipment, and demountable buildings; and
- shape, cover with soil and revegetate the final landform.

Blasting Scenario

Blasting impacts were assessed in accordance with *AS2187.2 Explosives—Storage and use Part 2: Use of explosives*. Blast locations were modelled at the northern and southern extents of the Extraction Arean. The following equations were used.

- air-blast overpressure ..... $P = K_a \left(\frac{R}{(Q^{1/3})}\right)^a$
- Ground-borne vibration..... $V = K_g \left(\frac{R}{(Q^{1/2})}\right)^{-B}$

4.1.3 Assessment Criteria

4.1.3.1 Operational Criteria

The operational noise criteria for the Proposal comprising intrusive and amenity criteria have been determined by MAC (2024) in accordance with the *Noise Policy for Industry* and are presented in **Table 4.2**. **Table 4.2** also presents the Project Noise Trigger Level (PNTL) which is the lower of the intrusive or amenity criteria and represents the applicable criteria for the Proposal.

Table 4.2
Operational Noise Criteria

Receiver Type	Assessment Period	Intrusiveness Criteria $L_{Aeq\ (15minute)}$ dB(A)	Amenity Criteria $L_{Aeq\ (15minute)}$ dB(A)	PNTL $L_{Aeq\ (15minute)}$ dB(A)
Residential	Day	40	48	40
Source: MAC (2024) after Table 7 and Table 8				

4.1.3.2 Construction and Decommissioning Criteria

The Construction Noise Management Levels for standard (daytime) construction hours have been determined by MAC (2024) in accordance with the quantitative assessment methodology presented in the NSW EPA's *Interim Construction Noise Guideline* and are presented in **Table 4.3**.

Table 4.3
Construction Noise Management Levels

Location	Assessment Period	Rating Background Level (dB(A))	Noise Management Level (dB $LA_{eq(15min)}$)
Residential receiver	Day (Standard Hours)	35	45 (RBL+10dBA)
Source: MAC (2024) after Table 9			

Decommissioning, being of a similar and temporary nature would also be assessed against the construction NMLs.

4.1.3.3 Road Traffic Noise Criteria

Road traffic noise criteria are determined in accordance with the NSW EPA's *Road Noise Policy*. The Canowindra Road may be classified as a "Freeway/arterial/sub-arterial road" under the *Road Noise Policy*. As a result, daytime road traffic noise criteria of 60dBA LAeq(15hour) has been adopted.

4.1.3.4 Blasting Criteria

The blasting and vibration are assessable against criteria established in the Australian and New Zealand Environment Council (ANZEC) – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration. General blasting limits are presented below.

- The recommended maximum overpressure level for blasting is 115dB. The level of 115dB may be exceeded for up to 5% of the total number of blasts over a 12-month period, but should not exceed 120dB at any time.
- The recommended maximum vibration velocity for blasting is 5mm/s Peak Vector Sum (PVS). The PVS level of 5mm/s may be exceeded for up to 5% of the total number of blasts over a 12-month period, but should not exceed 10mm/s at any time.

- Blasting should generally only be permitted during the hours of 9:00am to 5:00pm Monday to Saturday, and should not take place on Sundays and Public Holidays. and

4.1.4 Management and Mitigation Measures

The Applicant would implement the following noise and blasting management and mitigation measures throughout the life of the Proposal.

- Strictly comply with the proposed hours of operation identified in **Table 2.2**.
- Installation of a 3m high bund during the initial stages of extraction until appropriate buffering of noise is provided by the Extraction Area.
- Regularly service all on-site equipment to ensure sound power levels of each item remains at or below the default/or factory-set values.
- Install frequency modulated reversing alarms to all mobile equipment.
- Ensure that all truck drivers would be required to comply with the Applicant's Drivers Code of Conduct outlining procedures for reducing noise impacts during transportation within the Project Site and off site.
- Maintain an open dialogue with the surrounding community and neighbours to ensure any concerns over noise are addressed. In particular, ensure that the occupant of Residence R3 is consulted to ensure that there are no significant adverse noise-related impacts.
- Maintain unsealed roads to minimise body noise from empty trucks.
- Blasting to be undertaken only within the hours of 9:00am to 5:00pm Monday to Saturday and not on Sundays or public holidays.
- Blast designs should not exceed a Maximum Instantaneous Charge (MIC) of 100kg and should be designed to meet the relevant criteria within the ANZEC guidelines.
- Prior to commencing blasting operations, prepare a suitable Blast Management Plan to the satisfaction of Cabonne Shire Council. Ensure that the Plan includes a Traffic Control Plan for a brief closure of Canowindra Road and Battys Lane during blasting operations.
- At least 2 days prior to each blast, obtain required approvals from Cabonne Shire Council to briefly close Canowindra Road and Batty's Lane on the day of the proposed blast.
- At least 2 days prior to each blast, notification of neighbouring properties/residences should be undertaken to ensure that an adequate exclusion zone is identified to prevent harm to any person or animal.

- All blasts should be monitored by a suitably qualified person to ensure compliance with the ANZEC guideline limits. The results of any blast monitoring to be made available to surrounding neighbours on request.

4.1.5 Assessment of Impacts

4.1.5.1 Construction Noise Assessment

Table 4.4 presents the results of the construction noise assessment.. In summary, predicted noise levels during construction are expected to satisfy the relevant criteria at all non-project related receivers.

Table 4.4
Predicted Construction Noise Levels

Receiver	Noise Predictions (dBA $LA_{eq(15\ min)}$)	Noise Management Level (dBA $LA_{eq(15\ min)}$)
R2	44	45
R3	43	45
R4	32	45

4.1.5.2 Operational Noise Assessment

Table 4.5 presents the results of the four operational noise assessments. In summary, no residence is expected to receive noise emissions in excess of the 40dBA residential criterion under standard conditions at normal operations. Predicted noise levels from quarry operations are expected to satisfy the relevant criteria at all non-project related receivers all scenarios.

Table 4.5
Predicted Operational Noise Levels

Receiver	Year 1	Year 5	Year 10	Year 20	Project Noise Trigger Level (dB $L_{Aeq(15min)}$)
R2	38	35	38	33	40
R3	38	39	39	37	40
R4	<30	<30	<30	<30	40
Source: MAC (2024) after Table 18-21					

4.1.5.3 Road Traffic Noise Assessment

Table 4.6 presents the results of the road traffic noise assessment. The assessment was based on the offset distance to the nearest residential dwelling of 15m from the centreline of the Canowindra Road and assumed a maximum of 44 truck movements in any one day. The results indicate that traffic noise associated with the Proposal would be substantially less than the relevant criteria.

Table 4.6
Operational Road Traffic Noise Levels

Distance to Nearest Receiver (m)	Assessment Criteria – Day $L_{Aeq(15hr)}$, dB(A)	Project Traffic Noise $L_{Aeq(15hr)}$, dB(A)
15	60	56.2
Source: MAC (2024) after Table 24		

4.1.5.4 Decommissioning Noise Assessment

Table 4.7 presents the results of the decommissioning noise assessment. In summary, predicted noise levels during decommissioning are expected to satisfy the NMLs at all non-project related receivers.

Table 4.7
Predicted Decommissioning Noise Levels

Receiver	Noise Predictions (dBA $LA_{eq(15\ min)}$)	Noise Management Level (dBA $LA_{eq(15\ min)}$)
R2	40	45
R3	39	45
R4	<30	45
Source: MAC (2024) after Table 25		

4.1.5.5 Blasting Assessment

Table 4.8 presents the results of the blasting assessment assuming a Maximum Instantaneous Charge (MIC) of 100kg. In summary, blasting-related impacts would not exceed the relevant criteria for either air-blast overpressure or ground vibration at any residence during any period of operations.

Table 4.8
Predicted Blast Emissions

Receiver	Year of Highest Impact	Distance to Charge (m)	Air-Blast Overpressure (dBZ Peak)	Ground Vibration (mm/s)
R2	Year 20	513	114.7	2.1
R3	Year 1	1,000	106.3	0.7
R4	Year 1	2,130	96.8	0.2
Source: MAC (2024) – Table 22				

4.2 Biodiversity

4.2.1 Introduction

Specific biodiversity-related impacts that may result as a consequence of the Proposal (without the implementation of the management and mitigation measures presented below) and therefore require assessment include:

- disturbance to native vegetation;
- disturbance to the BC Act listed Box Gum Woodland CEEC; and
- loss of habitat trees.

OzArk (2024a) has completed an assessment of the potential biodiversity impacts associated with the Proposal (**Appendix 3**). The existing biodiversity environment is described in Section 3.5. This subsection provides a brief description of the management and mitigation that would be implemented, and the residual biodiversity impacts associated with the Proposal.

4.2.2 Management and Mitigation Measures

The Applicant would implement the following biodiversity management and mitigation measures throughout the life of the Proposal.

- Ensure that all personnel are aware of areas of approved disturbance and the consequences of unapproved disturbance.
- Identify the limit of approved disturbance areas on the ground through the use of permanent markers.
- Ensure that vegetation is removed in such a way to avoid damage to surrounding vegetation.
- Undertake a pre-clearing inspection to identify nests, roosting sites or threatened species in vegetation to be cleared. If nesting or roosting fauna are observed, encourage the animals to relocate by clearing surrounding vegetation or engage a suitable wildlife handler to relocate the animal(s).
- Engage a suitably qualified ecologist/fauna spotter catcher to conduct a pre-clearance survey of habitat trees to be removed, and to attend the removal of habitat trees.
- Avoid stockpiling and equipment operations/parking within the drip line of any remaining trees.
- Install erosion and sediment controls in line with *Managing Urban Stormwater, Soils & Construction Guidelines* (Landcom, 2004).
- Implement a Weed Management Plan consistent with Cabonne Shire Council's control plan for each noxious weed and the requirements of the *Biosecurity Act 2015*.

- Ensure that all ground-engaging machinery is cleaned and inspected prior to arriving at or departing the Project Site to prevent weed introduction and spread.

4.2.3 Assessment of Impacts

The design of the Proposal has, to the extent practicable, sought to reduce impacts to biodiversity by avoiding areas of high conservation value. The design has minimised disturbance of native vegetation as follows.

- The Extraction Area and associated Stockpile and Facilities Area have been located within extensively disturbed areas.
- The Extraction Area includes 0.35ha of native vegetation, of which 0.296ha is classified as the listed. Two habitat trees are located within the Extraction Area which would only be disturbed toward the end of the Quarry life.
- A small area (0.01ha) of the Box Gum CEEC occurs in the Canowindra Road corridor that will be disturbed for the site entrance upgrade. Previously, Cabonne Council has trimmed mature vegetation and no further vegetation clearing is required in this area. As a result, this area of native vegetation has not been included in the impact assessment.

The assessment of direct impacts conducted for the Proposal includes the following.

- Impacts to native vegetation and threatened ecological communities.
- Impact to threatened fauna and associated habitat.
- Impact to threatened flora.
- Fauna injury and mortality

Indirect impacts to biodiversity as a result of the Quarry included the following.

- Wildlife connectivity and habitat fragmentation
- Edge effects on adjacent native vegetation and habitat
- Invasion and spread of weeds, pests, pathogens, and disease.
- Noise, light, and vibration.

The total vegetated area (approx. 9.3ha) to be disturbed by the Proposal can be broken down into the following components.

- 0.054ha of PCT 53
- 0.218ha of PCT 266
- 0.078ha of PCT 277
- 2 habitat trees within PCT266 containing 3 small hollows.
- The remainder of the Project Site is classified as previously disturbed land/non-native vegetation totalling 9.191ha.

A small area (0.01ha) of the Box Gum CEEC occurs in the Canowindra Road corridor that will be disturbed for the site entrance upgrade. Previously, Cabonne Council has trimmed mature vegetation, and no further vegetation clearing is required in this area.

An Assessment of Significance was undertaken for each BC and EPBC Act-listed threatened species or communities considered to have a moderate-high likelihood of occurring within the subject site due to the presence of suitable habitat. Based on the above, OzArk (2024a) determined that the Proposal was considered unlikely to have a significant impact on biodiversity, including on predicted populations of threatened species and threatened ecological communities.

Cumulative Impacts

The cumulative impacts to biodiversity as a result of the Proposal, given the existing loss of native vegetation within the bioregion, is not considered to have a significant impact. The disturbance of the BC-Act Box Gum Woodland CEEC was determined by OzArk (2024a) to not be a significant impact.

Conclusion

OzArk (2024a) states that the Proposal is unlikely to have a significant impact on biodiversity, including to any threatened or migratory species, population or ecological community, or their habitats.

Finally, OzArk (2024a) states that the Proposal, due to the small disturbance footprint, does not require referral to the DCCEEW, trigger the need for a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report, or trigger entry into the Biodiversity Offset Scheme.

4.3 Traffic

4.3.1 Introduction

Specific traffic-related impacts that may result as a consequence of the Proposal (without the implementation of the management and mitigation measures presented below) and therefore require assessment include the following.

- Impacts on traffic volumes.
- Road network efficiency.
- Intersection operation and interaction with other intersections.
- Impacts on road safety.
- Parking.

TTPP (2024) has completed an assessment of the potential traffic impacts associated with the Proposal (**Appendix 4**). The existing traffic environment is described in Section 3.6. This subsection provides a brief description of the management and mitigation that would be implemented, and the residual traffic impacts associated with the Proposal.

4.3.2 Road Network Efficiency and Intersection Assessment

TTPP (2024) state that the Proposal would not create any discernible impacts on the Level of Service or traffic volumes along Canowindra Road.

TTPP (2024) recommends that the intersection of the Quarry Access Road and Canowindra Road to comply with a Basic Auxiliary Left and Basic Auxiliary Right (BAL and BAR) treatment consistent with Austroads (2023), *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*. The Applicant engaged Duncan Priestley Civil Engineering Pty Limited to prepare a preliminary design for a BAL/BAR intersection at the Site Entrance. That design is presented as **Figure 2.3** and the full design report is presented as **Appendix 5**.

TTPP (2024) states that the Site Access is considered adequately separated from other property accesses and intersections. The review of the road crash history of the roads to be used for transportation by the Proposal did not identify any causation factors associated with the existing road network that may be exacerbated by increased traffic demands.

Parking would be provided on-site to meet the Quarry's operational demands, creating no impact to on-street areas.

4.3.3 Management and Mitigation Measures

TTPP (2024) recommended the following management and mitigation measures to ensure that traffic and transport related impacts are minimised.

- Upgrade the Site Entrance intersection to comply with a BAL and BAR treatments prior to the sale of quarry products.

- Widen the Access Road to permit two-way movement of heavy vehicles.
- Develop and implement a Drivers' Code of Conduct for drivers of heavy vehicles who regularly access the Quarry, outlining behavioural expectations for those drivers. Compliance with the Code of Conduct should form part of the employment or contract conditions of those drivers, with penalties for non-compliance.
- Maintain the road reserve in the vicinity of the Site Entrance to ensure a suitable site distance is maintained through mowing of grass where required.
- Seal the Access Road for a distance of at least 50m from Canowindra Road to ensure that mud and dust is contained within the Project Site and does not track onto Canowindra Road.

4.3.4 Assessment of Impacts

In light of the fact that the Proposal would not result in a reduction in the existing level of service on the Canowindra Road and that the Applicant would construct the required BAL/BAR intersection between the Access Road and the Canowindra Road prior to the sale of quarry products, there would be no significant traffic-related impacts as a result of the Proposal.

The Applicant would consult with Transport for NSW and Council prior to any disturbance within the road reserve and would acquire the relevant permits and authorisations required to complete the site entrance upgrades.

4.4 Heritage

4.4.1 Introduction

Specific heritage-related impacts that may result as a consequence of the Proposal (without the implementation of the management and mitigation measures presented below) and therefore require assessment include disturbance of previously unidentified objects of Aboriginal or historic heritage significance.

OzArk (2024b) has completed an assessment of the heritage impacts associated with the Proposal (**Appendix 6**). The existing heritage environment is described in Section 3.7. This subsection provides a brief description of the management and mitigation that would be implemented, and the residual heritage impacts associated with the Proposal.

4.4.2 Management and Mitigation Measures

The Applicant would implement the following unanticipated finds protocol in the event that any objects of suspected Aboriginal heritage significance are identified throughout the life of the Proposal.

- Provide Quarry staff with information in relation to heritage awareness procedures to ensure they recognise Aboriginal artefacts and are aware of the legislative protection of Aboriginal objects under the National Parks and Wildlife Act 1974.
- Implement the following unanticipated finds protocol should any unanticipated Aboriginal objects be encountered.
  - Cease all work in the vicinity of the suspected object and establish a suitable buffer zone around the area.
  - Contact Heritage NSW as soon as practical, providing any details of the Aboriginal object and its location.
  - Facilitate, in consultation with the Aboriginal community and Heritage NSW and other appropriate authorities, recording of any objects determined to be of Aboriginal heritage significance and ensure that an Aboriginal Heritage Impact Permit is obtained prior to disturbance of the object.

4.4.3 Assessment of Impacts

As no objects of Aboriginal or historic heritage significance have been recorded or are considered likely to occur within the Project Site, the Proposal is unlikely to have a significant heritage.

4.5 Visual Amenity

4.5.1 Introduction

RWC has completed an assessment of the visual amenity impacts associated with the Proposal. The existing visual amenity is described in Section 3.8. This subsection provides a brief description of the management and mitigation that would be implemented, and the residual visual amenity impacts associated with the Proposal.

The Proposal would include establishment of the Extraction Area, Stockpile and Facilities Area and Access Road, each of which would be shielded by a visual screen. In reality, the Extraction Area would be the most visually intrusive aspect and, as a result the following assessment has focused primarily on that aspect.

No nighttime activities or operations are proposed, as such, there would be no changes to the night-time visual setting.

4.5.2 Management and Mitigation Measures

To reduce the impact of the Proposal on local visual amenity, the Applicant would implement the following management and mitigation measures. It is noted that many of these controls serve a dual function in the management of other environmental parameters, e.g. air quality and noise.

- Establish a tree line/visual screen around the perimeter of the Extraction Area and to the northwest of the Site Access Road (**Figure 2.2**).
- Establish a 3m high bund during the initial stages of extraction to minimise any direct visual impacts (**Figures 4.1** and **4.2**).
- Ensure that the soil stockpiles are progressively rehabilitated to establish a cover of vegetation as soon as practicable.
- Implement active dust suppression to reduce the potential for the creation of a 'dust cloud' over the Project Site.

4.5.3 Assessment of Impacts

Figure 4.9 presents the visual catchment of the Extraction Area. In summary, views of the Extraction Area would be available from elevated areas to the north of Battys Lane, including Residence R3 and to southbound motorists on Canowindra Road in the vicinity of the intersection with Nanami Lane.

Figure 4.7 presents a visual transect from Residence R3 towards the Extraction Area and **Figure 4.5** presents a photomontage of the Extraction Area currently and following completion of the Proposal. Visual amenity impacts on Residence R3 maybe summarised as follows.

- Sections of the Extraction Area would become progressively visible throughout the life of the Proposal.

- At the end of the life of the Proposal, approximately 19m of the eastern face of the Extraction Area would be visible, representing 1.0º of the vertical field of view from Residence R3
- A 10m high vegetated visual screen would reduce the visible section of the Extraction Area to the approximately 8.5m, representing 0.4º of the vertical field of view from Residence R3
- The final terminal faces would be revegetated to native vegetation and would blend with the surrounding landforms.

Figure 4.8 presents a visual transect from the intersection of Canowindra Road and Nanami Lane towards the Extraction Area and **Figure 4.6** presents a photomontage of the Extraction Area currently and following completion of the Proposal. Visual amenity impacts for southbound motorists on Canowindra Road maybe summarised as follows.

- Sections of the Extraction Area would become progressively visible throughout the life of the Proposal.
- At the end of the life of the Proposal, approximately 13m of the eastern face of the Extraction Area would be visible, representing less than 1.0º of the vertical field of view from the south bound section of Canowindra Road
- A 10m high vegetated visual screen would eliminate the visible section of the Extraction Area, only the tree screen would be visible
- The final terminal faces would be revegetated to native vegetation and would blend with the surrounding landforms.

The Applicant contends that the Proposal would not adversely impact on visual amenity surrounding the Project Site for the following reasons.

- All active extraction, processing, stockpiling, and loading operations would be undertaken within either the Extraction Area or Stockpiling Area which are located at a higher elevation than most of the surrounding lands, limiting the potential for site activities to be visible.
- The proposed perimeter vegetation screens would provide a long term screen that would prevent visual impact to surrounding lands.
- The proposed bund during the initial stages of extraction, would act as a visual screen from surrounding lands until the Extraction Area is more fully developed and would provide additional shielding.
- The Applicant would manage dust emissions to ensure dust does not impact on the visual amenity of the surrounding area.
- There would be no night-time operations, thus no nighttime visual amenity would be impacted.

Finally, the Applicant has met with the owners of Residence R3 and they indicated that they were comfortable with the Proposal and unconcerned about potential visual impacts.

D:\R W CORKERY & CO PTY LTD\RWC Test Site - Documents\1083\Cartography\Projects\108301\Photomontages.dwg_Layout1-22.05.2024-8:02 AM



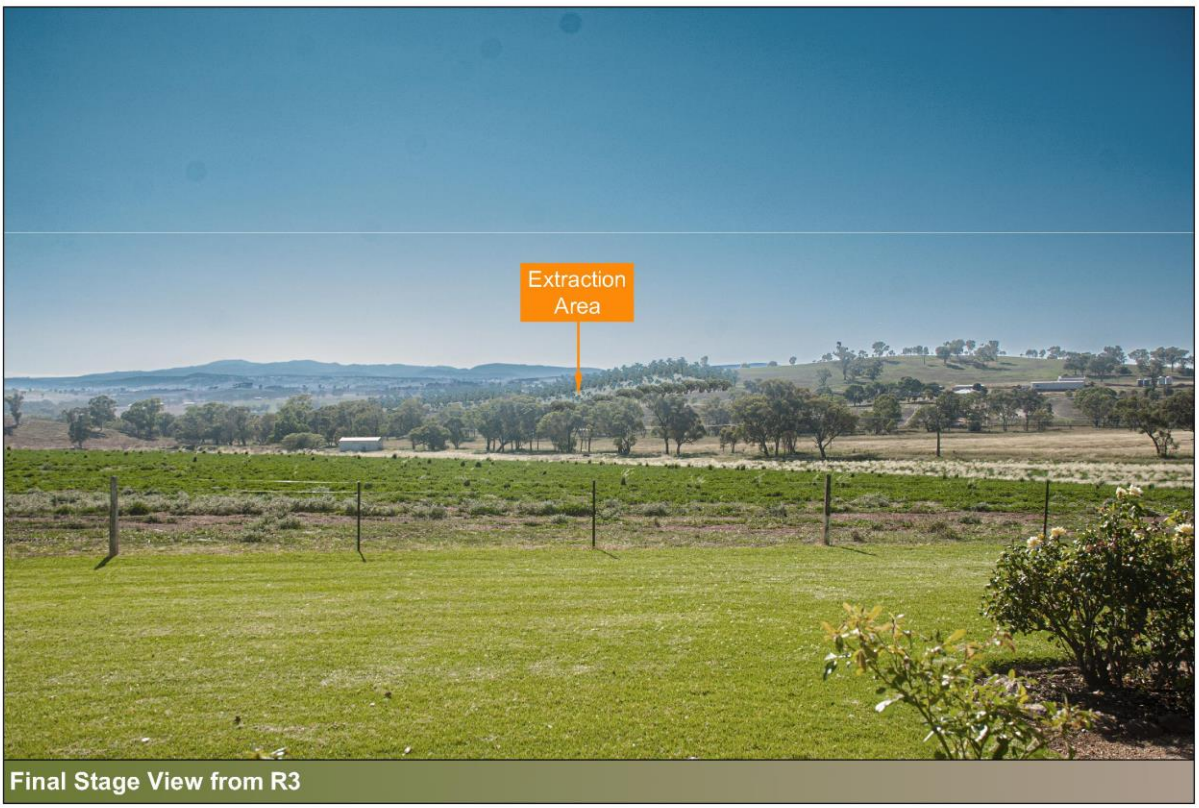
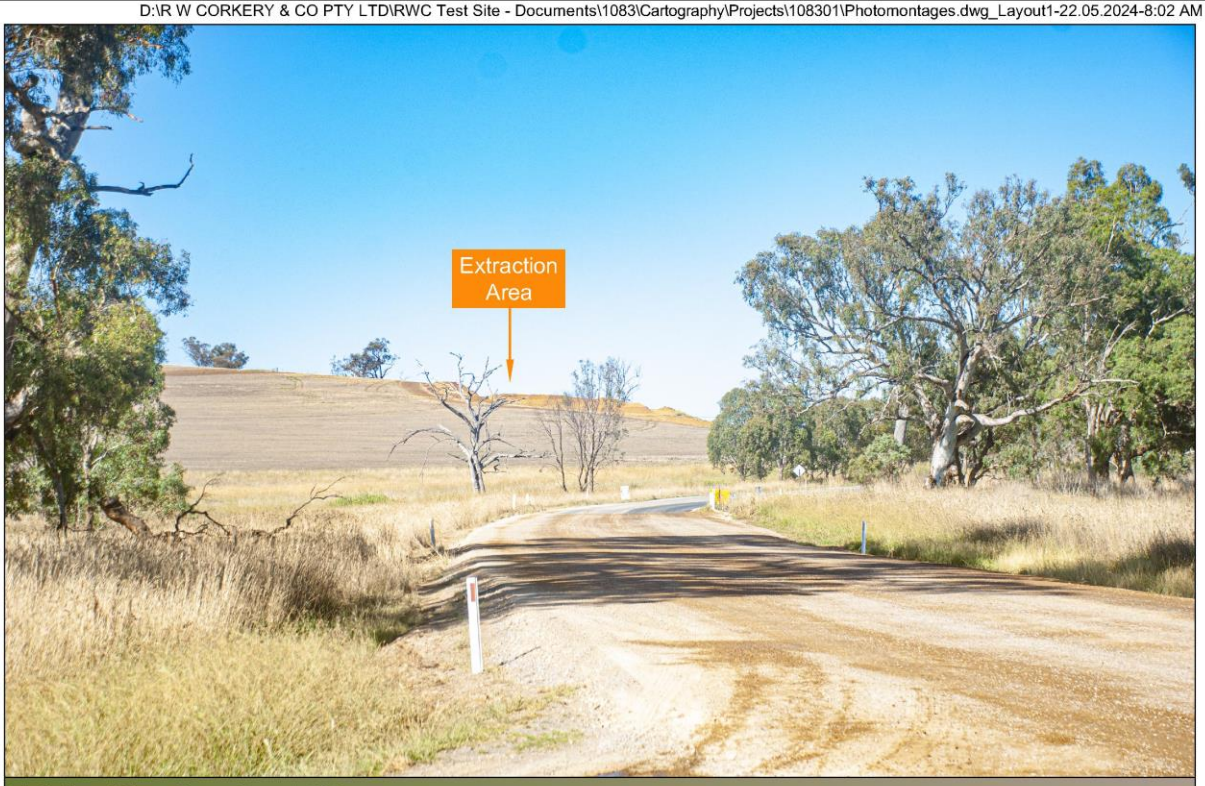


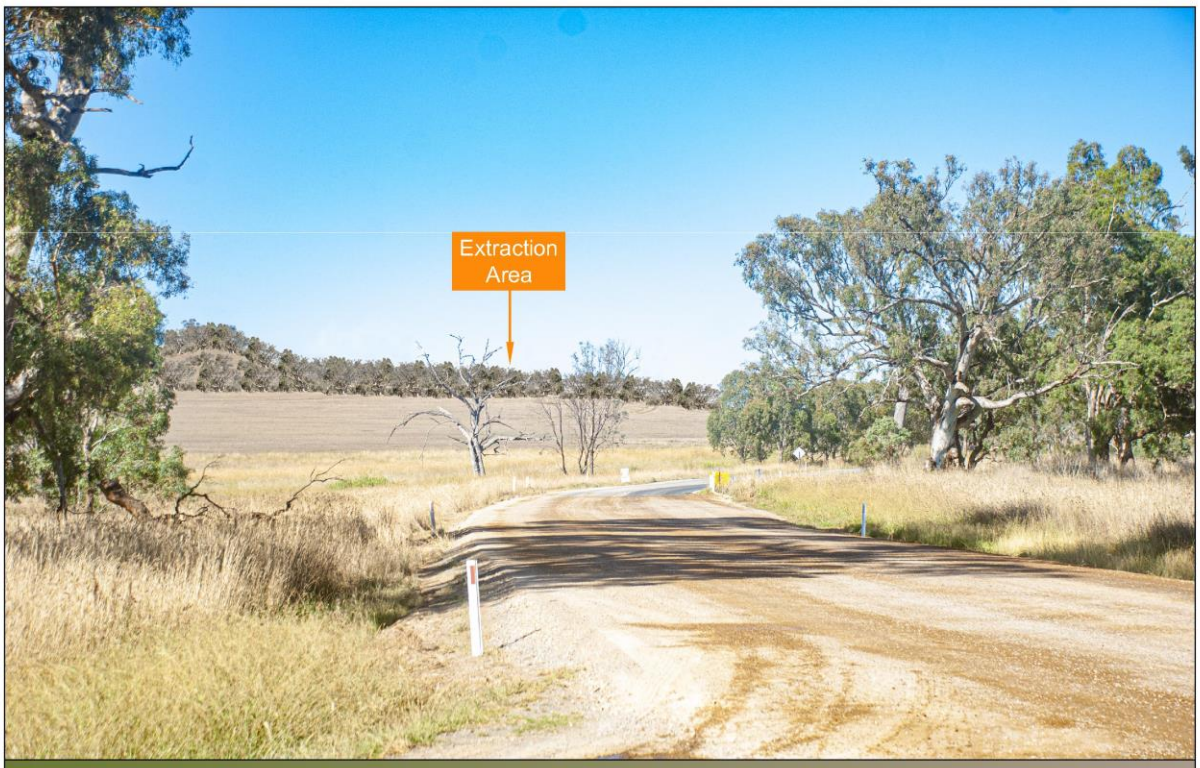
Figure 4.5
PHOTOMONTAGE - RESIDENCE R3

Source:

D:\R W CORKERY & CO PTY LTD\RWC Test Site - Documents\1083\Cartography\Projects\108301\Photomontages.dwg_Layout1-22.05.2024-8:02 AM



Existing View from Road Side



Final Stage View from Road Side

Figure 4.6
PHOTOMONTAGE - ROAD SIDE

Source:

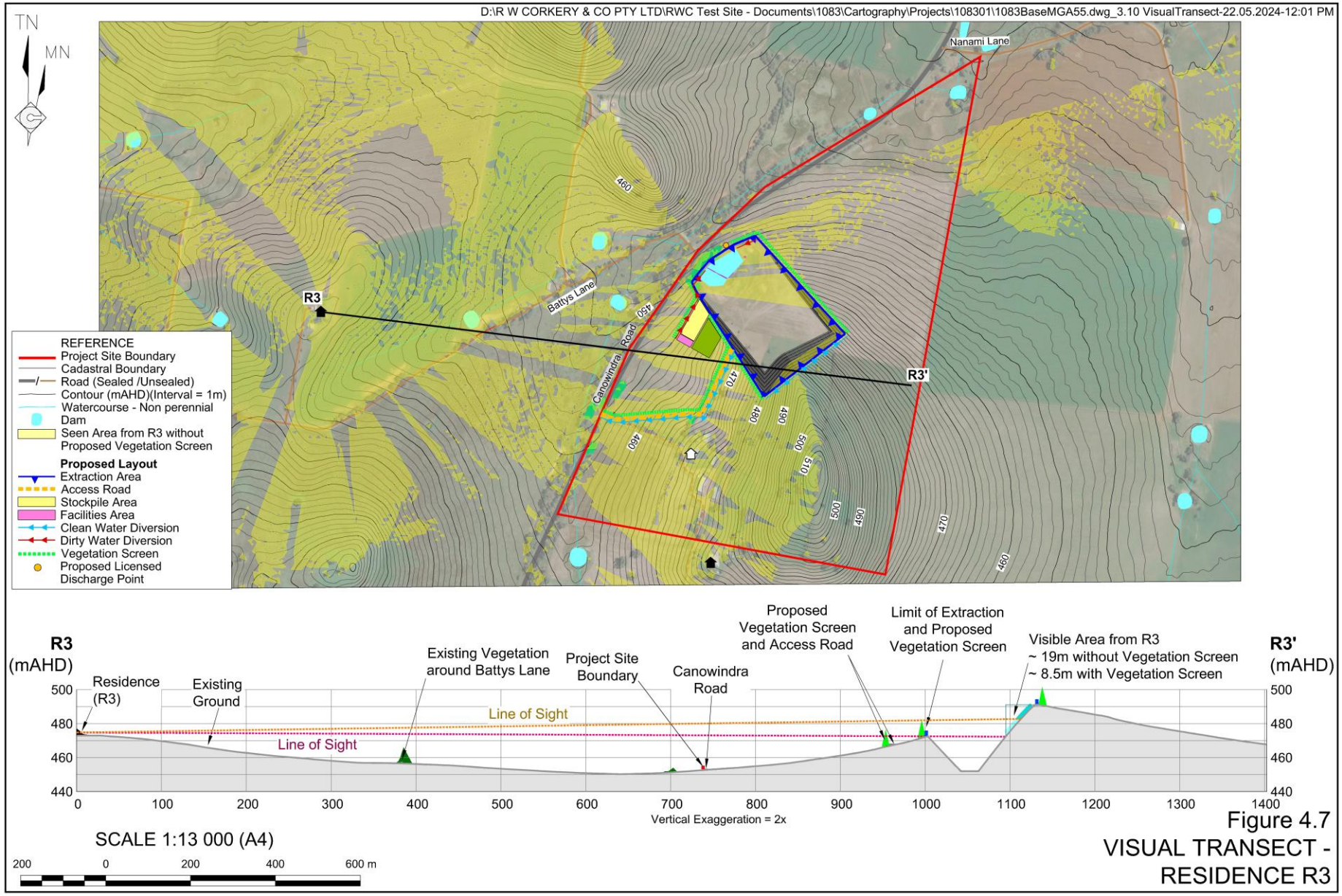


Figure 4.7
VISUAL TRANSECT - RESIDENCE R3

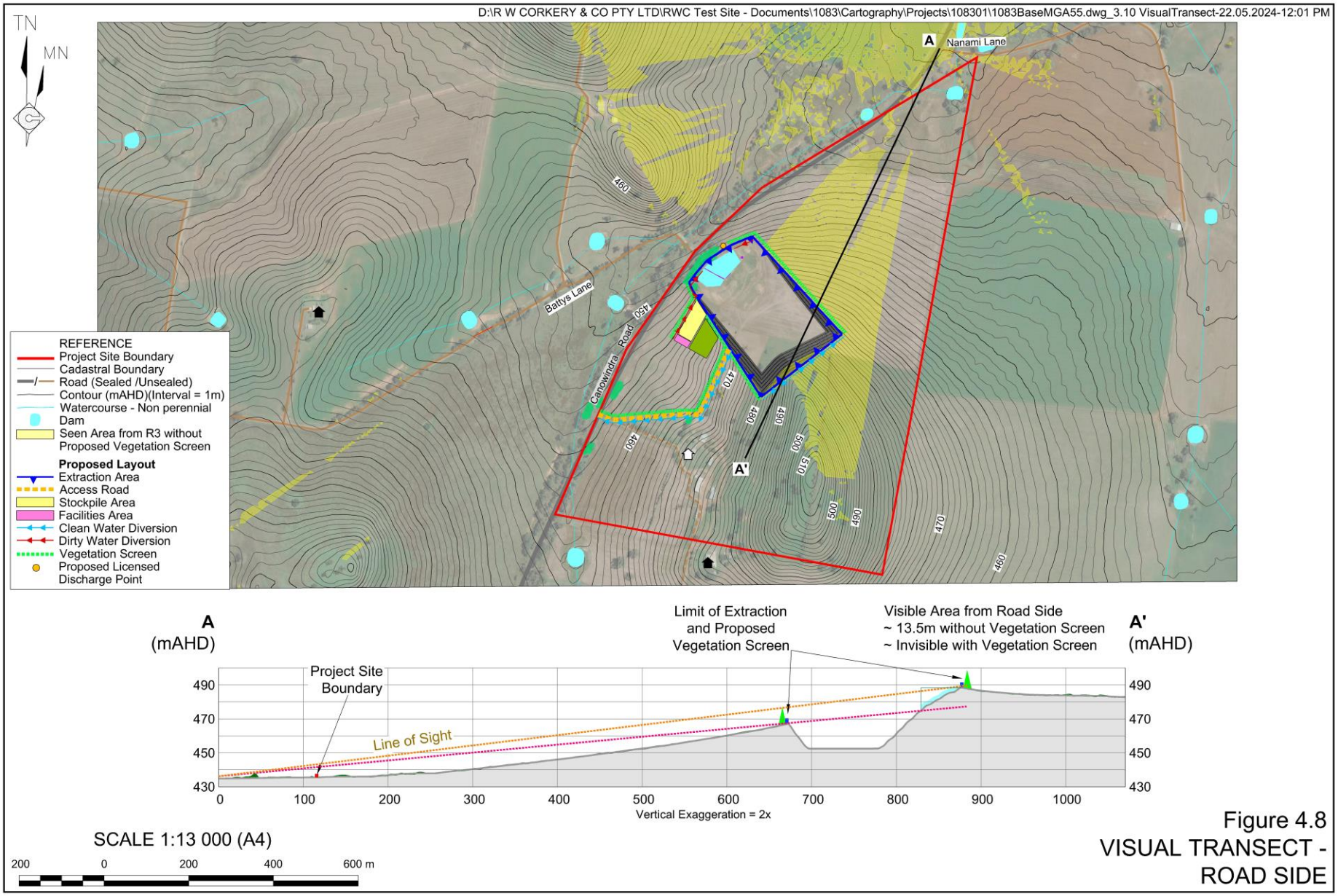


Figure 4.8
VISUAL TRANSECT - ROAD SIDE

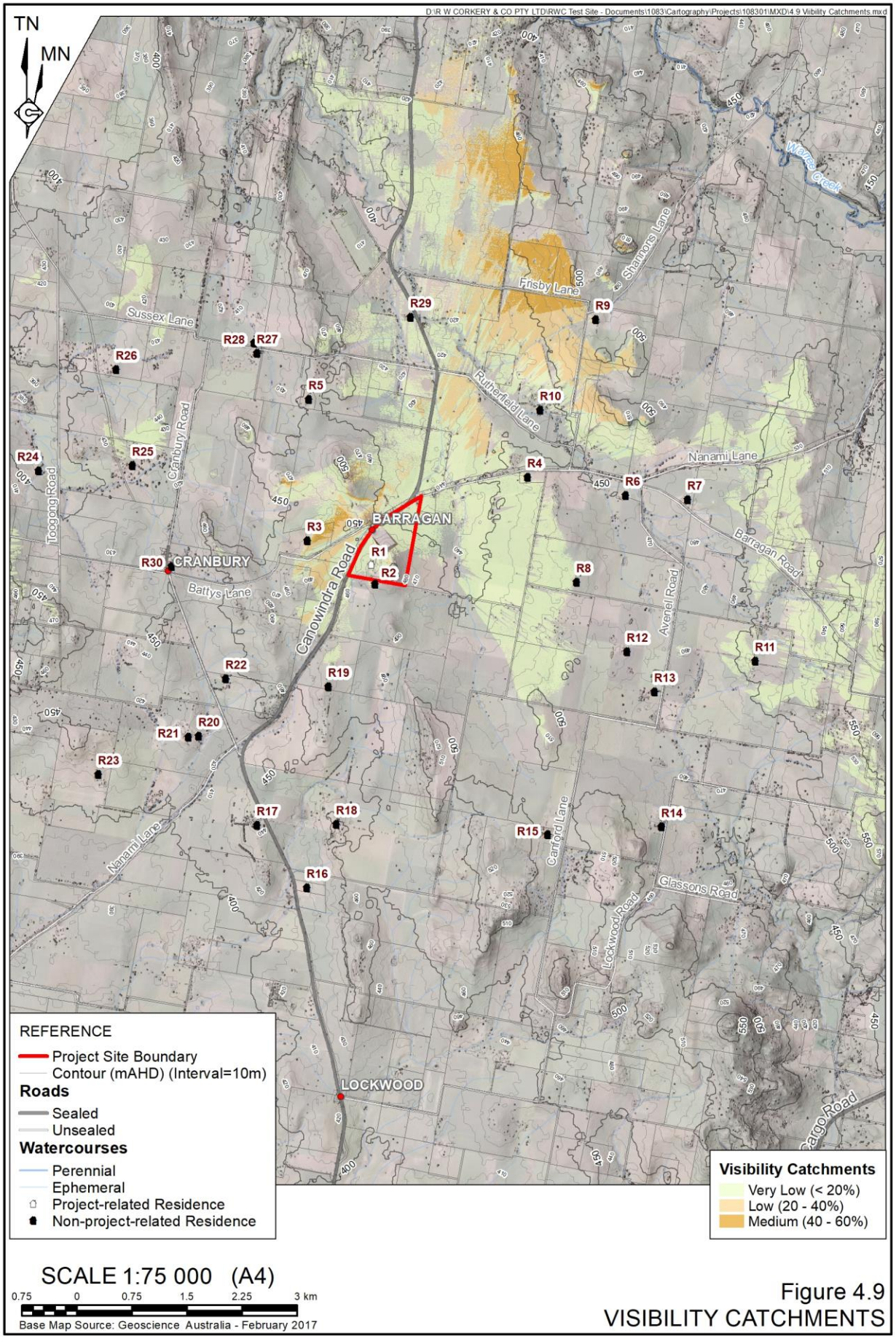


Figure 4.9
VISIBILITY CATCHMENTS

4.6 Water Resources

4.6.1 Introduction

RWC has completed an assessment of the water-related impacts associated with the Proposal. The existing surface water environment is described in Section 3.1 and the groundwater environment in Section 3.9. This subsection provides a brief description of the management and mitigation that would be implemented, and the water-related impacts associated with the Proposal.

4.6.2 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures to ensure that no polluted waters leave the Project Site and compromise the water quality of receiving waters.

- Prepare an Erosion and Sediment Control Plan in accordance with Landcom (2004) and DECC (2008a and 2008b) prior to commencement. The Plan would identify the following.
  - The location and dimensions/capacity of all surface water control structures to ensure that potentially sediment-laden water is not discharged from the Project Site.
  - Staging of works to account for initial stockpiling and processing operations outside of the active Extraction Area.
  - Operational procedures, including an inspection regime, to ensure the appropriate implementation of the Plan.
- Use accumulated sediment-laden water for dust suppression or store the water in the Sediment Basin, ensuring that adequate capacity remains to capture sediment laden water in accordance with the Erosion and Sediment Control Plan.
- Ensure that sediment laden is not permitted to leave the Project Site except in accordance with the Erosion and Sediment Control Plan.
- Import water from a suitably licenced source if surface water is not available within the Sediment Basin.
- Ensure that sediment control structures constructed for the Proposal remain in place until rehabilitated areas are sufficiently stabilised.
- Monitor water quality during discharge from the sediment control basin in accordance with the conditions of any Environment Protection Licence issued for the Proposal.

4.6.3 Assessment of Impacts

Water-related impacts associated with the Proposal would be as follows.

- Surface water quality

  Assuming the adoption of the design controls detailed in Section 4.6.2, it is anticipated that there would be a low likelihood that sediment-laden water would be discharged to surrounding water courses. If discharge of water is required, it would be undertaken in accordance with the requirements of any Environment Protection Licence issued for the Proposal.

- Surface water licencing

  Sediment laden water from disturbed sections of the Project Site would be directed to the existing Sediment Basin and would be used for Proposal-related purposes. As a result, a licence for the use of that water would not be required under Clause 3(1) of Schedule 1 of *Water Management (General) Regulation 2018*.

- Water balance

  Water within the Sediment Basin would be used for Proposal-related purposes. In the event that the Sediment Basin is dry, water would be sourced or purchased from suitable licenced sources and transported to the Project Site. In the event that water is not available from licenced sources, the Applicant would cease operations within the Project Site.

- Groundwater inflow, quality and licencing

  The deepest point of the proposed Extraction Area is approximately 15m higher than the shallowest recorded standing water level in surrounding bores. In addition, the floor of the Extraction Area would be at least 4m higher than the elevation of the unnamed watercourse located to the north of Canowindra Road (see **Figure 3.3**). As a result, the Extraction Area would not intersect the regional saturated water table and groundwater inflow nor depressurisation of the regional aquifer would not be expected to occur.

  The Proposal would not use, produce or store materials with the potential to contaminate groundwater. As a result, there would be no adverse groundwater quality impacts.

  In light of the above, there would be no groundwater-related impacts to surrounding groundwater users or groundwater dependent ecosystems.

4.7 Air Quality

4.7.1 Introduction

RWC has completed an assessment of the air quality-related impacts associated with the Proposal. The existing air quality environment is described in Section 3.10.This subsection provides a brief description of the management and mitigation that would be implemented, and the residual air quality-related impacts associated with the Proposal.

4.7.2 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal.

- Limit, where practicable, excavation of material during periods of high winds.
- Limit disturbance to the minimum area necessary for extraction operations.
- Apply vegetative cover to the soil stockpile as soon as practical after establishment.
- Apply water to all roads and trafficked areas to minimise the generation of dust and ensure, to the extent practicable, that no visible dust is emitted from the Project Site.
- Clearly define all road edges to control their locations.

4.7.3 Assessment of Impacts

Based on the proposed management and mitigation measures, the limited nature of the proposed activities the distance to surrounding residences and the experience of RWC with many similar sized quarrying and mining operations, the Proposal would be highly unlikely to result in dust levels that would cause significant air quality-related impacts at any non-Proposal related residences surrounding the Project Site. Furthermore, as there are no other significant dust-emission sources in the vicinity of the Project Site, the Proposal would not result in cumulative air quality-related impacts.

In light of the above, an assessment in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* has not been undertaken and is not required.

In order to ensure that dust emitted from the Project Site is not resulting in unacceptable impacts for surrounding residents, the Applicant would ensure that it regularly consults with those living the in vicinity of the Project Site.

Finally, due to the scale of the proposed operations, the Proposal would not have a significant impact on greenhouse gas emissions.

4.8 Soils and Land Capability

4.8.1 Introduction

RWC has completed an assessment of the soil-related impacts associated with the Proposal. The existing soils and land capability environment is described in Section 3.11. This subsection provides a brief description of the management and mitigation that would be implemented, and the residual soil and land capability-related impacts associated with the Proposal.

4.8.2 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal.

- Clearly mark areas for stripping and stockpiling.
- Strip soil from all areas of disturbance and store in stockpiles no more than 3m high.
- Refrain from stripping or placing soil during excessively wet or dry conditions.
- Ensure that the soil stockpile surfaces have a surface that is as 'rough' as possible, in a micro-scale, to assist in surface water runoff control and seed retention and germination.
- Spread seed of a suitable cover crop on all soils stockpiles to facilitate revegetation.
- Ensure that soil stockpiles are constructed with side slopes of 1:3 (V:H) or less and that the surface of all stockpiles achieves an effective 70% cover within 10 days of formation. This may be achieved through the use of mulches, spray on polymer-based products or hessian that would allow a vegetative cover to become established.
- Signpost the soil stockpile and limit operation of machinery on the stockpile to minimise compaction and further degradation of soil structure.

4.8.3 Assessment of Impacts

Adherence to the recommended soil and growth medium stripping, handling, stockpiling procedures and other management practices together with appropriate rehabilitation practices would result in a minimal impact to soils and land capability within the Project Site.

4.9 Hazards

4.9.1 Electricity Lines

The Applicant has altered the route for the Access Road to ensure that there is adequate clearance under an existing powerline (**Figure 2.1**). A minimum of 8.5m exists between the ground and the powerline in the vicinity of the Access Road. This exceeds the required distance of no less than 5m for truck travel beneath powerlines.

4.9.2 Bushfire

The Applicant contends that bushfire poses a negligible risk to the Proposal and that the Proposal would not increase bushfire risk surrounding the Project Site for the following reasons.

- All activities with the potential to cause ignition of a bushfire would be undertaken within the extraction area.
- No materials likely to exacerbate bushfire risk such as explosives or diesel would be stored within the Project Site.
- The Applicant would ensure that a water cart or another suitable water source is available during all extraction campaigns, thereby providing firefighting capabilities if required.
- The Project Site would contain minimal infrastructure that would require protection from bushfire attack.
- In the event that the Project Site is threatened by a bushfire, site personnel would be evacuated via the Site Access Road and Canowindra Road. Alternatively, if evacuation were not possible or safe, the Extraction Area would provide a cleared area for personnel to shelter.

4.9.3 Hazardous or Dangerous Goods

The Quarry would infrequently require the use of potentially hazardous or dangerous goods on site.

- Fuel for equipment utilised on site would be carted to site as required, no hydrocarbons would be stored on site.
- Explosives would not be stored on site and would be transported to the site on the day of the blast.
- Transportation of any hazardous or dangerous goods would be undertaken by drivers who are aware of their responsibilities under the Drivers Code of Conduct.
- Handling of explosives would be undertaken by suitably qualified and authorised personnel.

4.9.4 Waste

Waste generated by the Quarry would be limited to general waste brought on site by personnel or contractors.

All wastes would be removed from site by personnel or contractors each day.

No general wastes would be received or stored at the Quarry.

4.10 Socio-economic Impacts

4.10.1 Introduction

RWC has completed an assessment of the socio-economic related impacts associated with the Proposal. The existing socio-economic profile is described in Section 3.12. This subsection provides a brief description of management and mitigation that would be implemented, and the residual socio-economic impacts and benefits associated with the Proposal.

4.10.2 Management and Mitigation Measures

In addition to the mitigation measures and management procedures relating to amenity aspects such as noise, transportation, visibility, air quality, etc., described previously in Section 4, the Applicant would implement the following management and mitigation measures to ensure that Proposal-related benefits for the community surrounding the Project Site are maximised and adverse impacts are minimised.

- Proactively consult throughout the life of the Proposal with those residents who could potentially be adversely impacted by the Proposal.
- Continue to engage the community surrounding the Project Site through the use of an "open door" policy for any member of the community who wishes to discuss any aspect of the Proposal.
- Maintain a community complaints telephone line and ensure that the existence of the number is advertised at the site entrance.
- Give preference when engaging new employees, where practicable, to candidates from the surrounding communities over candidates with equivalent experience and qualifications from elsewhere and ensure that the other contractors do so as well.
- Give preference, where practicable and cost-competitive, to suppliers of equipment, services or consumables located within the surrounding communities.
- Support community organisations, groups and events, as appropriate, and review any request by a community organisation for support or assistance.

4.10.3 Assessment of Impacts

In order to assess the overall impact of the Proposal on the socio-economic environment, the various adverse and beneficial impacts are considered as follows.

Adverse Impacts

Considering the relative isolation of the Project Site, the previously considered impacts on local noise, traffic, visual amenity and air quality would each have a minor impact on the properties within and adjacent to the Project Site. As a result, adverse socio-economic impacts are likely to be negligible.

Beneficial/Positive Impacts

Potential beneficial impacts relating to socio-economic issues after the adoption of the management and mitigation measures presented above are as follows.

- Direct establishment of employment for between 2 and 3 persons, with additional employment for contract transportation personnel.
- Ongoing contributions to the local, regional, State and National economies, including contributions of approximately $455,000 through wages and salaries and purchase of goods and services respectively, with additional indirect contributions.
- Continued support for local community organisations and services.
- Finally, the Proposal would also produce a product that would benefit the local and surrounding community through the supply of a cost effective, high quality road base for the maintenance and construction of the local road network.

Assessment of the potential socio-economic impacts demonstrates the beneficial impacts of the Proposal far outweigh any minor adverse impacts associated with the operations.

Section 5

Evaluation and Justification of the Proposal

PREAMBLE

This section concludes the document with an evaluation and justification of the Proposal in terms of the biophysical and socio-economic considerations, as well as in the context of the principles of Ecologically Sustainable Development (ESD). The section concludes with a justification for the Proposal on the basis of the biophysical and socio-economic impacts, compliance with ESD principles and the consequences of not proceeding.

5.1 Ecologically Sustainable Development

5.1.1 Introduction

Throughout the design of the Proposal, the Applicant has endeavoured to address each of the following Ecologically Sustainable Development (ESD) principles, where applicable.

- The precautionary principle.
- The principle of social equity.
- The principle of the conservation of biodiversity and ecological integrity.
- The principle for the improved valuation and pricing of environmental resources.

5.1.2 The Precautionary Principle

The precautionary principle states that "*where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*" (IGAE, 1992).

The environmental safeguards discussed in Section 4 have been provided with a comprehensive knowledge of the existing environment derived from experience of RWC with similar extractive and mining projects and the various studies undertaken by recognised specialist consultants to provide an appreciation of the potential impacts that may result from the Proposal.

RWC has been involved in similar mining projects throughout the Central West of NSW for over 43 years. Throughout this time, RWC has gained a detailed understanding of the physical and social environment associated with mining operations similar to that proposed and the environment surrounding the Project Site, resulting in the ability to provide a comprehensive assessment of the potential environmental impacts.

Assisting in the compilation of this document, the following specialist consultants, recognised for being leaders in their respective fields, each undertook detailed impact assessments to provide the Applicant with the most appropriate management and mitigation measures to minimise any potential harm with the surrounding environment as a result of the Proposal.

- Dr Jodie Benton (PhD Archaeology, BA (Hons) Archaeology) and her team of OzArk Environment & Heritage, for the assessment of ecology and heritage.
- Mr Rod Linnet (Ass. Dip (Mechanical Engineering), of Muller Acoustic Consulting Pty Ltd, for the assessment of Noise.
- Ms Penny Dalton (BE Civil (Honours)) and Mr Charbel Hanna (BE Civil and Environmental), of The Transport Planning Partnership, for the assessment of Traffic and Transport.

Following a full evaluation of the potential environmental impacts of the Proposal based upon the consolidated knowledge of the Applicant, RWC and the specialist consultant team, there are no activities or features for which there is a level of uncertainty in achieving an acceptable level of environmental performance.

5.1.3 Social Equity

The objective of this principle is that "*the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations*" (IGAE, 1992). Essentially, social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes both inter-generational (between generations) and intra-generational (within generations) equity considerations.

Inter-generational equity was considered in the design of the Proposal as the nature of the proposed operations would result in the prolonging of an industry that would continue to provide ongoing training to local employees and contractors who could potentially use these skills to benefit the local or regional economy.

Intra-generational equity was considered in the Proposal as the ongoing operations would provide employment to residents of the Cabonne Local Government Area in close proximity to their residences, adding to the regions overall economy.

It is concluded that due to the nature of the Proposal and the proposed final landform and land uses, namely agriculture and nature conservation or, pending further approval, establishment of a residence, as well as the proposed management measures as outlined in Section 4, that the objectives of this principle would be maintained as a result of the Proposal and not adversely impact current or future generations.

5.1.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems is a central goal of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short- or long-term.

Disturbance to native vegetation within the Project Site would be limited a small area of native vegetation. As the Applicant has designed the Proposal to avoid areas high in volume of vegetation and minimise the area of disturbance, the Proposal is unlikely to have a significant impact on biological diversity or ecological integrity.

5.1.5 Improved Valuation, Pricing and Incentive Mechanisms

This principle involves consideration of the Proposal and the surrounding environmental resources (e.g. air, water, land and living things) which may be affected, and the financial resources required by the Applicant to minimise or manage these impacts on surrounding environmental resources.

The Applicant's principal objective of the Proposal is the design and operation of an extractive industry in a manner that minimises disturbance and any impact on the environment and surrounding residents. The Applicant has financially committed to this and other measures and would provide adequate financial resources to reinstate any disturbed habitat through appropriate rehabilitation procedures.

It is planned that the income received from the sale of the quarry products would be sufficient to enable the Applicant to achieve an acceptable profit level whilst undertaking all environmentally-related tasks and meeting all commitments in all approvals, licences and permits and those made to the local community, including rehabilitation of the Project Site once extraction operations are complete.

5.1.6 Conclusion

The approach taken in planning the Proposal has been multi-disciplinary, involved consultation with various government agencies, and has emphasised the application of safeguards to minimise potential environmental, social and economic impacts. The design of the Proposal has addressed each of the Ecologically Sustainable Development principles and is concluded that the Proposal achieves a sustainable outcome for the local and wider environment.

5.2 Justification of the Proposal

5.2.1 Introduction

In assessing whether the development and operation of the Proposal is justified, consideration has been given to both biophysical and socio-economic factors, including the predicted residual impacts on the environment and the potential benefits of the Proposal. This subsection also considers the planning considerations involved in the design of the Proposal, the alternatives considered as part of the final design and the consequences of the Proposal not proceeding. The overall justification recognises weightings placed upon both the negative and positive residual impacts identified within this document.

5.2.2 Biophysical Considerations

The Proposal has been designed in a manner that would:

- maximise the recovery of gravel resources from within the Project Site;
- minimise the total disturbance footprint through efficient design of the extraction area;
- minimise the requirement to clear high volumes of native vegetation;
- minimise the potential for surface water pollution; and
- rehabilitate the disturbed areas of the Project Site to create a landform that maximises its value for future land users.

Inevitably, despite the proposed operational controls and safeguards to be implemented by the Applicant, there remains the potential for some residual impacts on the biophysical environment to occur. The assessed biophysical impacts that the Proposal would have on the local environment are set out below.

Noise

Proposal-related noise impacts would include the following.

- Operational, blasting, and road transport noise levels are not anticipated to exceed the relevant criteria at any residence.
- Noise emissions would be limited to the daytime only.

As a result, there would be no significant noise-related adverse impacts as a result of the Proposal.

Biodiversity

The assessed biophysical impacts that the Proposal would have on biodiversity include the following.

- Disturbance of:
  - approximately 0.054ha of PCT53;
  - approximately 0.218ha of PCT266;
  - approximately 0.078ha of PCT277;
  - approximately 9.191ha of disturbed/cleared land;
  - two habitat trees within the Extraction Area, namely trees with hollows.
- A small area (0.01ha) of the Box Gum CEEC occurs in the Canowindra Road corridor that is within the footprint of the site entrance upgrade. No further vegetation will be disturbed following previous tree trimming undertaken by Council.
- This loss of habitat is relatively minor on a regional scale. The Proposal would also include tree screens which could serve as replacement native ecosystem or habitat.
- The proposed loss of habitat would not have a significant impact on any NSW or Commonwealth listed species, ecological community or population.
- The proposed disturbance does not exceed the threshold at which a biodiversity offset is required.

As a result, there would be no significant adverse impacts on biodiversity as a result of the Proposal.

Traffic

The assessed impacts that the Proposal would have on traffic include the following.

- There would be no change to the Level of Service on Canowindra Road.
- The proposed intersection of the Site Access Road and the Canowindra Road would be constructed as a BAL/BAR intersection prior to commencement of extraction. The intersection design would be in accordance with the requirements of the *Austroads Guide to Road Design.*

As a result, there would be no significant adverse impacts on traffic as a result of the Proposal.

Heritage

No sites of potential Aboriginal heritage significance were identified within the Project Site. The Applicant would implement measures to avoid inadvertent disturbance of unidentified sites should they exist within the Project Site.

As a result, there would be no significant adverse impacts on Aboriginal heritage as a result of the Proposal.

Visual Amenity

There would be no adverse impacts on visual amenity surrounding the Project Site for the flowing reasons.

- All active extraction, processing, stockpiling, and loading operations would be undertaken within either the Extraction Area or Stockpiling Area which are located at a higher elevation than most of the surrounding lands, limiting the potential for site activities to be visible.
- The proposed perimeter vegetation screens would provide a long term screen that would prevent visual impact to surrounding lands.
- The proposed bund during the initial stages of extraction, would act as a visual screen from surrounding lands until the Extraction Area is more fully developed and would provide additional shielding.
- The Applicant would manage dust emissions to ensure dust does not impact on the visual amenity of the surrounding area.
- There would be no night-time operations, thus no nighttime visual amenity would be impacted.

Water Resources

The Applicant would not permit sediment laden water to be discharged from the Project Site. In addition, the Extraction Area would not intersect groundwater. As a result, the Proposal would not result in significant surface water or groundwater impacts.

Air Quality

Particulate emissions generated by the Proposal would not result in significant air quality-related impacts at any privately-owned residence.

Other Impacts

Bushfire, soil and land capability and agricultural impacts associated with the Proposal would be negligible.

5.2.3 Socio-economic Considerations

The impacts of the Proposal on the socio-economic environment would be largely positive. Through the payment of wages, the Proposal would contribute approximately $455,000pa to the Cabonne LGA and NSW economies.

The Proposal would provide direct full-time-equivalent employment for between two and three people during construction and operation of the Proposal. As it is the intention of the Applicant to source this workforce from the local area, this would have a positive impact on economic activities within the Cabonne Local Government Area and the Central West of NSW.

Overall, the Proposal has been designed to ensure all potential adverse impacts are, to the maximum extent practicable, controlled which, in turn, would result in limited negative social impacts.

5.2.4 Planning Considerations

This subsection reviews the compliance of the Proposal with relevant State planning instruments, regional strategies, the Cabonne LEP 2012 and Section 79C of the *Environmental Planning and Assessment Act 1979*.

State Environmental Planning Policy (Planning Systems) 2021

The Proposal is classified as "Regional Development" under this SEPP. As a result, the Proposal is to be assessed by Cabonne Shire Council and determined by the Western Regional Planning Panel.

State Environmental Planning Policy (Resources and Energy) 2021

This Policy specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. **Table 1.2** presents a summary of each element requiring consideration and a reference to the section in the *Environmental Impact Statement* where each is addressed.

State Environmental Planning Policy (Transport and Infrastructure)

This Policy specifies matters requiring consideration in the assessment of any development adjacent to or in the vicinity of particular types of infrastructure. Sections 3.6 and Section 4.3 provide an assessment of traffic and transport impacts as a result of the Proposal.

Cabonne Local Environment Plan 2012

Project Site is situated within land zoned as Zone RU1 – Primary Production under the *Cabonne Local Environment Plan 2012. The Cabonne Local Environmental Plan*, and specifically the land zoning identified in that document, has been addressed in Section 1.5.3.1 of this document. It is noted that extractive industries are permissible with consent within this zone.

5.2.5 Section 79C Considerations

Section 4.15 of the *Environmental Planning and Assessment Act 1979* requires the consent authority, when determining an application for non-State Significant Development, to take into consideration the following matters:

a) the provision of:

i. any environment planning instrument;

The relevant environmental planning instruments being:

- *State Environmental Planning Policy (Resources and Energy) 2021;*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021;*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021;*
- *State Environmental Planning Policy (Resilience and Hazards) 2021;*
- *State Environmental Planning Policy (Planning Systems) 2021; and*
- *Cabonne Local Environmental Plan 2012.*

Each of these instruments are addressed in full in Section 1.5 of this document.

ii. any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved; and

The Applicant is not aware of any proposed instruments that are relevant to the Proposal.

iii. any development control plan and any planning agreement that has been entered into under Section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F; and

Development Control Plan No. 5 - General Rural Zones (DCP 5) is relevant to the Proposal. The Proposal would be compatible with the rural character of the locality and is consistent with existing land uses within the RU1 zone. The Proposal would therefore be consistent with the objectives, principles and standards identified within DCP 5.

iii. a) any planning agreement that has been entered into under Section 7.4, or any draft planning agreement that a developer has offered to enter into under Section 7.4; and

No planning agreement has been entered into for the Proposal. Given the scale of the Proposal, no planning agreement for the upgrade and maintenance of roads surrounding the Project Site is required and Council has no policy requiring such an agreement.

iv. the regulations (to the extent that they prescribe matters for the purposes of this paragraph); and

Section 26 of Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* is considered in determining that the Proposal is considered as "Designated Development" and is discussed in Section 1.1.

b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; and

The likely impacts of the Proposal, including environmental impacts on both the natural and built environments and social and economic impacts are assessed in Section 4 of this document.

c) the suitability of the site for the development; and

The suitability of the Project Site for the Proposal, including a description of surrounding lands and their use, is discussed in Section 3.3.

d) any submissions made in accordance with this Act or the regulations; and

The Applicant anticipates that submissions related to the Proposal will be provided following completion of the public exhibition and that it will be provided with an opportunity to respond to those submissions at that time.

e) the public interest.

Information relating to community and socio-economic setting of the Proposal and the Proposal-related contributions to the local, regional and national economies is presented in Sections 2.9, 3.12 and 4.10 within this document. Overall, the Applicant contends that the Proposal would satisfy public interest.

5.2.6 Consequences of Not Proceeding with the Proposal

The consequences of not proceeding with the Proposal include the following.

i) The recoverable gravel resources would not be extracted by the Applicant and the opportunity to produce a cost effective, high quality road base for use in maintenance and construction of the local road network would be lost.

ii) The opportunity to generate 2 to 3 positions would be foregone.

iii) Expenditure of approximately $315,000pa on wages, with additional $140,000pa expenditure on consumables, services and goods within the Cabonne regional, State and National economies, would be foregone.

iv) Minor impacts on the local biophysical environment would not eventuate.

It is considered that the benefits of proceeding with the Proposal therefore far outweigh the impacts on the environment that would result. The nominated consequences of not proceeding with the Proposal also weigh heavily in favour of proceeding with the Proposal.

Section 6

References

Colin Pardoe Bio-Anthropology & Archaeology (2009). *Cadia East Project Aboriginal Cultural Heritage Assessment.* Report for Cadia Holdings Pty Limited.

Department of Environment and Climate Change (DECC) (2008a). *Managing Urban Stormwater – Soils and Construction – Volume 2C Unsealed Roads* published by the Department of Environment and Climate Change in 2008.

Department of Environment and Climate Change (DECC) (2008b). *Managing Urban Stormwater: Soils and Construction, Vol. 2E,* DECC, NSW, Sydney.

Duncan Priestly Civil Engineering (2024). *McNaught Earthmoving Canowindra Rd Quarry Access Intersection*, presented as **Appendix 5**. Prepared on behalf of McNaught Earthworks Pty Ltd and dated May 2024.

Intergovernmental Agreement on the Environment (IGAE) (1992). *Intergovernmental Agreement on the Environment*, prepared by the Department of the Environment on behalf of the Australasian Commonwealth, States and Territories and the Australian Local Government Association.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction, Vol. 1 Second eds,* Landcom, NSW, Sydney.

Mitchell, Dr. Peter (2002). *Description for NSW (Mitchell) Landscapes Version 2.* Department of Environment and Climate Change NSW.

Muller Acoustic Consulting (MAC) (2024). *Noise Assessment*, presented as **Appendix 2**. Prepared on behalf of McNaught Earthworks Pty Ltd and dated January 2024.

NSW Department of Environment, Climate Change and Water (DECCW) (2010). *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*

NSW Department of Environment, Climate Change and Water (DECCW) (2010). *NSW Road Noise Policy*

NSW Office of Water (NOW) (2012). *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources.*

OzArk Environment & Heritage (2009). *Aboriginal Heritage Assessment: MR310 (Cudal to Canowindra Rd) Widening Project.* Report for NSW Roads & Traffic Authority.

OzArk Environment & Heritage (2010). *Indigenous Heritage Assessment: MR310 (Cudal to Frisby Lane) Widening Project.* Report for NSW Roads & Traffic Authority.

OzArk Environment & Heritage (OzArk) (2024a). *Biodiversity Assessment Report*, presented as **Appendix 3**. Prepared on behalf of McNaught Earthworks Pty Ltd and dated January 2024.

OzArk Environment & Heritage (OzArk) (2024b). *Aboriginal Due Diligence Assessment Report*, presented as **Appendix 6**. Prepared on behalf of McNaught Earthworks Pty Ltd.

Pardoe, C. (2010). *Wellington – Young Pipeline Cultural Heritage Assessment.* CNC Project Management.

Thackway & Cresswell (1995). *Interim Biogeographic Regionalisation of Australia's categorisation* (IBRA).

Thackway, R and Cresswell I.D (1995). *An Interim Biogeographic Regionalisation for Australia: A Framework for Setting Priorities in the National Reserves System Cooperative Program, Australian Nature Conservation Agency*, Canberra.

The Transport Planning Partnership (TTPP) (2024). *Road Transport Assessment*, presented as **Appendix 4**. Prepared on behalf of McNaught Earthworks Pty Ltd and dated February 2024.

Section 7

Glossary of Technical Terms, Acronyms, Symbols and Units

Glossary of Technical Terms

ABS - Australian Bureau of Statistics.

Aboriginal heritage Site – discrete area or concentration of artefactual material, place of past Aboriginal activity, or place of significance to Aboriginal people.

acoustics – the science of sound and vibration.

adverse weather conditions (in respect of noise) – conditions, such as high wind, which assist the movement of dust or propagation of noise away from the mine towards receptors.

aesthetic appeal – an item/area having visual or sensory appeal, landmark qualities and/or creative or technical excellence.

aggregates – fragments of crushed rock with a defined size specified for use in the construction industry.

AHD - Australian height datum (in metres).

airblast overpressure – a shock wave from the blast transmitted through the air, normally measured in dB(Linear).

air pollutant – a substance in ambient atmosphere, resulting from the activity of man or from natural processes, causing adverse effects to man and the environment (also called "air contaminant").

air pollution – presence of air pollutants.

alluvial – pertaining to material, such as sand or silt, deposited by running water (e.g. a creek or river).

ambient – relating to conditions outside the active project area.

ambient level – existing level of a phenomenon without the influence of the proposal.

amenity – the desirability of an area.

amphibians – animals (such as frogs) adapted to live both on land and in water.

Applicant – person, organisation or company proposing to carry out an activity / seeking development consent (i.e. Argent (Kempfield) Pty Ltd.

approx. – approximately.

aquifer - rock or sediment capable of holding and transmitting groundwater.

archaeology – the scientific study of human history, particularly the relics and cultural remains of the distant past.

artefact – anything made by human workmanship, particularly by previous cultures (such as chipped and modified stones used as tools).

AS – Australian Standard.

attenuation – reduction in sound pressure levels between two locations.

average annual daily traffic (AADT) – unit of assessment of traffic flow along a road.

ANZEC – Australian and New Zealand Environment Council.

background – the conditions (e.g. noise levels, bird populations) already present in an area before the commencement of a specific activity (e.g. a mining operation).

background level – the concentration (deposition) level of a pollutant which must be added to the concentration (deposition) level of the modelled sources in order to obtain a total.

background noise levels - the level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source; or sound generated for test purposes).

bench - a step in the face of a quarry.

biological diversity/biodiversity – a concept encompassing the diversity of indigenous species and communities occurring in a given region; biological diversity includes genetic diversity, which is the diversity of genes and genotypes within each species; species diversity, which is the variety of living species; and ecosystem diversity which is the diversity of the different types of communities formed by living organisms and the relations between them.

blasting – the operation of breaking rock by means of explosives.

bore – a well, usually of less than 20 cm diameter, sunk into the ground and from which water is pumped.

buffer – a physical barrier/structure or width of land that encloses, partially encloses, or defines a particular environment. A buffer serves to minimise the impacts of non-desirable external influences on the adjoining environment.

bulldozer – an item of tracked mobile earth moving equipment fitted with a front blade and with rear rippers used for pushing and ripping soil and rock.

bund wall – a man-made earth mound used to visually and acoustically screen nearby receivers.

catchment – the entire land area from which water (e.g. rainfall) drains to a specific water course or waterbody.

community – a combination of plants that are dependent on their environment and influence one another and modify their own environment. They form together, with their common habitat and other associated organisms, an ecosystem, which is also related to neighbouring ecosystems and to the macroclimate of the region.

concentration – the amount of a substance, expressed as mass or volume, in a unit volume of air.

clay – very fine-grained sediment or soil (often defined as having a particle size less than 0.002 mm (2 microns) in diameter).

coarse sand – sand predominantly >0.5mm.

conservation – the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs as aspirations of future generations.

consolidation – the process whereby loose or soft sedimentary material (e.g. an alluvial deposit) becomes a compacted, harder sedimentary material (e.g. a sandstone).

contaminant – a chemical compound or element which has been introduced as a result of human activity. It is noted, however, that some chemical compounds and elements also occur naturally in water and sediments.

contamination – The degradation of natural water quality as a result of man's activities. There is no implication of any specific limits, since the degree of permissible contamination depends upon the intended end use, or uses, of the water.

contingency procedures – procedures put in place to handle an event considered unlikely to occur.

cross-section – a two-dimensional diagram of an object presented as if the object had been cut along its length.

crusher – that part of an ore-processing plant where the ore is mechanically crushed into smaller pieces.

crusher fines – material finer than 3mm produced in the crushing plant.

crushing – the mechanical process of reducing rock size usually by pressure or impact.

culvert – large pipe or channel carrying water underneath a structure (e.g. a road or railway track) or underneath the ground.

cumulative – increasing by successive additions.

day time period – the period from 7:00am to 6:00pm Monday to Saturday and 8:00am on Sundays and Public Holidays (where relating to noise).

dB – decibel, unit used to express sound intensity.

dB(A) – decibels, A-weighted scale; unit used for most measurements of environmental noise; the scale is based upon typical responses of the human ear to sounds of different frequencies.

decibel - unit expressing difference in power between acoustic signals.

deceleration lane – a lane used for decreasing speed before leaving the road.

deposited dust – relatively large dust particles which settle out – not detrimental to health.

development application – an application to the local council for approval of an activity deemed to require an approval prior to commencement.

diversion bank – an earth bank constructed to divert water away from disturbed areas.

drainage line – a passage along which water concentrates and flows towards a stream, drainage plain or swamp intermittently during or following rain.

drainage structures – artificial structures to control and direct drainage and prevent erosion or flooding.

drawdown – the difference between the water level observed during pumping and the non-pumping water level (static water level or static head).

drilling – the action of boring holes (usually less than 30cm in diameter and up to several kilometres deep) into the ground, typically to establish a water bore or to investigate the geology found at depth.

dry screening plant – a dry processing plant designed to separate the gravel from oversize material by simple vibration and screening.

dust - particles of mostly mineral origin generated by erosion of surfaces and the mining and handling of materials.

ecology – the relationship between living things and their environment.

ecologically sustainable development (ESD) – using, conserving and enhancing the community's resources so that ecological processes on which life depends are maintained and the total quality of life, now and in the future can be increased.

ecosystem – a functional unit of energy transfer and nutrient cycling in a given place, it includes all the relationships within the biotic community and between the biotic components of the system.

emission – a discharge of a substance (e.g. dust) into the environment.

environment – a general term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms (including human beings) exists.

environmental constraints - limitations on a project by components of the environment.

Environmental Assessment – a formal description of a project and an assessment of its likely impact on the physical, social and economic environment. The *Environmental Assessment* is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.

Environmental Impact Statement (EIS) – a formal description of a project and an assessment of its likely impact on the physical, social and economic environment. It includes an evaluation of alternatives and an overall justification of the project. The EIS is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.

EPA – Environment Protection Authority – the successor to the SPCC.

EP&A Act – Environmental Planning and Assessment Act 1979.

ephemeral – lasting only a short time e.g. creek flow.

erodibility – the tendency of soil, earth or rock to erode.

erosion – the wearing away of the land surface (whether natural or artificial) by the action of water, wind and ice.

evaporation – the loss of water as vapour from the surface of a liquid that has a temperature lower than its boiling point.

excavate – to dig into natural material or fill using an excavator or other machinery.

excavator - item of earth moving equipment fitted with a bucket on an articulated boom and used for digging material from a face in front of, or below the machine. An excavator would be used around the perimeter of the lakes.

extraction – a term synonymous with quarrying and dredging; the recovery of rock from its in-situ location by drilling and blasting and loading/hauling to the processing plant.

exotic - introduced or foreign, not native.

face – sub-vertical quarry feature generally forming limits of benches.

fauna – a general term for animals (birds, reptiles, marsupials, fish, etc.) particularly in a defined area or over a defined time period.

fill – material imported and emplaced to raise the general surface level of a site.

flora – a general term for plant, particularly those found in a defined area or characteristic of a defined time period.

fragmentation – the extent to which rock is broken into small pieces by primary blasting.

front-end loader – machine used to lift and place soil, earth, rocks, etc. on a construction site.

grader – an item of rubber tyred earthmoving equipment, fitted with a centrally mounted blade and rippers to shape and trim the ground surface.

gradient – rate of change of a given variable (such as temperature or elevation) with distance.

greenhouse – the heating of the earth's surface because outgoing long-wavelength radiation from the earth is absorbed and re-emitted by the carbon dioxide and water vapour in the lower atmosphere and eventually returns to the surface.

groundcover – vegetation that grows close to the ground (such as grasses and herbs) providing protection from erosion.

ground vibration – oscillatory motion of the ground caused by the passage of seismic waves originating from a blast.

groundwater – all waters occurring below the land surface; the upper surface of the soils saturated by groundwater in any particular area is called the water table.

groundwater dependent ecosystems – ecosystems that use groundwater as part of survival, and can potentially include wetlands, vegetation, springs, base flows, cave ecosystems, river pools and hanging swamps.

groundwater discharge – a low place in the landscape that intersects a groundwater aquifer, allowing it to discharge to the surface.

habitat – the place where an organism normally lives; habitats can be described by their floristic and physical characteristics.

haul road – road used in a quarry for haulage of rock from the active face to the crusher and for general site access.

heavy vehicle – a motor vehicle or trailer that has a gross vehicle mass greater than 4.5 tonnes. Also includes motor vehicles with seats for more than 12 adults.

heritage – the things of value which are inherited.

heritage significance – of aesthetic, historic, scientific, cultural, social, archaeological, natural or aesthetic value for past, present or future generations.

heritage study – a conservation study of an area. The study usually includes historical context report, an inventory of heritage items within the area and recommendations for conserving their significance.

hydrocarbon – any organic compound, gaseous, liquid or solid, consisting solely of carbon and hydrogen. Crude oil is essentially a complex mixture of hydrocarbons.

Hydromulch - to spread mulch on (a field, garden, etc.) in a stream of water propelled through a hose. Sometimes seeds are included in the mulch to start revegetation.

in-situ – a term sued to distinguish material (e.g. rocks, minerals, fossils, etc.) found in its original position of formation, deposition, or growth, as opposed to transported material.

indigenous – belonging to, or found naturally in, a particular environment (see also exotic).

infiltration – the process of surface water soaking into the soil or ground.

infrastructure – the supporting installations and services that supply the needs of a project.

inter-generational equity – the principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

intermittent - flows periodically, irregularly.

internal drainage – drainage confined to the project area.

intra-generational equity – the present generation should ensure that improved well-being and welfare are accessible to all sectors of society within Australia and that improved welfare within Australia does not result in decreased welfare in other nations.

inversion – generally used in meteorology with respect to an increase of temperature with height in contrast with the usual decrease of temperature with height in the troposphere. An inversion layer is distinguished by its large stability, which limits the turbulence and therefore the dispersion of pollutants.

landform – a specific feature of a landscape (such as a hill) or the general shape of the land.

Local Environmental Plan (LEP) - a plan developed by a council to control development in part or all of their shire or municipality.

light vehicle – a vehicle that has a gross vehicle mass of 4.5 tonnes or less.

lithology – refers to the general characteristics of sediments.

long-term – a period of time associated with annual air quality standards. Long-term models usually address pollutant concentrations over several seasons to one year.

mammal – animal of the class mammalia, distinguished by the presence of hair and mammary glands.

maximum instantaneous charge (MIC) – the maximum amount of explosives detonated during each delay during a blast.

migratory – passing, usually predictably (based on aquatic species), from one region or climate to another, for purposes of feeding, breeding, or other biological purposes.

mitigation measures – measures employed to reduce (mitigate) an impact (such as the construction of a perimeter bund to reduce sound emissions).

mobile equipment - wheeled or tracked self-propelled equipment such as trucks and front-end loaders.

monitoring – systematic sampling and, if appropriate, sample analysis to record changes over time caused by impacts such as mining.

native – said of an organism or group of organisms that is restricted to a particular region or environment. A local inhabitant of a place.

natural – existing in, or formed by, nature (generally excludes anything obviously modified by human beings).

noxious – introduced species considered to be harmful to native species or to the habitat of native species.

overburden - subsoil and decomposed rock overlying the main rock body that is not suitable for use in the final product.

particulate matter - small solid or liquid particles suspended in or falling through the atmosphere - sometimes expressed by the term particulates.

perennial – refers to stream which has flow throughout the year.

perimeter – outer boundary.

perimeter safety bund – embankment constructed from soil and/or weathered rock to surround the Project Site or extraction area.

permeability - a material property relating to the ability of the material to transmit water.

plant communities – groupings of plants that inhibit the same area.

pollution – the alteration of air, soil, or water as a result of human activities such that it is less suitable for any purpose for which it could be used in its natural state.

population – a group of organisms all of the same species occupying a particular area.

potable - water suitable for human consumption.

precautionary principle – a principle of ESD which states that decisions about any proposed development should be guided by careful management to avoid serious and irreversible damage to the environment.

precipitation – natural water phenomena producing quantities of water measurable by standard methods (e.g. rainfall, snow).

privately-owned residence – an occupied dwelling not owned or under an option to purchase by the Applicant or another resource company, or the subject of a purchase or lease agreement with the Applicant or by any other resource company – referred to as receptors when considered with the predicted noise and/or air quality impacts.

processing – the size reduction of rock delivered from the extraction area and separation into final products of different size.

processing plant – a group of equipment used to clean and grade sand.

processing screen – the screen used for separate various sizes of material for further crushing or product screening.

progressive rehabilitation – rehabilitation of mine or disturbed areas as soon as practicable after they are released during the life of the mine.

Project Site – the total area covered by the project, including pit, processing plant, storage, waste emplacements, stockpiles, bunds, ponds, etc.

quantify – to determine the quantity or amount of a component in a substance.

quarry – an open pit from which construction materials are excavated.

recovery – the recovery of material (e.g. gravel) from the ground to be processed as saleable product.

regrowth – a forest stand established by natural regeneration after major disturbance of the previous forest canopy by wildfire, windthrow or logging.

rehabilitation - the preparation of a final landform after quarrying and its stabilisation with grasses, trees and shrubs.

relief – the variation in landscape elevation over a region.

remnant bushland – native bushland remaining after widespread clearing has taken place.

reptiles – cold-blooded vertebrates, including lizards, snakes, turtles, and crocodiles.

resource – an estimate of potentially usable material in a defined area based on preliminary geological information.

revegetated – an area that has been planted with trees, bushes and grasses after being disturbed.

revegetation - replacement of vegetation, principally grasses and legumes on areas disturbed by quarrying activities.

ripping - breaking up of ground with a bulldozer using an action similar to a rake.

road base – road pavement usually made up of densely graded crushed rock in varying

runoff – that portion of the rainfall falling on a catchment area that flows from the catchment past a specified point.

sand - sediment comprising particles in 0.063mm to 2mm size range.

scarify – to stir the soil without altering its form, or disturbing its sequence of layers.

screening – a process which separates crushed rock into various size fractions – this usually involves a mechanical vibration of the rock over a series of decks fitted with steel mesh, steel plate or polyurethane or rubber mats with fixed sized apertures.

sediment basin – a small excavation designed to trap the coarse material washed from disturbed areas.

sedimentation – process or rate of depositing of sediment.

sight distance – the distance along the road visible to the driver. It is measured along the normal travelled path of a roadway from the driver's location (such as at an intersection) to a specified height above the roadway when the view is unobstructed by traffic.

silt – a classic sediment, most of the particles of which are between 0.063mm and 0.004mm in diameter.

social equity – embraces value concepts of justice and fairness so that the basic needs of all the sectors of society are met and there is a fairer distribution of costs and benefits to improve the well-being and welfare of the community, population or society.

source – the place where pollutants are emitted into the atmosphere. Sources may be point, area or line sources. Often the term "source" is used for a whole plant or an installation. In air pollution modelling, the terms "continuous source" and "instantaneous source" are used:

continuous source: source which emits pollution continuously over a time period much larger than the travel time to a point where the concentration is considered. Usually, it is assumed that during this time period the emission is constant.

instantaneous source: source which emits pollution over a time period much short than the travel time of the emission to a point where its concentration is considered.

spatial – related to areal extent.

species – a taxonomic grouping of organisms that are able to interbreed with each other but not with members of other species.

species diversity – a measure of the number of different species in a given area.

stable – used with respect to the atmospheric boundary layer when the vertical temperature gradient is greater than the adiabatic lapse rate. Vertical air motions are suppressed. The turbulence intensity is low resulting in poor dispersion conditions.

stakeholder – person, group or organisation or company with an interest in an activity or outcome.

standing water – water that is pooled and still.

stripping – removal of vegetation and topsoil.

stockpile – a pile used to store material (such as low-grade ore) for future use.

storage capacity – the maximum volume of liquid able to be retained in a structure.

Study Area – a defined area for the purposes of a specific area of environmental study.

subsoil – surface material comprising the B and C Horizons of soil with distinct profiles; often having brighter colours and higher clay contrasts.

surface waters – all water flowing over, or contained on, a landscape (e.g. runoff, streams, lakes, etc.).

sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their needs.

temperature inversion – an increase in air temperature with height.

terrestrial – of or relating to the land, as distinct from air or water.

topography – the physical relief and contour of a region.

topsoil – the upper layer of soil, usually containing more organic material and nutrients than the subsoil beneath it.

transect – a line across a study area along which observations are made and changes can be observed (e.g. changes in vegetation).

tubestock – tree seedlings supplied with roots enclosed in soil.

undulation – the gentle rise and fall or wave-like structure of a landscape.

uniform – similar or unvarying.

variability – degree or amount of change.

variable – not constant, subject to change (e.g. temperature, rainfall or population).

vegetated – covered with plants.

vehicle movement – a one-way trip.

vibration – oscillating movement.

visual amenity – attractiveness to the eye.

water quality – degree of the lack of contamination of water.

water quality criteria – generally refers to numeric levels specified for key water quality variables, such as dissolved metals or pH, which can be measured to determine the suitability of water for human consumption, supporting aquatic life, etc.

water table – the upper limit of the saturated zone within a rock mass, generally at atmospheric pressure. It is characteristic of unconfined aquifers.

watercourse – stream or river, running water.

weed – any plant (in particular an herbaceous one) that survives in an area where it is harmful or troublesome to the desired land use.

wetland – a low-lying area regularly inundated or permanently covered by shallow water.

wildlife corridor – a strip of vegetation that has a design purpose of allowing animals to pass from one area to another and acting as an undisturbed area for wildlife preservation.

wind direction – the direction from which the wind, averaged over a certain period of time, is blowing.

wind rose – diagrammatic representation of wind direction, strength, and frequency of occurrence over a specified period.

yield – (of a water bore) **1)** the capacity of the bore to produce water. **2)** the amount of water actually withdrawn.

Glossary of Acronyms

ABS – Australian Bureau of Statistics.

AHD – Australian Height Data (in metres).

AHIMS – Aboriginal Heritage Information Management System.

ANZECC – Australian and New Zealand Environment and Conservation Council.

AS – Australian Standard.

AWS – Automatic Weather Station

BAL – Basic Auxiliary Left (as in road intersections).

BAR – Basic Auxiliary Right (as in road intersections).

BAR – Biodiversity Assessment Report.

BDAR - Biodiversity Development Assessment Report

BC Act – Biodiversity Conservation Act 2016.

BOM – Bureau of Meteorology.

BOS – Biodiversity Offset Scheme

Cabonne LEP – Cabonne Local Environment Plan.

DCCEEW – Department of Climate Change, Energy, the Environment, and Water

DCP – Development Control Plan.

DECC - Department of Environment and Climate Change NSW

DECCW - Department of Environment, Climate Change, and Water NSW

DP – Deposited Plan.

DPHI - Department of Planning, Housing, and Infrastructure.

EAR – Environmental Assessment Requirements.

EEC/CEEC – Endangered Ecological Community/Critically Endangered Ecological Community.

EIS – Environmental Impact Statement.

EP&A Act – Environmental Planning and Assessment Act 1979 (NSW).

EP&A Reg – Environmental Assessment and Planning Regulation 2021.

EPBC Act - Environment Protection and Biodiversity Conservation Act 1999

EPL – Environment Protection Licence.

ESD – Ecologically Sustainable Development

FM Act – Fisheries Management Act 1994.

LEP - Local Environment Plan.

LGA – Local Government Area.

MIC – maximum instantaneous charge (as in blasting).

Mt – Million tonnes

Mtpa – million tonnes per annum.

NPW Regulation - National Parks and Wildlife Regulation 2019

PCT – Plant Community Type

PNTL – Project Noise Trigger Level (as in noise).

POEO Act – Protection of the Environment Operations Act 1997.

PVS – Peak Vector Sum (as in vibration).

RBL – Rating Background Level (as in noise).

SEARs – Secretary's Environmental Assessment Requirements.

SEPP – State Environmental Planning Policy.

SRILUS – Sub-Regional Rural and Industrial Land Use Strategy

swl – standing water level.

tpa – tonnes per annum.

WRPP – Western Regional Planning Panel.

Glossary of Symbols and Units

% – percentage.

< – less than.

≤ – less than or equal to.

> – greater than.

≥ – greater than or equal to.

~ – approximately.

µg/g – micrograms per gram.

µg/L – micrograms per litre.

µg/m^3 – micrograms per cubic metre.

µm – micron, one millionth of a metre (one thousandth of a millimetre).

µS/cm – microsiemens per centimetre; a measure of conductivity.

^{o}C – degrees Celsius.

cm – centimetre (unit of measure).

dB – decibel, unit used to express sound intensity.

dB(A) – the unit of measurement of sound pressure level heard by the human ear, expressed in "A" scale.

dB(Linear) – the measurement of sound pressure level in which the amplitudes of the sound signal, though all frequencies of the signal, are treated equally, i.e. not weighted.

g – gram (= 0.001 kilogram).

g/m^2/month – grams per square metre per month unit for deposited dust.

GHG – greenhouse gas.

ha – hectare (100 m x 100 m).

kg – kilogram (weight measure).

km – kilometre (= 1 000 metres).

L – litre.

L/s – litres per second.

L/t – litres per tonne.

L_{A10} – sound level exceeded 10 per cent of the sampling time.

L_{A90} – sound level exceeded 90 per cent of the sampling time.

L_{Aeq} – the L_{Aeq} is the "equal energy" average noise levels, and is used in some instances for the assessment of traffic noise effects or the risk of hearing impairment due to noise exposures.

$L_{Aeq\ 1\ hour}$ – the "equal energy" average noise level over 60 minutes – used for assessing impacts of motor vehicles.

$L_{Aeq\ T}$ – Sound level of continuous noise which emits the same energy as the fluctuation sound over a given time period (T).

L_{Amax} – the absolute maximum noise level measured in a given time interval.

L_{AN} – the A-weighted sound pressure level exceeded by N% of a given measured period.

m – metre.

m AHD – metres Australian Height Datum.

M – million.

m^2 – square metre.

m^3 – cubic metre.

mg – milligram (weight unit).

mg/L – milligrams per litre (parts per million).

ML – megalitre.

Mt – million tonnes (metric tonne = 1 000 kg).

PM_{10} – particulate matter <10µm in diameter.

$PM_{2.5}$ - particulate matter <2.5µm in diameter.

ppm – parts per million.

t – tonnes.

V:H – vertical to horizontal ratio.

Appendices

Appendix 1	Coverage of Secretary's Environmental Assessment Requirements and Government Agency Assessment Requirements for Consideration in the EIS
Appendix 2	Noise Assessment
Appendix 3	Biodiversity Assessment Report
Appendix 4	Road Transport Assessment
Appendix 5	Canowindra Road Quarry Access Intersection Design
Appendix 6	Aboriginal Due Diligence Assessment Report

Appendix 1

Coverage of Secretary's Environmental Assessment Requirements and Government Agency Assessment Requirements for Consideration in the EIS

(Total No. of pages including blank pages = 17)

Table A1.1
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
GENERAL REQUIREMENTS	
The Environmental Impact Statement (EIS) for the development must comply with the requirements in Clauses 190, 192 and 193 of Part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021*.	1.5
In particular, the EIS must include: • an executive summary;	Executive Summary
• a comprehensive description of the development, including: – a detailed site description and history of any previous activities on the site, including a current survey plan;	1.2
– identification of the resource, including the amount, type, composition;	2.3
– the layout of the proposed works and components (including any existing infrastructure that would be used for the development);	2.1
– an assessment of the potential impacts of the development, as well as any cumulative impacts, including the measures that would be used to minimise, manage or offset these impacts;	4
– a detailed rehabilitation plan for the site;	2.10
– any likely interactions between the development and any existing/approved developments and land uses in the area, paying particular attention to potential land use conflicts with nearby residential development;	1.5, 3.3.2, 5.2.5
– a list of any other approvals that must be obtained before the development may commence;	2.2
– the permissibility of the development, including identification of the land use zoning of the site;	1.5
– identification of sensitive receivers likely to be affected by the development using clear maps/plans, including key landform areas, such as conservation areas and waterways;	3.3
• a conclusion justifying why the development should be approved, taking into consideration: – alternatives;	5.2
– the suitability of the site;	5.2
– the biophysical, economic and social impacts of the project, having regard to the principles of ecologically sustainable development; and	5.2
– whether the project is consistent with the objects of the Environmental Planning and Assessment Act 1979; and	5.2
• a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.	
CONSULTATION	
• In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers and any surrounding landowners that may be impacted by the development.	1.6
• The EIS must describe the consultation that was carried out, identify the issues raised during this consultation, and explain how these issues have been addressed in the EIS.	Appendix 1

Table A1.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
KEY ISSUES	
Noise	
including a quantitative assessment of potential: • construction and operational noise and off-site transport noise impacts of the development in accordance with the Interim Construction Noise Guideline, NSW Noise Policy for Industry and NSW Road Noise Policy respectively;	4.1
• reasonable and feasible mitigation measures to minimise noise emissions; and	4.1.4
• monitoring and management measures;	4.1.4
Blasting and Vibration	
including: • proposed hours, frequency, methods and impacts; and	2.5.2.2, 4.1.3.4, 4.1.4
• an assessment of the likely blasting and vibration impacts of the development, having regard to the relevant ANZECC guidelines and paying particular attention to impacts on people, buildings, livestock, infrastructure and significant natural features;	4.1.5.5
Biodiversity	
including: • accurate predictions of any vegetation clearing on site;	4.2
• a detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and	4.2.3
• a detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.	4.2.2
Traffic and Transport	
including: • accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;	2.6, 4.3
• an assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;	4.3
• a description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development;	4.3.3
• evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and	4.3
• a description of access roads, specifically in relation to nearby Crown roads and fire trails;	2.6, 4.3

Table A1.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
KEY ISSUES (Cont'd)	
Heritage	
including: • An Aboriginal Cultural Heritage Assessment Report (ACHAR), prepared in accordance with relevant policy and guidelines, identifying, describing and assessing any impacts to Aboriginal cultural heritage sites or values associated with the project. – The ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of thorough archaeological survey and test excavations (where required);	4.4
– Include evidence of adequate and continuous consultation with Aboriginal stakeholders in determining and assessing impacts, developing and selecting options for avoidance of Aboriginal cultural heritage and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010).); and	-
• identification of Historic heritage in the vicinity of the development and an assessment of the likelihood and significance of impacts on heritage items, having regard to the relevant policies and guidelines listed in Attachment 1;	4.4
Visual	
• including an assessment of the likely visual impacts of the development on private landowners in the vicinity of the development and key vantage points in the public domain, including with respect to any new landforms;	4.5
Water	
including: • a detailed site water balance and an assessment of any water licensing requirements or other approvals required under the *Water Act 1912* and/or *Water Management Act 2000*, including a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo;	4.6
• an assessment of potential impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives; and	4.6
• a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts;	4.6
Air	
including an assessment of the likely air quality impacts of the development in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The assessment is to give particular attention to potential dust impacts on any nearby private receivers due to construction activities, the operation of the quarry and/or road haulage;	4.7

Table A1.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
KEY ISSUES (Cont'd)	
Land Resources	
including: • potential impacts on soils and land capability (including potential erosion and land contamination) and the proposed mitigation, management and remedial measures (as appropriate); and	4.8
• an assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts;	4.8
Social and Economic	
• an assessment of the likely social and economic impacts of the development; and	4.9
Hazards	
• including an assessment of the likely risks to public safety, paying particular attention to potential bushfire risks and the transport, storage, handling and use of any hazardous or dangerous goods;	4.10
Rehabilitation	
• including a detailed description of the proposed rehabilitation measures that would be undertaken throughout the development.	2.10
Waste	
• including estimates of the quantity and nature of the waste streams that would be generated or received by the development and any measures that would be implemented to minimise, manage or dispose of these waste streams;	2.7.4
Planning Instruments and Guidelines	
The EIS must take into account all relevant State Government environmental planning instruments, guidelines, policies, and plans.	Entire document

Table A1.2
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
NOISE		
Environment Protection Authority 05/03/2024	In relation to noise impacts, the following matters should be addressed (where relevant) as part of the Environmental Assessment. 1. Construction noise associated with the proposed development in accordance with the Interim Construction Noise Guideline (DECC, 2009).	4.1.2, 4.13
	2. Operational noise from all industrial activities proposed (including private haul roads) to be undertaken on the premises should be assessed in accordance with the Noise Policy for Industry (EPA, 2017).	
	3. Noise from existing or upgraded or new public roads from increased road traffic should be assessed in accordance with the NSW Road Noise Policy (DECCW, 2011).	
BLASTING AND VIBRATION		
Cabonne Council 11/03/2024	• The impact of blasting and procedures to ensure safe management. Due to the proximity to Canowindra Road council is of the opinion that blasting will necessitate closure of the road at such times and that the nearest neighbour may also need to be evacuated.	2.5.2.2, 4.1
Environment Protection Authority 05/03/2024	In relation to blasting and vibration, the following matters should be address (where relevant) as part of the Environmental Assessment	-
	• Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in *the Assessing Vibration: a technical guideline* (DEC2006).	4.1.2
	• If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).	4.1.2, 4.1.4
BIODIVERSITY		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	**Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)** The EIS should include an assessment of the following:	
	• The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:	4.2, Appendix 3
	a) The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:	4.2.3
	i. The clearing of native vegetation exceeding the thresholds listed under Clause 7.23 of the BC Regulation, or	4.2.3, Appendix 3

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
BIODIVERSITY (Cont'd)		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	ii. The clearing of native vegetation, or other action, on land included on the Biodiversity Values Map published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).	4.2.3, Appendix 3
	b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on *'the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.	4.2.3
	c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.	4.2.3
	d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.	NA
	Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the NSW DCCEE website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification.	4.2.3
TRAFFIC AND TRANSPORT		
Cabonne Council 11/03/2024	• The requirements for a BAL/BAR and whether sufficient sight distances exist from the proposed entrance (or requirements regarding alteration/reshaping within the road reserve to achieve this);	2.6.1, 3.6, 4.3.2
	• Proposed future maintenance within the road reserve by the proponent to ensure sight distances are maintained;	4.3.3
	• Proposed sealing of the initial length of internal road to reduce dust together with other proposed methods to reduce tracking of dirt onto external roads (shaker grid/beds);	2.6.2

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
TRAFFIC AND TRANSPORT (Cont'd)		
Crown Lands and Public Spaces 07/03/2024	No Crown reserves or waterways are in the vicinity of the proposal are affected by the proposal however Canowindra Road is a shared Council and Crown managed road. Any works proposed that may affect the access road and intersection with Canowindra Road will need authorisation from the department and Cabonne Council as the Roads Authority under the Roads Act 1992.	4.3.4
Transport for NSW 11/03/2024	To ensure that TfNSW's key interests are addressed, TfNSW requests that any future application be submitted with an Environmental Impact Assessment (EIA) containing a Traffic Impact Assessment (TIA), prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, Australian Standards and any complementary TfNSW Supplements, and Roads and Maritime Guide to Traffic Generating Developments. The TIA should contain information listed in Attachment A: Traffic Impact Assessment (TIA).	Appendix 4
	The purpose of the TIA is to address the impact of traffic generation on the public road network and measures employed to ensure traffic efficiency and road safety during construction, operation and decommissioning of the project.	4.3.2, Appendix 4
	The requested TIA should be tailored to the scope of the proposed development and include, but not be limited to, the following: • Project schedule: – Phases and stages of the project, including construction, operation and decommissioning / rehabilitation, as applicable, and	2.6.3
	– Operational hours and days of work, number of shifts and start and end times.	2.6.3
	• Traffic volumes including: – Existing background traffic,	3.6.2
	– Project-related traffic for each phase or stage of the project,	3.6.2
	– Projected cumulative traffic at commencement of operation, and a 10-year horizon post- commencement.	4.3.2
	• Traffic characteristics including: – Number and ratio of heavy vehicles to light vehicles,	3.6.2
	– Peak times for existing traffic justified by up-to-date traffic counts,	3.6.2
	– Peak times for project-related traffic including commuter periods,	2.6.1, 2.8
	– Proposed hours for transportation and haulage,	2.8
	– Interactions between existing site traffic and project-related traffic.	2.6, 3.6
	• The origins, destinations and routes for: – Commuter (employee and contractor) light vehicles and pool vehicles,	2.6
	– Heavy (haulage) vehicles.	2.6

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
TRAFFIC AND TRANSPORT (Cont'd)		
Transport for NSW 11/03/2024	• Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include: – Available sight distances at the site access and nearby intersections and any constraint to achieving the required sight distance.	4.3.2
	– An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.	4.3.2
	– Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.	4.3.2
	• Road safety assessment of the development access. Note, where road safety concerns are identified, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.	4.3
	• Consideration of the local climate conditions that may affect road safety during the life of the project (e.g. fog, wet and dry weather, icy road conditions).	Appendix 4
	• Strategic design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit+10km/h	4.3.2
	• Identification and assessment of potential environmental impacts of the project, such as blasting, lighting, visual, noise, dust and drainage on the function and integrity of all affected public roads.	4.1.5
	• A draft Traffic Management Plan (TMP) that could be implemented following approval of the EIS, in consultation with relevant Councils and TfNSW. The TMP should identify strategies to manage the impacts of project related traffic, including any community consultation measures for peak haulage periods.	Appendix 4
	• Propose a Driver Code of Conduct for haulage operations which could include, but not be limited to: – Safety initiatives for haulage through residential areas and/or school zones.	Appendix 4
	– An induction process for vehicle operators and regular toolbox meetings.	
	– A public complaint resolution and disciplinary procedure.	

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
ABORIGINAL HERITAGE		
Heritage NSW (DCCEEW) 06/03/2024	Provide an Aboriginal Cultural Heritage Assessment Report (ACHAR), prepared in accordance with relevant policy and guidelines, identifying, describing and assessing any impacts to Aboriginal cultural heritage sites or values associated with the project. • The ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of thorough archaeological survey and test excavations (where required);	4.4
	• Include evidence of adequate and continuous consultation with Aboriginal stakeholders in determining and assessing impacts, developing and selecting options for avoidance of Aboriginal cultural heritage and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010).	-
WATER		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	• The EIS must map features relevant to water, including: – Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method).	3.1
	– Wetlands (as described in s4.2 of the Biodiversity Assessment Method).	3.1
	– Groundwater.	3.1
	– Groundwater dependent ecosystems.	3.1
	• The EIS must describe background conditions for any water resource likely to be affected by the proposal, including: – Existing surface and groundwater.	3.9
	– Hydrology	3.1, 3.9
	– Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government	3.9
	– *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).	3.9

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER (Cont'd)		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	• The EIS must assess the impacts of the proposal on water quality, including:	3.9.3
	– The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.	3.9.3
	– Identification of proposed monitoring of water quality.	3.9.3, 4.6.2
	– Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).	NA
	• The EIS must assess the impact of the proposal on hydrology, including: – Water balance including quantity, quality and source.	3.9.4
	– Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.	3.9.2
	– Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.	3.9.2
	– Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).	3.9.2
	– Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.	3.9, 4.6
Department of Climate Change, Energy, the Environment and Water 07/05/2024	• Assessment of impacts on surface water sources, watercourses and riparian land, and measures proposed to reduce and mitigate these impacts.	4.6.3
	• Consideration of relevant legislation, policies and guidelines including the Guidelines for Controlled Activities on Waterfront Land (available at https://water.dpie.nsw.gov.au/licensing-and-trade/approvals/controlled-activity-approvals/guidelines).	4.6.3
	• Consideration into required approvals. Before commencing any proposed works on waterfront land, an application under the Water Management Act 2000 for controlled activity approval (CAA) must be submitted. Works cannot commence until a CAA has been issued, unless an exemption applies under Schedule 4 of the Water Management (General) Regulation 2018, please refer to the Exemption e-tool (available at https://water.dpie.nsw.gov.au/licensing-and-trade/approvals/controlled-activity-approvals/guidelines)	4.6.3

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER (Cont'd)		
Environment Protection Authority 05/03/2024	The EIS should; 1. Describe water usage for the proposal including the position of any intakes and discharges, volumes, water quality and frequency of all water discharges.	3.9.3
	2. Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resource likely to be affected by the proposal.	3.9
	3. State the Water Quality Objectives for the receiving waters relevant to the proposal. These refer to the community's agreed environmental values and human uses endorsed by the NSW Government as goals for ambient water. http://www.environment.nsw.gov.au/ieo/index.htm Where groundwater may be impacted the assessment should identify appropriate groundwater environmental values.	3.9.4
	4. State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality. http://www.environment.gov.au/water/quality/publications/australian-and-new-zealand- guidelines-fresh-m arine-water-quality-volume-1.	3.9.4
	5. State any locally specific objectives, criteria or targets which have been endorsed by the NSW Government.	-
	6. Provide a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.	3.9.3
	7. Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.	3.9, 4.6
	8. Describe the nature and degree of impact that any proposed discharges will have on the receiving environment.	3.9
	9. Assess impacts against the relevant ambient water quality outcomes. Demonstrate how the proposal will be designed and operated to:	3.9
	– protect the Water Quality Objectives for receiving waters where they are currently achieved; and	3.9
	– contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved.	3.9
	10. Where a discharge is proposed that includes a mixing zone, the proposal should demonstrate how wastewater discharged to waterways will ensure the ANZECC (2000) water quality criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge, that any impacts in the initial mixing zone are demonstrated to be reversible.	4.6.3
	11. Describe how predicted impacts will be monitored and assessed over time.	3.9

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER (Cont'd)		
Environment Protection Authority 05/03/2024	12. Assess potential impacts on groundwater and groundwater dependent ecosystems.	3.9
	13. Detail the erosion and sediment controls to be implemented to minimise erosion and sediment mobilisation at the site which have been designed in accordance with the requirements of the publication Managing Urban Stormwater: Soils and Construction (Landcom 2004). The EIS should show the location of each measure to be implemented for the construction and operational phases of the project. The measures to be considered include: – Sediment traps – Diversion banks – Sediment fences – Bunds (earth, hay, mulch) – Geofabric liners – Other control measures as appropriate	4.6.2, 2.1
FLOODING		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	• The EIS must map the following features relevant to flooding as described in the Flood Risk Management Manual (NSW Government 2023) including: – Flood prone land (i.e. land susceptible to the probable maximum flood event).	3.9
	– Flood planning area, the area below the flood planning level.	
	– Hydraulic categorisation (floodway and flood storage areas).	
	– Flood hazard.	
	• The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.	NA
	• The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	NA
	• All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.	4.6.2
	• Modelling in the EIS must consider and document: – Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.	NA

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
FLOODING (Cont'd)		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	– The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.	NA
	– Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.	NA
	– Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.	NA
	– Relevant provisions of the Flood Risk Management Manual 2023.	NA
	• The EIS must assess the impacts on the proposal on flood behaviour, including: – Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.	NA
	– Consistency with Council floodplain risk management plans.	
	– Consistency with any Rural Floodplain Management Plans.	
	– Compatibility with the flood hazard of the land.	
	– Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.	
	– Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.	
	– Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.	
	– Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.	
	– Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.	
	– Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.	

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
FLOODING (Cont'd)		
Department of Climate Change, Energy, the Environment and Water 06/03/2024	– Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.	NA
	– Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.	
AIR QUALITY		
Cabonne Council 11/03/2024	• Proposed vegetation screening of parallel section of internal gravel road to reduce dust to vehicles travelling along the adjacent Canowindra Road;	2.4, 4.5.3
Environment Protection Authority 05/03/2024	The EIS should include a detailed air quality impact assessment (AQIA). The AQIA should: 1. Identify all potential discharges of fugitive and point source emissions of pollutants including dust for all stages of the proposal and assess the risk associated with those emissions. All processes that could result in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided. Assessment of risk relates to environmental harm, risk to human health and amenity.	3.10
	2. Justify the level of assessment undertaken on the basis of risk factors, including but not limited to: – proposal location; – characteristics of the receiving environment; – type and quantity of pollutants emitted.	3.10
	3. Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to: – meteorology and climate; – topography; – surrounding land-use; – ambient air quality.	3.10.2
	4. Include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits.	3.10
	5. Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.	4.7.3
	6. Include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005)*. http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf.	NA

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
AIR QUALITY (Cont'd)		
Environment Protection Authority 05/03/2024	7. Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2010)*.	4.7.3
	8. Detail emission control techniques/practices that will be employed by the proposal. Consideration should be given to dust management techniques where water is unavailable or limited and the development of a Trigger Action Response Plan (TARP).	4.7.2
AGRICULTURE		
Department of Primary Industries - Agriculture 05/03/2024	• The Scoping Report and draft SEARs have been reviewed and it is recommended that a LUCRA should be undertaken to determine any risks associated with the proposed development to create potential land use conflicts with nearby residences and ongoing agricultural operations . Further information and a guide can be found at https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment/development- assessment2/lucra	3.3.2
BUSH FIRE		
NSW Rural Fire Service 13/03/2024	• The NSW Rural Fire Service recommends that the Applicant engages in a suitably qualified person to prepare a bush fire report addressing the requirements *of Planning for Bush Fire Protection 2019* as part of the preparation of an Environment Impact Statement.	4.10
HAZARDS		
Cabonne Council 11/03/2024	• Consideration of the powerline traversing the site (height above natural ground level), particularly over the proposed internal road;	4.9.1
ACCESS		
Crown Lands and Public Spaces 07/03/2024	• It is noted that there is an exploration licence that encompasses the proposed quarry site.	Noted
	• It is also important to note that all Crown land and roads within an exploration licence that are to be subject to exploration activities must be subject to a s140 Exploration Land Access Arrangement under the Mining Act 1992. The Exploration Land Access Arrangement must be agreed and executed prior to any exploration taking place.	Noted
STATUTORY REQUIREMENTS		
Environment Protection Authority 05/03/2024	• The activity as proposed will be a schedule Activity (Extractive Industry and Crushing Grinding and Separating) under the *Protection of the Environment Operations Act 1997* and therefore will be Integrated Development Application for the purposes of the EPA, requiring an environment protection licence should development consent be granted.	2.2.2

Table A1.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WASTE AND STOCKPILE MANAGEMENT		
Environment Protection Authority 05/03/2024	The EIS should; 1. Identify, characterise and classify all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste. All waste must be classified in accordance with EPA's Waste Guidelines.	2.7.4, 4.10
	2. Identify, characterise and classify all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling. All waste must be classified in accordance with the EPA's Waste Guidelines.	4.10
AGRICULTURE		
Environment Protection Authority 05/03/2024	3. Provide details of how waste and product stockpiles will be handled and managed onsite to minimise pollution, including: – Labelling of stockpiles for identification, ensuring that all waste is in clearly identified stockpiled from other types of material (especially the separation of contaminated and non-contaminated waste).	2.5.2.4
	– Proposed height limits for all waste and product stockpiles to reduce the potential for dust.	2.4, 2.5
	– Procedures for minimising the movement of waste and products around the site to avoid the need for double handling.	2.7.4
	– Where relevant, measures to minimise leaching from stockpiles into the surrounding environment, such sediment fencing, geofabric liners, etc.	2.5.2.4
	4. Provide details of how the waste will be handled and managed during transport to a lawful facility. If the waste possesses hazardous characteristics, the Proponent must provide details of how the waste will be treated or immobilised to render it suitable for transport and disposal.	2.7.4

Appendix 2

Noise Assessment

prepared by

Muller Acoustic Consulting

(Total No. of pages including blank pages = 55)

Noise Assessment

McNaught's Quarry
5082 Canowindra Road
Canowindra, NSW

Prepared for: McNaught Earthworks Pty Ltd
C/- RW Corkery & Co Pty Ltd
January 2024
MAC231962-01RPV3

Muller Acoustic Consulting

Document Information

Noise Assessment

McNaught's Quarry

5082 Canowindra Road

Canowindra, NSW

Prepared for: McNaught Earthworks Pty Ltd

C/- RW Corkery & Co Pty Ltd

Suite 12.01, 1/5 Railway Street

Chatswood NSW 2067

Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC231962-01RPV3	27 February 2024	Rod Linnett		Oliver Muller	

DISCLAIMER

All documents produced by Muller Acoustic Consulting Pty Ltd (MAC) are prepared for a particular client's requirements and are based on a specific scope, circumstances and limitations derived between MAC and the client. Information and/or report(s) prepared by MAC may not be suitable for uses other than the original intended objective. No parties other than the client should use or reproduce any information and/or report(s) without obtaining permission from MAC. Any information and/or documents prepared by MAC is not to be reproduced, presented or reviewed except in full.

CONTENTS

1 INTRODUCTION 5

2 PROJECT DESCRIPTION 7

2.1 BACKGROUND 7

2.2 RECEIVER REVIEW 7

3 NOISE POLICY AND GUIDELINES 9

3.1 NOISE POLICY FOR INDUSTRY 9

3.1.1 PROJECT NOISE TRIGGER LEVELS (PNTL) 10

3.1.2 RATING BACKGROUND LEVEL (RBL) 10

3.1.3 PROJECT INTRUSIVENESS NOISE LEVEL (PINL) 10

3.1.4 PROJECT AMENITY NOISE LEVEL (PANL) 11

3.1.5 MAXIMUM NOISE ASSESSMENT TRIGGER LEVELS 13

3.2 INTERIM CONSTRUCTION NOISE GUIDELINE 13

3.2.1 STANDARD HOURS FOR CONSTRUCTION 15

3.2.2 CONSTRUCTION NOISE MANAGEMENT LEVELS 15

3.3 ROAD NOISE POLICY 16

3.4 ANZEC BLASTING GUIDELINES 17

4 ASSESSMENT CRITERIA 19

4.1 BACKGROUND NOISE LEVELS 19

4.2 OPERATIONAL NOISE TRIGGER LEVELS (CRITERIA) 19

4.2.1 INTRUSIVENESS NOISE LEVELS 19

4.2.2 AMENITY NOISE LEVELS AND PROJECT AMENITY NOISE LEVELS 20

4.2.3 PROJECT NOISE TRIGGER LEVELS 20

4.3 CONSTRUCTION NOISE MANAGEMENT LEVELS 20

4.4 ROAD TRAFFIC NOISE 21

4.5 ANZEC GUIDELINE BLASTING LIMITS 21

4.6 CONSTRUCTION VIBRATION 21

5 MODELLING METHODOLOGY 23

5.1 ASSESSMENT SCENARIOS 23

5.1.1 CONSTRUCTION 23
5.1.2 OPERATIONS 24
5.1.3 SITE DECOMMISSIONING AND REHABILITATION 25
5.2 MITIGATION INCLUDED IN DESIGN 25
5.3 HOURS OF OPERATION 30
5.4 SOUND POWER LEVELS 30
5.5 METEOROLOGICAL ANALYSIS 31
5.5.1 NPI VERY NOISE ENHANCING CONDITIONS 32
5.5.2 MODELLED METEOROLOGICAL PARAMETERS 33
5.6 BLASTING AND VIBRATION ASSESSMENT METHODOLOGY 33
5.6.1 AIR-BLAST OVERPRESSURE 33
5.6.2 GROUND-BORNE VIBRATION 34
6 NOISE ASSESSMENT RESULTS 35
6.1 OPERATIONAL NOISE ASSESSMENT 35
6.2 BLASTING ASSESSMENT RESULTS 37
6.3 CONSTRUCTION NOISE ASSESSMENT 38
6.4 ROAD TRAFFIC NOISE ASSESSMENT 43
6.5 DECOMMISSIONING NOISE ASSESSMENT 43
7 CONCLUSION 45
APPENDIX A – GLOSSARY OF TERMS
APPENDIX B – NEWA METEOROLOGICAL DATA

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Ltd (RWC) on behalf of McNaught Earthworks Pty Ltd (McNaught) to prepare a Noise Assessment (NA) for the proposed McNaught's Quarry (the project) located at 5082 Canowindra Road, Canowindra, NSW.

The NA has quantified potential operational construction related noise emissions from the project and recommends reasonable and feasible noise controls where required.

This assessment has been undertaken in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017;
- NSW Environment Protection Authority (EPA), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- NSW Department of Environment and Climate Change (DECC) – NSW Interim Construction Noise Guideline (ICNG), July 2009;
- NSW Department of Environment, Climate Change and Water (DECCW) – NSW Road Noise Policy (RNP), March 2011;
- International Organisation for Standardisation (ISO) 9613-1:1993 (ISO9613:1) - Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere;
- International Organisation for Standardisation (ISO) 9613-2:1996 (ISO9613:2) - Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation;
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures;
- Standards Australia AS/NZS 2107:2016 (AS2107) – Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors;
- ISO/TR 17534-3 - Acoustics — Software for the calculation of sound outdoors — Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1;
    - Standards Australia AS2187.2-2006 (AS2187.2) – Explosives—Storage and Use Part 2: Use of Explosives; and
    - Australia and New Zealand Environment Council (ANZEC) Guideline – Technical Basis For Guidelines To Minimise Annoyance Due To Blasting Overpressure And Ground Vibration (ANZEC Guideline), September 1990.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**

This page has been intentionally left blank

2 Project Description

2.1 Background

McNaught proposes to establish and operate the project, located at 5082 Canowindra Road, Canowindra. The project includes the following activities within land identified hereafter as the 'project site' (refer **Figure 1**):

- extraction of up to 960,000m^3 or approximately 2.3 million tonnes (Mt) of material at an average rate of 80,000 tonnes per annum (tpa) and a maximum rate of 150,0000tpa for a period of approximately 30 years using drill and blast extraction methods;
- crushing, screening, and stockpiling of extracted material within the proposed Extraction Area or Stockpile Area;
- loading and transportation of stockpiled material from the project site via Canowindra Road;
- construction of a Site Access Road, including a suitable intersection with Canowindra Road;
- installation of demountable buildings for site office, amenities, workshop and storage facilities; and
- rehabilitation of the project site to achieve final land use of agricultural grazing and native ecosystem areas.

2.2 Receiver Review

A review of residential receivers in proximity to the project has been completed and are summarised in **Table 1.** Residential receivers are classified by their typical land use zoning in accordance with Table 2.3 of the NPI and would be categorised as rural residential. **Figure 1** provides a locality plan showing the position of these receivers in relation to the project.

Table 1 Receiver Locations

Receiver	Description	Receiver Type	Coordinates (GDA94/MGA55)	
			Easting	Northing
R01	Residential	Project Related	656952	6302450
R02	Residential	Rural	656998	6302195
R03	Residential	Rural	656080	6302784
R04	Residential	Rural	659079	6303645



FIGURE 1

PROJECT LAYOUT

MAC231962-02

McNaughts Quarry

KEY

Receiver

Extraction Area

Project Boundary

0 100 200 300 400 500 m

N

MAC
Muller Acoustic Consulting

3 Noise Policy and Guidelines

3.1 Noise Policy for Industry

The EPA released the Noise Policy for Industry (NPI) in October 2017 which provides a process for establishing noise criteria for consents and licenses enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997.

The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

1. Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.
4. Consider residual noise impacts - that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.

5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.

6. Monitor and report environmental noise levels from the development.

3.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level** (PINL) and **Project Amenity Noise Level** (PANL) determined in accordance with Section 2.3 and Section 2.4 of the NPI.

3.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a parameter determined from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period.

For low noise environments, such as rural environments, minimum assumed RBLs apply within the NPI can be adopted in lieu of completing background noise measurements. This is considered the most conservative method for establishing noise criteria for a project. The minimum assumed RBLs are as follows:

- Minimum Day RBL = 35dBA;
- Minimum Evening RBL = 30dBA; and
- Minimum Night RBL = 30dBA.

3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ($LA_{eq(15min)}$) is the RBL + 5dB and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

3.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended Amenity Noise Levels specified in Table 2.2 (of the NPI). The NPI defines two categories of Amenity Noise Levels:

- **Amenity Noise Levels (ANL)** – are determined considering all current and future industrial noise within a receiver area; and
- **Project Amenity Noise Level (PANL)** – is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: "to ensure that industrial noise levels (existing plus new) remain within the recommended Amenity Noise Levels for an area, a Project Amenity Noise Level applies for each new source of industrial noise as follows":

PANL for new industrial developments = recommended **ANL** minus 5dBA.

The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and

The recommended Amenity Noise Levels as per Table 2.2 of the NPI are reproduced in **Table 2**.

Table 2 Amenity Noise Levels

Receiver Type	Noise Amenity Area	Time of day[1]	Recommended Amenity Noise Level dB LAeq(period)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks.	See column 4	See column 4	5dB above the recommended Amenity Noise Level for a residence for the relevant noise amenity area and time of day
School Classroom	All	Noisiest 1-hour period when in use	35 (internal) 45 (external)
Hospital ward			
- internal	All	Noisiest 1-hour	35
- external	All	Noisiest 1-hour	50
Place of worship - internal	All	When in use	40
Passive Recreation	All	When in use	50
Active Recreation	All	When in use	55
Commercial premises	All	When in use	65
Industrial	All	When in use	70

Notes: The recommended Amenity Noise Levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

3.1.5 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the night-time period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq(15min)}$ 40dB or the prevailing RBL plus 5dBA, whichever is the greater; and/or
- L_{Amax} 52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

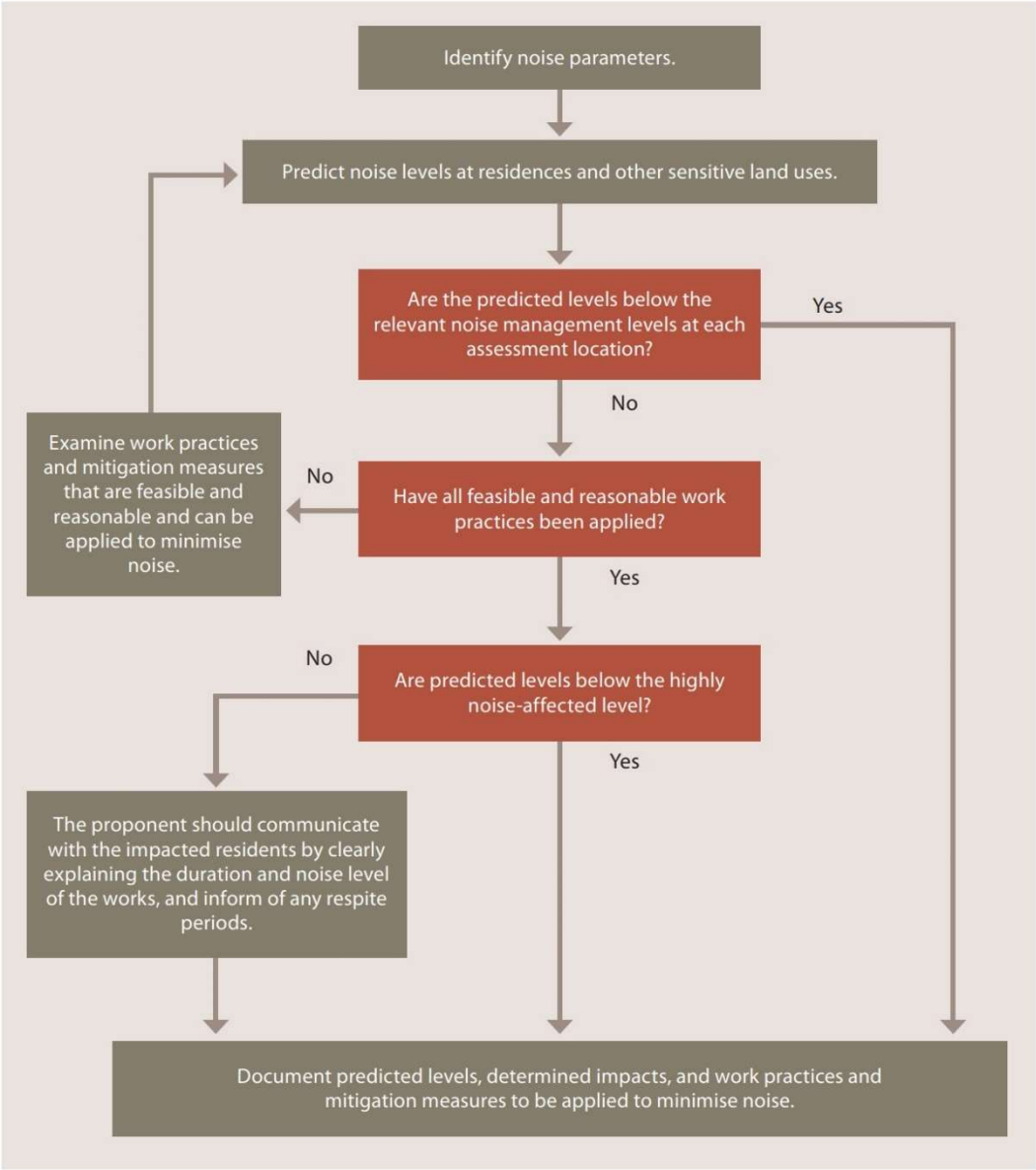
3.2 Interim Construction Noise Guideline

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- qualitative, which is suited to short term infrastructure maintenance (< three weeks).

The qualitative assessment methodology is a more simplified approach that relies on noise management strategies. This NCA has adopted a quantitative assessment approach which is summarised in **Figure 2.** The quantitative approach includes identification of potentially affected receivers, derivation of the construction noise management levels, quantification of potential noise impact at receivers via predictive modelling and, provides management and mitigation recommendations.

Figure 2 Quantitative Assessment Processes for Assessing and Managing Construction Noise



Source: Department of Environment and Climate Change, 2009.

3.2.1 Standard Hours for Construction

Table 3 presents the ICNG recommended standard hours for construction works.

Table 3 Recommended Standard Hours for Construction

Daytime	Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction activities are anticipated to be undertaken during standard construction hours.

3.2.2 Construction Noise Management Levels

Section 4 of the ICNG details the quantitative assessment method involving predicting noise levels and comparing them with the NML and are important indicators of the potential level of construction noise impact. **Table 4** reproduces the ICNG Noise Management Level for residential receivers. The NML is determined by adding 10dB (standard hours) or 5dB for Out of Hours (OOH) to the Rating Background Level (RBL) for each specific assessment period.

Table 4 Noise Management Levels		
Time of Day	Management Level LAeq(15min)[1]	How to Apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq(15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75dBA (HNA)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours.	Noise affected RBL + 5dB	A strong justification would typically be required for work outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see Section 7.2.2 of the ICNG.

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.

3.3 Road Noise Policy

The road traffic noise criteria are provided in the Road Noise Policy (RNP), 2011. The policy sets out noise criteria applicable to different road classifications for the purpose of quantifying traffic noise impacts. Road noise criteria relevant to this assessment are presented in detail in **Section 4.4**.

3.4 ANZEC Blasting Guidelines

Noise and vibration levels from blasting are assessable against criteria established in the Australian and New Zealand Environment Council (ANZEC) – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration. The blasting limits are generally consistent with the guideline levels contained within AS2187:2006 Part 2 – Explosives - Storage and Usage – Part 2. Where compliance is achieved, the risk of human annoyance is minimised.

Furthermore, for damage induced vibration, German Standard DIN 4150 - Part 3: 1999 provides the strictest guideline levels of vibration velocity for evaluating the effects of vibration in structures. Blasting and vibration induced damage criteria relevant to this assessment are presented in detail in Section 4.5.

This page has been intentionally left blank

4 Assessment Criteria

4.1 Background Noise levels

The assessment has adopted the minimum assumed Rating Background Noise Levels (RBLs) outlined in Section 2.3 of the Noise Policy for Industry (NPI, 2017) and are reproduced in **Table 5**.

Table 5 Default RBLs

Period[1]	Adopted RBL, dB L_{A90}
Day	35
Evening	30
Night	30

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Operational Noise Trigger Levels (Criteria)

This section outlines the determination of PNTLs and Maximum Noise Assessment Trigger Levels in accordance with NPI methodology.

4.2.1 Intrusiveness Noise Levels

The PINL are presented in **Table 6** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 6 Project Intrusiveness Noise Levels

Location	Receiver Type	Period[1]	Measured RBL dB L_{A90}	Adopted RBL dB L_{A90}	PINL dB $L_{Aeq(15min)}$
All	Rural Residential	Day	35	35	40
		Evening	30	30	35
		Night	30	30	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2.2 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers potentially affected by the project are presented in **Table 7.**

Table 7 Amenity Noise Levels and Project Amenity Noise Levels

Receiver Type	Noise Amenity Area	Assessment Period[1]	NPI Recommended ANL dB $L_{Aeq(period)}$	ANL dB $L_{Aeq(period)}$[2]	PANL dB $L_{Aeq(15min)}$[3]
Residential	Rural	Day	50	45	48
		Evening	45	40	43
		Night	40	35	38

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Project Amenity Noise Level equals the Amenity Noise Level -5dB as there is other industry in the area.

Note 3: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

4.2.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 8** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 8 Project Noise Trigger Levels

Receiver Type	Noise Amenity Area	Assessment Period[1]	PINL dB $L_{Aeq(15min)}$	PANL dB $L_{Aeq(15min)}$	PNTL dB $L_{Aeq(15min)}$
Residential	Rural	Day	40	48	40
		Evening	35	43	35
		Night	35	38	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.3 Construction Noise Management Levels

The relevant NMLs for standard construction hours are presented in **Table 9**.

Table 9 Construction Noise Management Levels

Receiver Type	Assessment Period[1]	Adopted RBL dB L_{A90}	NML dB $L_{Aeq(15min)}$
Rural Residential	Standard Hours	35	45 (RBL+10dBA)

Note 1: Refer to **Table 3** for Standard Recommended Hours for Construction.

Decommissioning, being of a similar and temporary nature would also be assessed against the construction NMLs.

4.4 Road Traffic Noise

Table 10 presents the road traffic noise assessment criteria reproduced from the RNP relevant to this assessment. The road traffic noise criteria are provided in the RNP. For this assessment, the 'sub arterial road' category for Canowindra Road.

Table 10 Road Traffic Noise Assessment Criteria

Road category	Type of project/development	Assessment Criteria – dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeways/arterial/ sub-arterial Roads	Existing residences affected by additional traffic on freeways/arterial/sub-arterial roads generated by land use developments	60dB LAeq(15hr)	55dB LAeq(9hr)

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

4.5 ANZEC Guideline Blasting Limits

The ANZEC blasting limits for air-blast overpressure and ground vibration are presented in Table 11.

Table 11 ANZEC Guideline Blasting Limits

	Overpressure dB (Linear Peak)	Ground Vibration PPV (mm/s)
Recommended Maximum (95% of all blasts)	115	5
Level not to be exceeded	120	10
Long term goal for ground vibration	N/A	2

4.6 Construction Vibration

Department of Environment and Conservation (DEC) 2006, *Assessing Vibration: A Technical Guideline* (the guideline) provides guidance on determining effects of vibration on buildings occupants. The guideline does not address vibration induced damage to structures, blast induced vibration effects or structure borne noise effects.

A qualitative assessment of potential vibration impacts has been completed. Due to the nature of the works proposed and distances to potential vibration sensitive receivers, vibration impacts from the project would be negligible.

The Construction Noise & Vibration Strategy (V4.1 Transport for NSW, 2019) sets out safe working distances to achieve the human response criteria for vibration. The key vibration generating source proposed to be used is a vibratory roller used for road construction. For a large vibratory roller, the Construction Noise Strategy sets a safe working distance of 100m to achieve the residential human response criteria for continuous vibration. Therefore, as the nearest receivers to the project are greater than 100m, human exposure to vibration is anticipated to be minimal. Furthermore, where the human response criteria are satisfied, the structural or cosmetic criteria for sensitive receivers will be achieved. Therefore, vibration impacts are not considered to be a significant issue and have not been considered further in this assessment.

5 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE[1]. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

5.1 Assessment Scenarios

5.1.1 Construction

Construction activities would include the development of the following infrastructure prior to extractive operations:

- clearing and topsoil stripping which will be stockpiled within the quarry for use during final landform rehabilitation;
- construction of a perimeter safety bund, incorporating a clean water diversion to prevent surface water inflow to the extraction area;
- development of an internal processing and stockpiling area;
- construction of surface water infrastructure utilising existing farm dams, with all sediment-laden or dirty water directed to the existing farm dams which would act as sediment basins;

[1] Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

- upgrade of the existing entrance from Canowindra Road to the project site to cater for quarry vehicles; and
- installation of demountable buildings.

5.1.2 Operations

Quarry operations would include the following activities.

- extraction would be undertaken on a campaign basis using a bulldozer to rip and push the gravel into stockpiles;
- crushing and screening (processing) would be conducted on a campaign basis as required to ensure that customer's material specifications are achieved;
- processed material would be stockpiled within the extraction area or stockpile area and would be loaded into road-registered trucks using a front-end loader; and
- if required, in-situ material would be fragmented using blasting, requiring a drill. Blasting operations are expected to be required infrequently. The operator would ensure that suitable blast exclusion zones are established, including closing Canowindra Road for a short period during each blast.

Extracted material would be transported from the project using truck and dog style vehicles or smaller. via the upgraded entrance road. Trucks would then turn right, to the north, or left, to the south, onto Canowindra Road. **Table 12** presents the anticipated traffic levels associated with the project.

Table 12 Proposed Heavy Vehicle Movements

Production Rate, tpa	Average Load/Vehicle	Vehicle Movements		
		Annual	Average/day[1]	Maximum/day[2]
80,000	33t	2,424	9.0	44
150,000	33t	4,545	16.8	44

Note 1: Assumes transportation on 270 days per year.

Note 2: Based on an 11-hour day and 4 vehicle movements per hour.

Clearing, drilling, extraction and transportation operations would be undertaken on a campaign basis with production typically increasing in preparation to support the demands of particular road construction or maintenance programs.

The following operational scenarios have been assessed:

- **Extraction Year 1** - operations at 452m RL including a 3m earthen bund on western side of the extraction area (refer **Figure 3**).
- **Extraction Year 5** - expansion of the pit maintaining a floor level of 452m RL including a 3m earthen bund on western side of the extraction area to the 460m RL contour providing an 8m face (refer **Figure 4).**
- **Extraction Year 10** - expansion of the pit floor (452m RL) to full width of the permitted extraction area (refer **Figure 5**).
- **Extraction Year 20** - expansion of the pit maintaining a floor level of 452m RL to the full extent of the permitted extraction area (refer Figure 6).

5.1.3 Site Decommissioning and Rehabilitation

Where practicable, progressively rehabilitation would be completed in sections of the project involving the following activities:

- shaping and, where required, backfilling of the terminal benches of the extraction area;
- spreading of topsoil sourced either from onsite stockpiles or elsewhere;
- ripping and scarifying perpendicular to the slope to facilitate infiltration of water and seed retention; and
- stabilising and seeding the prepared landform using a hydromulch of native grass species suitable for the final land use of nature conservation and / or agriculture.

In particular, the operator would establish native vegetation on the terminal benches as soon as practicable to screen final quarry faces from observers located to the northwest of the project.

Following completion of extraction operations, the operator would:

- remove all mobile plant and equipment, and demountable buildings; and
- shape, cover with soil and revegetate the final landform.

5.2 Mitigation Included in Design

During initial extraction operations in Year 1 to approximately Year 5, or when the pit floor is at the pre-quarry height of 460m RL, a 3m bund will be kept in place to shield noise emissions from the crusher. The bund may be constructed from either topsoil, waste rock or stockpiled material and must extend at least 15m in each direction the crusher to provide sufficient shielding (ie minimum of 30m in length at any time).



FIGURE 3

Year 1 Operations

MAC231962-02

McNaughts Quarry

KEY

- Extraction Area
- Project Boundary
- HeightLine
- Y1 Bund
- Mobile Crusher
- Drill
- Bulldozer
- Excavator
- Loader
- Transport Route

0 20 40 60 80 m

N

MAC
Muller Acoustic Consulting



FIGURE 4

Year 5 Operations

MAC231962-02

McNaughts Quarry

KEY

- Extraction Area
- Project Boundary
- HeightLine
- Y5 Bund
- Mobile Crusher
- Drill
- Bulldozer
- Excavator
- Loader
- Transport Route

0 20 40 60 80 m

N

MAC
Muller Acoustic Consulting



FIGURE 5

Year 10 Operations

MAC231962-02

McNaughts Quarry

KEY

- Extraction Area
- Project Boundary
- HeightLine
- Mobile Crusher
- Drill
- Bulldozer
- Excavator
- Loader
- Transport Route

0 20 40 60 80 m

N

MAC
Muller Acoustic Consulting



FIGURE 6

Year 20 Operations

MAC231962-02

McNaughts Quarry

KEY

- Extraction Area
- Project Boundary
- HeightLine
- Mobile Crusher
- Drill
- Bulldozer
- Excavator
- Loader
- Transport Route

0 20 40 60 80 m

N

MAC
Muller Acoustic Consulting

5.3 Hours of Operation

Table 13 presents the proposed hours of operation for all assessed scenarios.

Table 13 Proposed Heavy Vehicle Movements

Activity	Monday – Friday	Saturday	Sunday and Public Holidays
Extraction Operations	7:00am to 6:00pm	8:00am to 1.00pm	No Operations
Drilling Operations	7:00am to 6:00pm	8:00am to 1.00pm	No Operations
Transportation Operations	7:00am to 6:00pm	8:00am to 1.00pm	No Operations
Rehabilitation Operations	7:00am to 6:00pm	8:00am to 1.00pm	No Operations
Construction and Decommissioning	7:00am to 6:00pm	8:00am to 1.00pm	No Activities

5.4 Sound Power Levels

Table 14 presents the sound power level for each noise source modelled in this assessment. It is noted that sound power levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites.

Table 14 Acoustically Significant Sources - Sound Power Levels dBA (re 10^{-12} Watts)

Item and number modelled per 15 minutes	Individual Sound Power Level dB LAeq(15min)	Modelled Sound Power Level dB LAeq(15min)	Source Height[1]
Construction			
Bulldozer CAT D9 x 1	113	113	1.5m
Excavator CAT 349 x 1	110	110	1.5m
Front End Loader CAT 992 x 1	114	114	1.5m
Mobile Crusher x 1	118	118	1.5m
Road Truck[2] x 1 movement (Semi tipper, Truck & Dog)	108	108	1.5m
Mobile Crane x 1	109	109	1.5m
Operation			
Bulldozer CAT D9 x 1	113	113	1.5m
Drill x 1	114	114	1.5m
Excavator CAT 349 x 1	110	110	1.5m
Front End Loader CAT 992 x 1	114	114	1.5m
Mobile Crusher x 1	118	118	1.5m
Road Truck[2] x 1 movement (Semi tipper, Truck & Dog)	108	108	1.5m

Table 14 Acoustically Significant Sources - Sound Power Levels dBA (re 10^{-12} Watts)			
Item and number modelled per 15 minutes	Individual Sound Power Level dB LAeq(15min)	Modelled Sound Power Level dB LAeq(15min)	Source Height[1]
Decommissioning			
Bulldozer CAT D9 x 1	113	113	1.5m
Front End Loader CAT 992 x 1	114	114	1.5m
Hydromulch Sprayer x 1	104	104	1.5m
Mobile Crane	109	109	1.5m
Road Truck[2] x 1 movements (Semi tipper, Truck & Dog)	108	108	1.5m

Note 1: Height above the relative ground or building below source.

Note 2: Modelled as a moving point source with adjustments for length of travelled path, velocity and number of movements in a 15-minute period.

5.5 Meteorological Analysis

Noise emissions can be influenced by prevailing weather conditions. Light stable winds (<3m/s) and temperature inversions have the potential to increase noise at a receiver.

Fact Sheet D of the NPI provides two options when considering meteorological effects:

- adopt the noise enhancing conditions for all assessment periods without an assessment of how often the conditions occur – a conservative approach that considers a source to receiver winds for all receivers and F class temperature inversions with wind speeds up to 2m/s at night; or
- determine the significance of noise enhancing conditions. This requires assessing the significance of temperature inversions (F and G Class stability categories) for the night-time period and the significance of light winds up to 3m/s for all assessment periods during stability categories other than E, F or G.

Standard meteorological conditions and noise-enhancing meteorological conditions as defined in Table D1of the NPI are reproduced in **Table 15**.

Table 15 Standard and Noise-Enhancing Meteorological Conditions	
Meteorological Conditions	Meteorological Parameters
Standard Meteorological Conditions	Day/evening/night: stability categories A–D with wind speed up to 0.5m/s at 10m AGL.
Noise Enhancing Meteorological Conditions	Daytime/evening: stability categories A–D with light winds (up to 3 m/s at 10m AGL). Night-time: stability categories A–D with light winds (up to 3m/s at 10m AGL) and/or stability category F with winds up to 2m/s at 10 m AGL.

A detailed analysis to determine the frequency of occurrence for prevailing winds has been undertaken for the two nearest available weather stations at Orange (BOM# 63303) and Cowra (BOM# 65111) for the period from January 2022 to December 2023 as there are no weather stations within 30km of the site.

Table 16 summarises the results of the wind analysis and includes the dominant wind direction and percentage occurrence during each season for each assessment period. The results of the detailed analysis of meteorological data are presented in **Appendix B**. The analysis shows that prevailing winds are not a feature of the area, and hence standard meteorological conditions are applicable to the assessment.

Table 16 Seasonal Frequency of Occurrence Wind Speed Intervals

Season	Period[1]	Wind Direction ±(45°)	% Wind Speeds (m/s)
			0.5 to 3 m/s
Orange			
Summer	Day	NNE	9
Autumn	Day	NE, ENE, E	8
Winter	Day	NNE	9
Spring	Day	NNE	11
Cowra			
Summer	Day	ESE	15
Autumn	Day	SE	22
Winter	Day	S	19
Spring	Day	NNW	15

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

5.5.1 NPI Very Noise Enhancing Conditions

Fact Sheet D of the NPI also states:

> *'Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' (see glossary[2]) a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5dB. In this way a development is subject to noise limits under all meteorological conditions.'*

Essentially, this means a limiting criterion of PNTL +5dB is applicable for meteorological conditions outside that adopted in the assessment. In the context of the project, this means that the operation would need to comply with PNTL +5dB for meteorological conditions outside the range of Standard Meteorological Conditions.

[2] Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions as adopted in the noise impact assessment following the procedures in Fact Sheet D.

5.5.2 Modelled Meteorological Parameters

Predictions have been completed for NPI standard meteorological conditions and Noise enhancing meteorological conditions presented in **Table 17**.

Table 17 Modelled Meteorological Parameters

Assessment Condition[1]	Temperature	Wind Speed[2]/ Direction	Relative Humidity	Stability Class[2]
Day – Standard Meteorological Conditions	20°C	0.5m/s all directions	50%	D
Day – Noise Enhancing Meteorological Conditions	20°C	3m/s all directions	50%	D

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Implemented using CONCAWE meteorological corrections.

5.6 Blasting and Vibration Assessment Methodology

5.6.1 Air-Blast Overpressure

Calculation of overpressure has been completed using the following AS2187.2 equation:

$$\mathrm{P} = K_a \left(\frac{R}{(Q^{1/3})} \right)^a$$

Where:

P = Pressure, in kilopascals;

Q = Effective explosives charge mass, in kilograms (MIC);

R = Distance from charge, in metres;

K_a = Site constant, a value of 10 was adopted; and

a = Site exponent, a value of -1.45 was adopted.

The conversion of 'P' to unweighted decibels (dBZ) is completed using the following formula:

$$\mathrm{SPL} = 10\ x \log \left(\frac{P}{P_0} \right)^2$$

5.6.2 Ground-Borne Vibration

Preliminary estimations for vibration have been completed using the following AS2187.2 equation:

$$V = K_g \left(\frac{R}{(Q^{1/2})} \right)^{-B}$$

Where:

V = ground vibration as vector peak particle velocity, in mm/s;

R = distance between charge and point of measurement, in m;

Q = maximum instantaneous charge (effective charge mass per delay), in kg;

K_g = a constant related to site and rock properties for estimation purposes, a value of 1140 was adopted as per AS2187.2 to predict the 50% chance of exceedance in “average conditions”; and

B = a constant related to site and rock properties for estimation purposes, a value of 1.6 was adopted.

6 Noise Assessment Results

This assessment has quantified operational noise levels at the nearest receivers for the construction, operational and decommissioning stages of the project.

6.1 Operational Noise Assessment

Predicted noise levels from all sources operating at maximum capacity simultaneously have been quantified at surrounding non-project related residential receivers to the project site and are presented in **Table 18** for Year 1 operations; **Table 19** for Year 5 operations; **Table 20** for Year 10 operations and **Table 21** for Year 20 operations. The noise contours for 'normal operations' are located in **Figure 7, Figure 8, Figure 9** and **Figure 10.**

Quarry operations have been distinguished into the following categories:

- extraction (including clearing);
- processing;
- transport; and
- drilling.

'Normal' quarry operation involves extraction, processing and transport. When blasting is required, only drilling operations (drill and dozer) occur.

Table 18 Noise Predictions – Year 1

Location	Period[1]	Predicted Noise Level dB LAeq(15min)		PNTL dB LAeq(15min)	PNTL dB LAeq(15min)	Compliant Std/Enh
		Standard Conditions	Noise Enhancing Conditions	Standard Conditions	Noise Enhancing Conditions	
Normal Operations						
R02	Day	38	41	40	45	✓ / ✓
R03	Day	38	41	40	45	✓ / ✓
R04	Day	<30	32	40	45	✓ / ✓
Drilling Operations						
R02	Day	36	39	40	45	✓ / ✓
R03	Day	38	41	40	45	✓ / ✓
R04	Day	<30	<30	40	45	✓ / ✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 19 Noise Predictions – Year 5

Location	Period[1]	Predicted Noise Level dB LAeq(15min)		PNTL dB LAeq(15min)	PNTL dB LAeq(15min)	Compliant Std/Enh
		Standard Conditions	Noise Enhancing Conditions	Standard Conditions	Noise Enhancing Conditions	
Normal Operations						
R02	Day	35	37	40	45	✓ / ✓
R03	Day	39	42	40	45	✓ / ✓
R04	Day	<30	32	40	45	✓ / ✓
Drilling Operations						
R02	Day	<30	31	40	45	✓ / ✓
R03	Day	38	41	40	45	✓ / ✓
R04	Day	<30	<30	40	45	✓ / ✓

Table 20 Noise Predictions – Year 10

Location	Period[1]	Predicted Noise Level dB LAeq(15min)		PNTL dB LAeq(15min)	PNTL dB LAeq(15min)	Compliant Std/Enh
		Standard Conditions	Noise Enhancing Conditions	Standard Conditions	Noise Enhancing Conditions	
Normal Operations						
R02	Day	38	41	40	45	✓ / ✓
R03	Day	39	42	40	45	✓ / ✓
R04	Day	<30	31	40	45	✓ / ✓
Drilling Operations						
R02	Day	32	35	40	45	✓ / ✓
R03	Day	35	38	40	45	✓ / ✓
R04	Day	<30	<30	40	45	✓ / ✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 21 Noise Predictions – Year 20						
Location	Period[1]	Predicted Noise Level dB LAeq(15min)		PNTL dB LAeq(15min)	PNTL dB LAeq(15min)	Compliant Std/Enh
		Standard Conditions	Noise Enhancing Conditions	Standard Conditions	Noise Enhancing Conditions	
Normal Operations						
R02	Day	33	36	40	45	✓ / ✓
R03	Day	37	39	40	45	✓ / ✓
R04	Day	<30	31	40	45	✓ / ✓
Drilling Operations						
R02	Day	<30	32	40	45	✓ / ✓
R03	Day	34	37	40	45	✓ / ✓
R04	Day	<30	<30	40	45	✓ / ✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Predicted noise levels from quarry operations are expected to satisfy the PNTLs at all non-project related receivers during standard meteorological conditions and Noise Enhancing Meteorological Conditions during the daytime period for all scenarios.

6.2 Blasting Assessment Results

Airblast overpressure and ground vibration have been calculated to non-project related receivers for the project, adopting a maximum probable MIC of 100kg. Blast locations were modelled at the northern extent of the extraction area (Year 1 operations) and the southern extent of the extraction area (Year 20 operations). The results of the assessment, presented in **Table 22**, show the highest calculated overpressure and ground vibration for each assessed receiver location, including the years of highest predicted impact.

Table 22 Predicted Blast Emissions				
Receiver	Year of Highest Impact	Distance to Charge m	Airblast Overpressure dBZ Peak	Ground Vibration mm/s
R02	Year 20	513	114.7	2.1
R03	Year 1	1,000	106.3	0.7
R04	Year 1	2,130	96.8	0.2

The results of the assessment demonstrate that blasts of MICs up to 100kgs would satisfy the recommended maximum overpressure and vibration limits of 115dBZ and 5mm/s respectively. Furthermore, a review of the project area identifies that there is no significant infrastructure in the locality, hence, no impact to significant infrastructure would occur from blasting.

Notwithstanding, the proposed MIC blast patterns should be designed specifically to meet the relevant ANZEC guidelines at receivers and be completed in conjunction with an appropriate blast monitoring program. It is recommended that initial blasts are undertaken using a reduced MIC, with blast monitoring undertaken to demonstrate compliance with the ANZEC blasting limits and establish the site law for the project to inform future blasts.

6.3 Construction Noise Assessment

Predicted noise levels from all sources operating at maximum capacity simultaneously have been quantified at surrounding non-project related residential receivers to the project site and are presented in **Table 23**. Predicted noise levels during construction are expected to satisfy the NMLs at all non-project related receivers.

Table 23 Noise Predictions – All Receivers

Location	Period[1]	Predicted Noise Level dB LAeq(15min)	NML dB LAeq(15min)	Compliant
R02	Day	44	45	✓
R03	Day	43	45	✓
R04	Day	32	45	✓

Note 1: Refer to **Table 3** for Standard Recommended Hours for Construction.

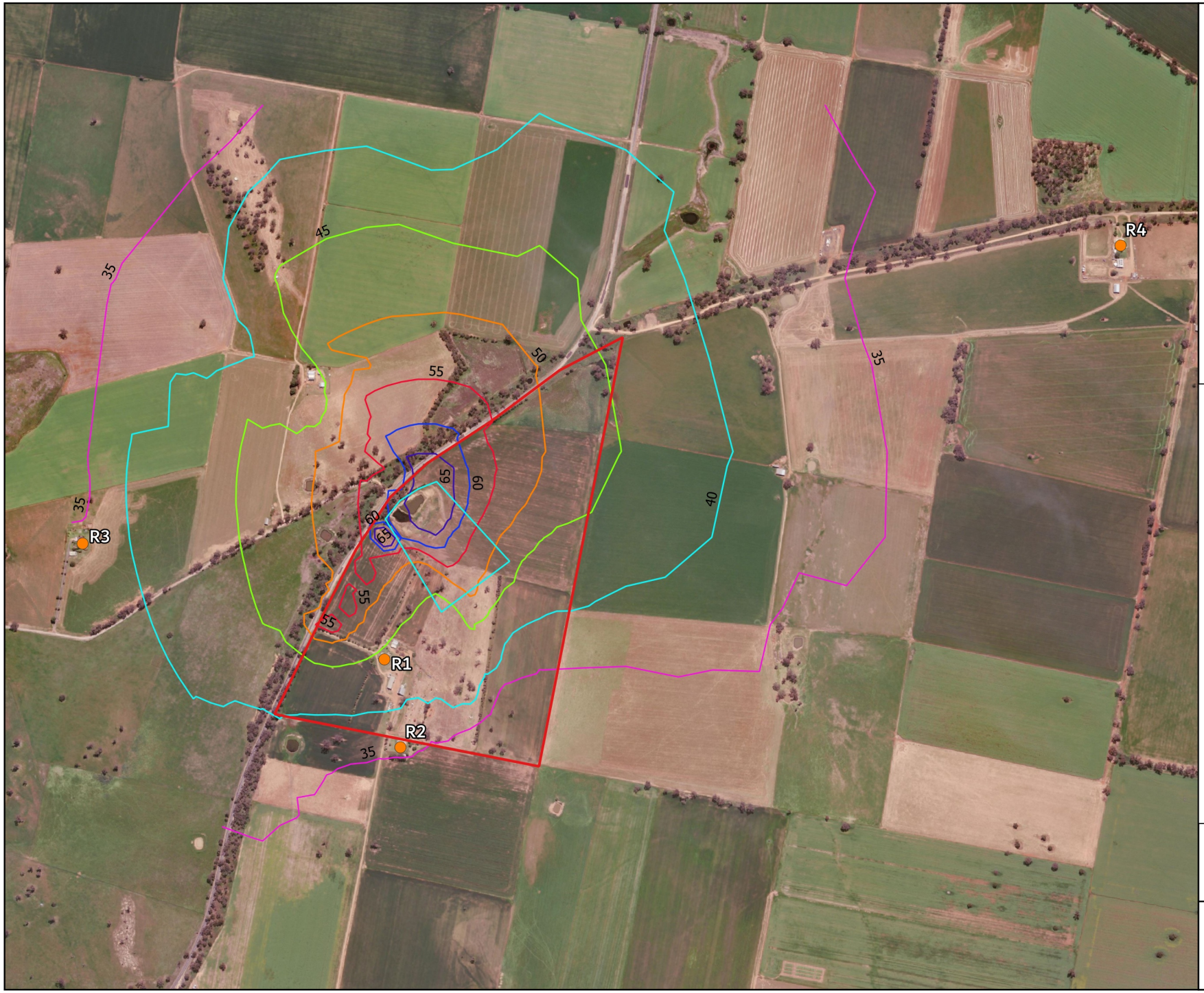


FIGURE 7

Predicted Noise Levels

Year 1 Normal Operations

Calm Conditions

MAC231962-02

McNaughts Quarry

KEY

Extraction Area

Project Boundary

Noise Level dBLAeq(15min)

35

40

45

50

55

60

65

0 200 400 600 m

N

MAC
Muller Acoustic Consulting

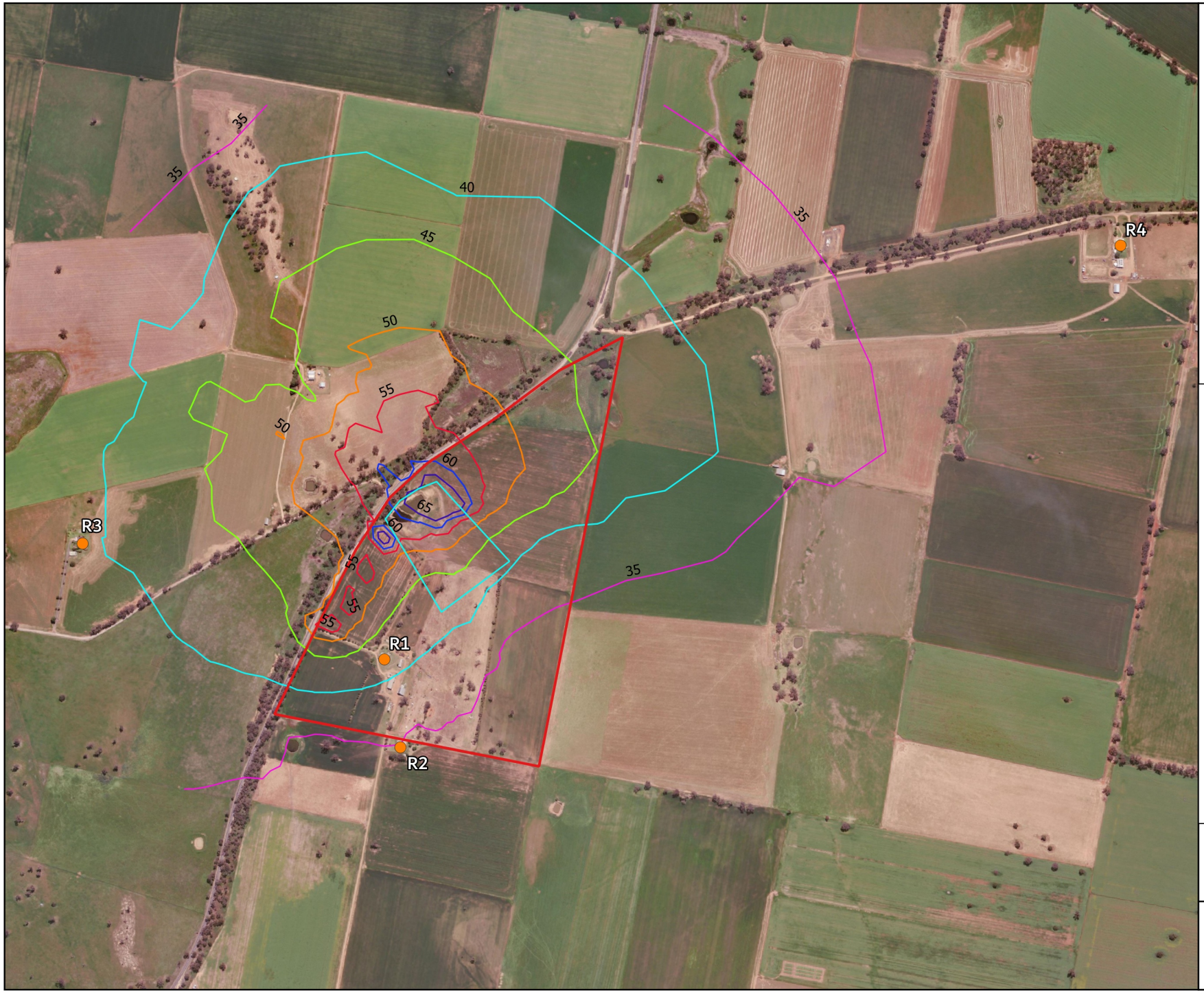


FIGURE 8

Predicted Noise Levels

Year 5 Normal Operations

Calm Conditions

MAC231962-02

McNaughts Quarry

KEY

Extraction Area

Project Boundary

Noise Level dBLAeq(15min)

35

40

45

50

55

60

65

0 200 400 600 m

N

MAC
Muller Acoustic Consulting

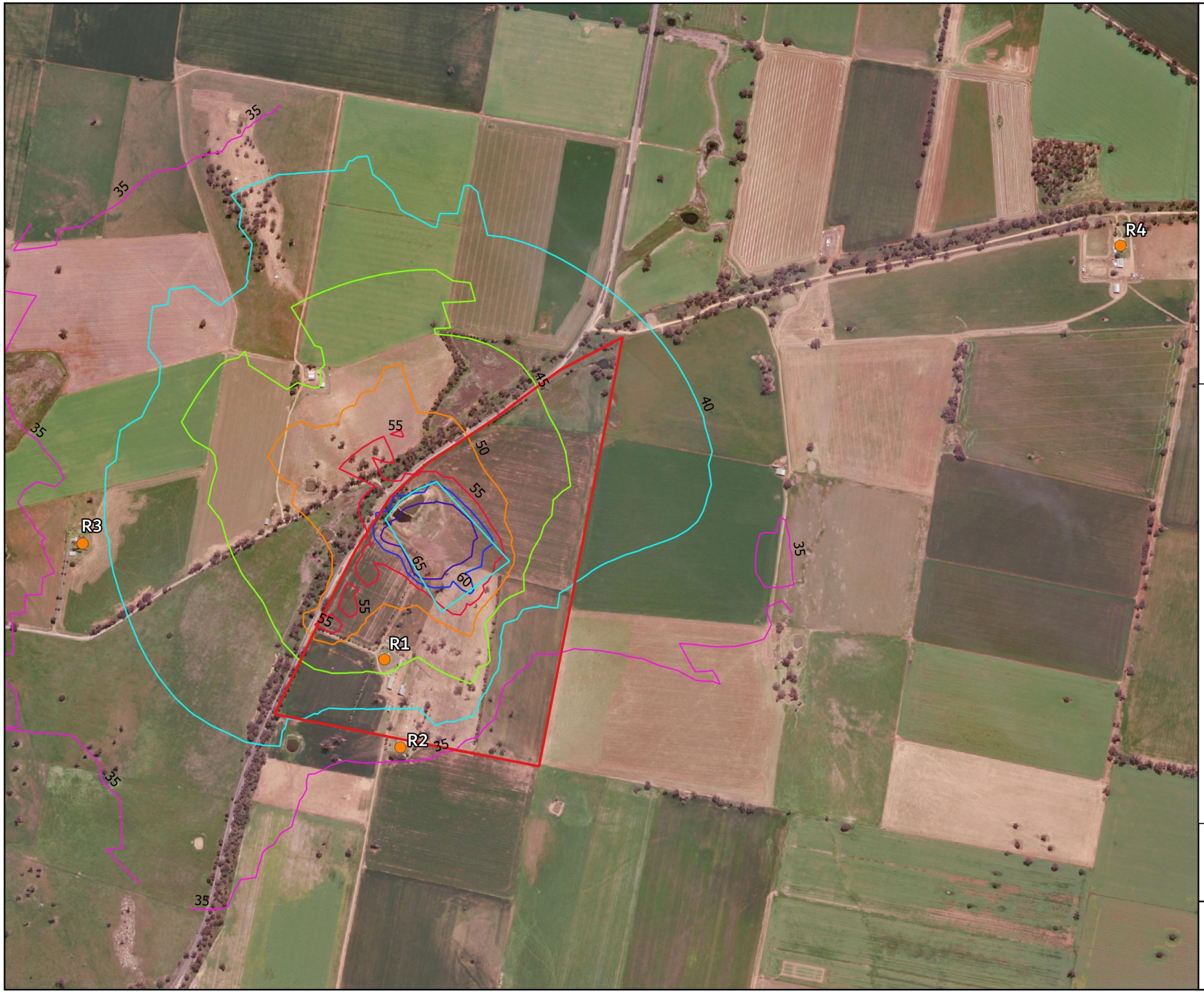


FIGURE 9

Predicted Noise Levels

Year 10 Normal Operations

Calm Conditions

MAC231962-02

McNaughts Quarry

KEY

Extraction Area

Project Boundary

Noise Level dBLAeq(15min)

35

40

45

50

55

60

65

0 200 400 600 m

N

MAC
Muller Acoustic Consulting

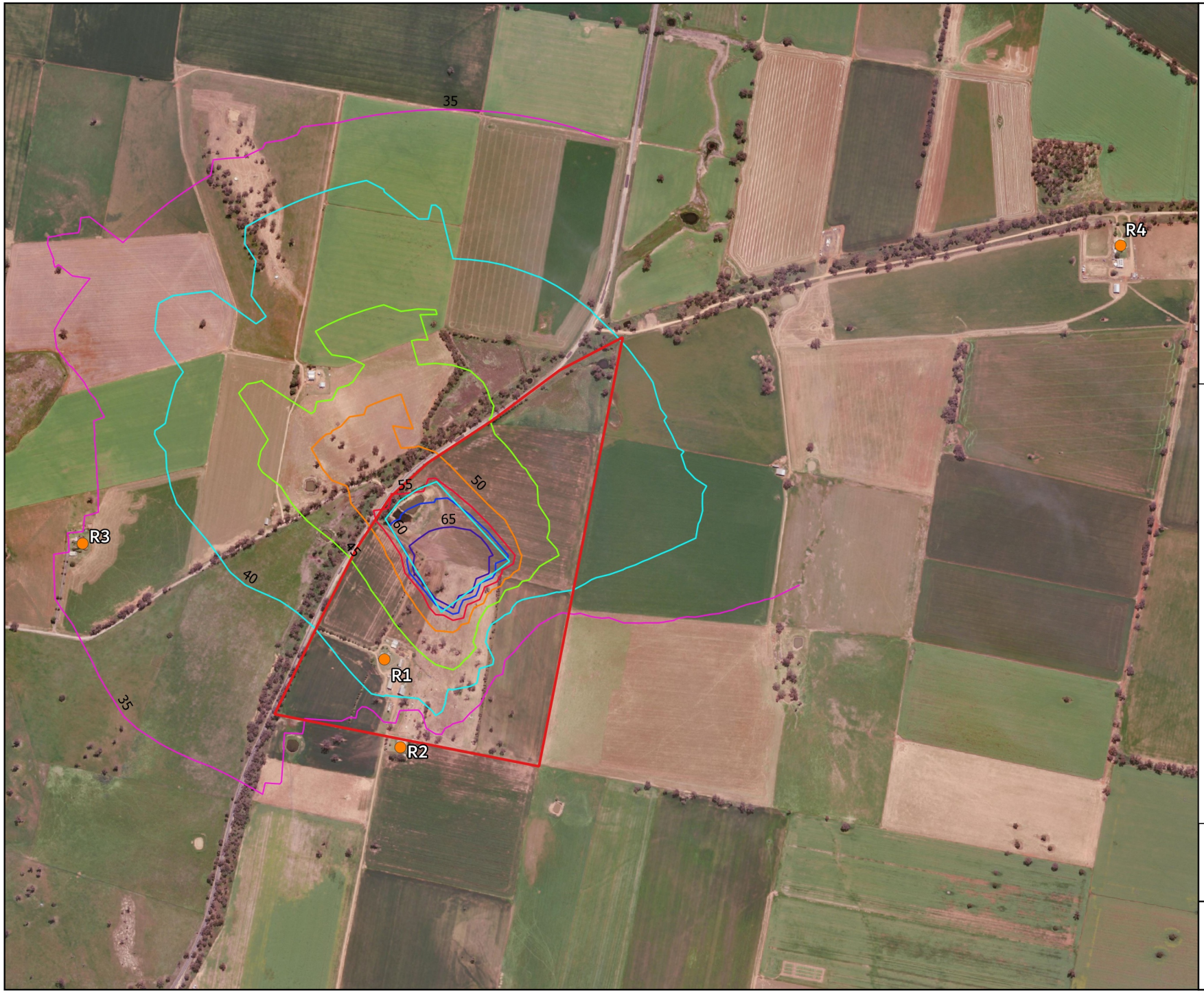


FIGURE 10

Predicted Noise Levels

Year 20 Normal Operations

Calm Conditions

MAC231962-02

McNaughts Quarry

KEY

Extraction Area

Project Boundary

Noise Level dBLAeq(15min)

35

40

45

50

55

60

65

0 200 400 600 m

N

MAC
Muller Acoustic Consulting

6.4 Road Traffic Noise Assessment

Predicted road traffic noise levels from the project are presented in **Table 24.** Calculations were completed, to represent traffic flow from the project at an offset distance of 15m for receivers adjacent to Canowindra Road using the Traffic Noise Model (TNM) by the United States Department of Transport, Federal Highway Administration Low Volume Calculation Tool.

Table 24 Operational Road Traffic Noise Levels

Offset from Road	Period	Assessment Criteria dB $LA_{eq(15hr)}$	Calculated Project Traffic Noise dB $LA_{eq(15hr)}$	Compliant
15m	Day	60	56.2	Yes
7m	Day	60	59.5	Yes

Predicted road traffic noise levels from the project are expected to satisfy the RNP criteria for receivers greater than 7m from the road.

6.5 Decommissioning Noise Assessment

Predicted noise levels from all sources operating at maximum capacity simultaneously have been quantified at surrounding non-project related residential receivers to the project site and are presented in **Table 25**. Predicted noise levels during decommissioning are expected to satisfy the NMLs at all non-project related receivers.

Table 25 Decommissioning Noise Predictions – All Receivers

Location	Period[1]	Predicted Noise Level dB LAeq(15min)	NML dB LAeq(15min)	Compliant
R02	Standard	40	45	✓
R03	Standard	39	45	✓
R04	Standard	<30	45	✓

Note 1: Refer to **Table 3** for Standard Recommended Hours for Construction.

This page has been intentionally left blank

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions from the proposed McNaught's Quarry located at 5082 Canowindra Road, Canowindra, NSW.

The assessment has quantified potential noise emissions from activities associated with the construction, operation, and decommissioning stages of the project.

The results of the Noise Assessment demonstrate that modelled noise emissions from construction and decommissioning activities would satisfy construction NMLs at all receiver locations.

The results of the Noise Assessment demonstrate that noise emissions from all operational activities would satisfy the relevant PNTLs at all assessed receivers for all assessment periods for standard meteorological conditions and very noise enhancing meteorological conditions with the implementation of a 3m high earthen bund during initial extractive operations to Year 5 of the project.

Airblast overpressure and ground vibration levels are predicted to meet the ANZEC recommended maximum blasting limits at all non-project related receivers for blasts of up to 100kg MIC.

Road noise emissions associated with the project are anticipated to satisfy the relevant RNP criteria at all receivers along the proposed transportation route.

Based on the Noise Assessment results, the project satisfies the relevant requirements of the Noise Policy for Industry and the Road Noise Policy and supports the Statement of Environmental Effects.

This page has been intentionally left blank

Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

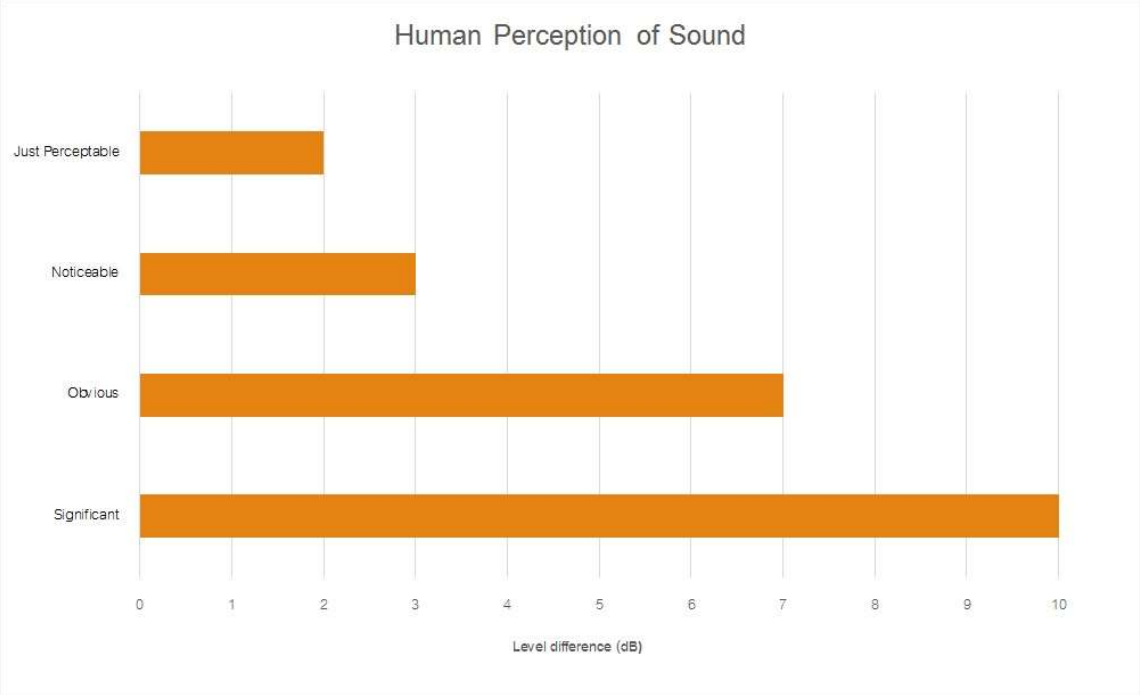
Table A1 Glossary of Acoustical Terms

Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by 10.log10 (W/Wo). Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



This page has been intentionally left blank

Appendix B – NEWA Meteorological Data

Table B1 NEWA Analysed Meteorological Conditions, Orange Airport, NSW									
Wind Direction ± 45°	Season	Day	Evening	Night	Direction	Season	Day	Evening	Night
		Percentage Occurrence %					Percentage Occurrence %		
0	Summer	8	5	12	180	Summer	4	12	5
0	Autumn	6	5	7	180	Autumn	5	13	8
0	Winter	7	8	8	180	Winter	5	11	9
0	Spring	9	8	8	180	Spring	4	10	7
22.5	Summer	9	8	18	202.5	Summer	5	14	5
22.5	Autumn	8	9	10	202.5	Autumn	6	15	8
22.5	Winter	9	8	9	202.5	Winter	6	13	11
22.5	Spring	11	9	12	202.5	Spring	4	12	8
45	Summer	8	14	26	225	Summer	5	15	6
45	Autumn	8	14	15	225	Autumn	5	15	8
45	Winter	6	8	7	225	Winter	6	14	11
45	Spring	8	9	14	225	Spring	4	16	10
67.5	Summer	7	13	26	247.5	Summer	5	12	6
67.5	Autumn	8	15	16	247.5	Autumn	6	13	9
67.5	Winter	6	8	7	247.5	Winter	6	12	10
67.5	Spring	7	8	14	247.5	Spring	4	15	10
90	Summer	7	12	24	270	Summer	5	9	7
90	Autumn	7	14	15	270	Autumn	4	10	9
90	Winter	5	6	6	270	Winter	5	9	8
90	Spring	6	8	13	270	Spring	4	11	8
112.5	Summer	6	14	21	292.5	Summer	6	8	7
112.5	Autumn	7	14	16	292.5	Autumn	5	8	7
112.5	Winter	4	6	5	292.5	Winter	5	9	8
112.5	Spring	5	8	12	292.5	Spring	5	12	8
135	Summer	4	10	11	315	Summer	6	7	7
135	Autumn	6	13	10	315	Autumn	4	6	7
135	Winter	4	5	5	315	Winter	5	8	8
135	Spring	4	6	7	315	Spring	6	10	8
157.5	Summer	2	6	5	337.5	Summer	7	5	9
157.5	Autumn	3	5	5	337.5	Autumn	6	6	6
157.5	Winter	2	4	4	337.5	Winter	7	9	9
157.5	Spring	2	4	4	337.5	Spring	8	9	8

Table B2 NEWA Analysed Meteorological Conditions, Cowra, NSW									
Wind Direction ± 45°	Season	Day	Evening	Night	Direction	Season	Day	Evening	Night
		Percentage Occurrence %					Percentage Occurrence %		
0	Summer	11	8	6	180	Summer	10	20	30
0	Autumn	10	6	5	180	Autumn	20	24	28
0	Winter	13	15	13	180	Winter	19	15	17
0	Spring	14	10	9	180	Spring	12	21	21
22.5	Summer	12	9	9	202.5	Summer	9	15	22
22.5	Autumn	9	7	6	202.5	Autumn	16	19	22
22.5	Winter	11	15	14	202.5	Winter	17	14	14
22.5	Spring	14	12	11	202.5	Spring	11	17	17
45	Summer	9	14	12	225	Summer	8	9	9
45	Autumn	7	9	7	225	Autumn	10	10	9
45	Winter	4	9	7	225	Winter	13	10	8
45	Spring	8	10	9	225	Spring	10	15	9
67.5	Summer	12	19	17	247.5	Summer	10	7	4
67.5	Autumn	9	16	12	247.5	Autumn	9	7	4
67.5	Winter	5	13	9	247.5	Winter	11	7	6
67.5	Spring	8	15	12	247.5	Spring	9	10	6
90	Summer	13	23	27	270	Summer	10	5	2
90	Autumn	14	22	19	270	Autumn	9	6	3
90	Winter	7	16	14	270	Winter	9	7	5
90	Spring	9	20	18	270	Spring	9	8	4
112.5	Summer	15	28	35	292.5	Summer	11	4	2
112.5	Autumn	19	27	26	292.5	Autumn	10	5	3
112.5	Winter	10	17	17	292.5	Winter	10	9	7
112.5	Spring	11	24	22	292.5	Spring	10	7	5
135	Summer	14	30	40	315	Summer	12	5	3
135	Autumn	22	34	35	315	Autumn	11	5	4
135	Winter	13	20	20	315	Winter	13	12	11
135	Spring	11	25	26	315	Spring	12	8	7
157.5	Summer	11	22	34	337.5	Summer	12	7	6
157.5	Autumn	20	25	30	337.5	Autumn	11	5	5
157.5	Winter	13	14	17	337.5	Winter	14	15	14
157.5	Spring	10	18	22	337.5	Spring	15	10	9

Muller Acoustic Consulting Pty Ltd
PO Box 678, Kotara NSW 2289
ABN: 36 602 225 132
Ph: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting

Appendix 3

Biodiversity Assessment Report

prepared by

OzArk Environment & Heritage

(Total No. of pages including blank pages = 231)



BIODIVERSITY ASSESSMENT REPORT

MCNAUGHT'S QUARRY

CANOWINDRA NSW

CABONNE SHIRE LOCAL GOVERNMENT AREA

MAY 2024

Report prepared by

OzArk Environment & Heritage

for McNaught Earthworks Pty Ltd

OzArk
Environment & Heritage

145 Wingewarra St
(PO Box 2069)
Dubbo NSW 2830

Phone: (02) 6882 0118
Fax: (02) 6882 0630
enquiry@ozarkehm.com.au
www.ozarkehm.com.au

This page has intentionally been left blank.

DOCUMENT CONTROLS

Proponent	**McNaught's Earthworks Pty Ltd**		
Client	**RW Corkery**		
Purchase order number			
Document description	Biodiversity Assessment Report		
	Name	**Signed**	**Date**
Client's reviewing officer			
Client's representative managing this document		**OzArk representative managing this document**	
Grace Scullett-Dean		Jeff Lewis (JL), Dr Crystal Graham (CG)	
Location		**OzArk job number**	
S:\OzArk EHM Data\Clients\RWCorkery\ McNaught'sQuarry\Ecology\Reporting		4160	

Document status: Final	**Version**	**Date**	**Action**
Internal Draft Series	V1.0	10/01/2024	JL to CG
	V1.1	12/01/2024	CG to JL
	V1.2	19/01/2024	JL to CG
	V1.3	23/01/2024	CG to JL
	V1.4	24/01/2024	JL to CG
	V1.5	25/01/2024	CG edit
First Draft for Client Review	V2.0	25/01/2024	CG to client
Final Report for Client	V3.0 V3.1	19/02/2024 25/05/2024	JL to client Footprint update

Prepared for	**Prepared by**
Grace Scullett-Dean	Jeff Lewis
Graduate Environmental Consultant	Ecologist
RW Corkery	OzArk Environment & Heritage
62 Hill Street Orange	145 Wingewarra Street (PO Box 2069)
Orange NSW 2800	Dubbo NSW 2830
grace@rwcorkery.com	Jeffrey@ozarkehm.com.au

COPYRIGHT

© OzArk Environment & Heritage Pty Ltd, 2024

and

© RW Corkery, 2024

All intellectual property and copyright reserved.

Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the *Copyright Act 1968*, no part of this report may be reproduced, transmitted, stored in a retrieval system or adapted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without written permission.

Enquiries would be addressed to OzArk Environment & Heritage Pty Ltd.

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.

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by R.W. Corkery (the client) to complete a Biodiversity Assessment Report (BAR) concerning the expansion of the McNaught's Quarry, 16 kilometres (km) north of Canowindra, New South Wales (NSW). Work will be occurring in the Cabonne Shire Local Government Area (LGA).

The proposed disturbance area is up to 9.541 hectares (ha). The extraction of the material will be via a bulldozer to rip and push the material which is then direct loaded into road trucks for transportation off site. Occasional blasting and crushing are proposed on a campaign basis. .

This BAR assesses the impacts of the proposal on biodiversity.

As per the Cabonne Local Environmental Plan 2012 (LEP), areas mapped as having high terrestrial biodiversity value are present within the subject site.

An onsite field survey was conducted by OzArk Ecologist Sam Bulling on the 25th of October 2023. The subject site, 9.541 ha in size, consisted of native and non-native vegetation, along with bare earth, road surfaces, farmland and the existing McNaught's Quarry. The 0.350 ha of native vegetation was found to belong to three Plant Community Types (PCTs):

- PCT 53 - Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.
- PCT 277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.

PCTs 266 and 277 was judged to be an example of the *Biodiversity Conservation Act* 2016 (BC Act)-listed Critically Endangered Ecological Community (CEEC), White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. As such, up to 0.296 ha of this Threatened Ecological Community (TEC) may be cleared for this proposal.

The aforementioned CEEC also occurs on Canowindra Road, a small area (0.010 ha) of which has been impacted by road upgrades required to support this proposal. Considering that mature vegetation has already been trimmed by Cabonne Shire Council, and the client has indicated that no further clearing is required in this area, this area of native vegetation clearing has not been included in the impact assessments of this report.

In total, two habitat trees (e.g., hollow-bearing) were recorded within the subject site; these trees cumulatively contained three small (<20 cm in diameter) hollows. No large hollows or fallen timber deposits were encountered during the field survey. Large rocks suitable for use by fauna species

were located adjacent to the extraction site dams. These should be relocated if in the path of bulldozing to retain reptile and amphibian habitat.

No watercourses intersect the subject site. Seventeen watercourses are present within the study area. Key Fish Habitat (KFH) occurs at the edge of the study area and Protected Riparian Land (PRL) at the edge of the search area, but neither are close to the subject site.

In total, fifty-seven threatened or migratory fauna species or populations, and 10 flora species, listed under the BC Act, *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), were considered to have a moderate or greater probability of occurrence at the subject site. However, no listed species or population were encountered during the field survey. Subject to implementation of the mitigation measures proposed, it has been concluded that no significant biodiversity impacts are likely, including to any threatened or migratory species, population or ecological community, or their habitats. As such, the proposal does not require referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEW) in respect of these matters or trigger the need for a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR).

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment. If entry into the Biodiversity Offset Scheme (BOS) is triggered by a changed footprint impacting additional native vegetation, then additional field work and reporting completed according to the Biodiversity Assessment Method 2020 (BAM) may be required.

CONTENTS

EXECUTIVE SUMMARY v

ABBREVIATIONS 1

GLOSSARY OF TERMS 3

1 INTRODUCTION 6

1.1 Background 6

1.2 Project Location and Context 7

1.2.1 Regional Context 7

1.2.2 Impact Footprint 10

1.3 Subject site, Study Area and Search Area 10

2 STATUTORY AND PLANNING CONTEXT 11

2.1 Commonwealth legislation 11

2.1.1 *Environment Protection & Biodiversity Conservation Act* 1999 (EPBC Act) 11

2.2 State Legislation 11

2.2.1 *Environmental Planning and Assessment Act* 1979 (EP&A Act) 11

2.2.2 *Biodiversity Conservation Act* 2016 (BC Act) 11

2.2.3 *Biosecurity Act* 2015 12

2.2.4 *Local Land Services Act* 2013 12

2.2.5 *Fisheries Management Act* 1994 12

2.2.6 *Water Management Act* 2000 (WM Act) 13

2.2.7 Cabonne Local Environmental Plan 2012 13

2.3 State Environmental Planning Policies under the EP&A Act 1979 16

2.3.1 *State Environmental Planning Policy (Biodiversity and Conservation)* 2021 16

3 METHODS 17

3.1 Personnel 17

3.2 Background Research 18

3.3 Habitat assessment 19

3.4 Field survey 20

3.4.1 Vegetation surveys 20

3.4.2 Targeted fauna surveys 21

3.5 Limitations 21
4 EXISTING ENVIRONMENT 23
4.1 Bioregion 23
4.2 NSW Landscapes 24
4.3 Climate 26
4.4 Watercourses 27
4.5 Groundwater dependent ecosystems 31
5 RESULTS 33
5.1 Plant community types 33
5.2 Threatened ecological communities 34
5.3 Threatened species and populations 40
5.4 Aquatic ecological communities 42
5.5 Habitat trees and features 42
5.6 Wildlife connectivity corridors 44
5.7 Matters of National Environmental Significance 44
6 IMPACT ASSESSMENT 45
6.1 Construction impacts 45
6.1.1 Impacts to native vegetation and threatened ecological communities 45
6.1.2 Impact to threatened fauna and associated habitat 45
6.1.3 Impact to threatened flora 45
6.1.4 Fauna injury and mortality 46
6.2 Indirect/operational impacts 46
6.2.1 Wildlife connectivity and habitat fragmentation 46
6.2.2 Edge effects on adjacent native vegetation and habitat 46
6.2.3 Invasion and spread of weeds 46
6.2.4 Invasion and spread of pests 47
6.2.5 Invasion and spread of pathogens and disease 47
6.2.6 Noise, light and vibration 47
6.3 Cumulative impacts 47
6.4 Impact Summary 48

7 AVOID, MINIMISE AND MITIGATE IMPACTS 49

7.1 Avoidance and minimisation 49

7.2 Mitigation measures 49

8 CONCLUSION 53

9 REFERENCES 55

APPENDIX A – DATABASE SEARCH RESULTS 59

APPENDIX B – FIELD SURVEY RESULTS 82

APPENDIX C – BC & EPBC ACT HABITAT ASSESSMENT FOR THREATENED SPECIES AND COMMUNITIES PREDICTED TO OCCUR 88

APPENDIX D – BC ACT TESTS OF SIGNIFICANCE 140

APPENDIX E – MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE 183

APPENDIX F – KEY THREATENING PROCESSES 216

FIGURES

Figure 1-1. Subject site specific to the proposal. 8
Figure 1-2. Regional context of the proposal showing the subject site, study area, and search area. 9
Figure 2-1. Cabonne LEP 2012 - Terrestrial Biodiversity Map. Green shaded areas indicate high terrestrial biodiversity; red polygon approximates the subject site (enlarged inset of subject site in the bottom right) 15
Figure 4-1. NSW (Mitchell) Landscapes of the search area (Mitchell, 2002). 25
Figure 4-2. Climate statistics for the Orange Agricultural Institute weather station (ID 063254).26
Figure 4-3. Representative photographs of the condition of McNaught's Quarry. Left, looking north towards Canowindra Road into the extraction area. Right, looking south from the internal access road between the extraction area site buildings (both within the subject site). 28
Figure 4-4. Key Fish Habitat, Protected Riparian Land, and watercourses within the search area. 29
Figure 4-5. Key Fish Habitat, Protected Riparian Land, and watercourses within the study area (magnified view). 30
Figure 4-6. Groundwater Dependent Ecosystems adjacent to search area. 32
Figure 5-1. Assessment of PCT 266 and 277 according to the EPBC Box-Gum Woodland guidelines. 35
Figure 5-2. Confirmed Plant Community Types and habitat trees within the subject site (1 of 2). 36
Figure 5-3. Confirmed Plant Community Types and habitat trees within the subject site (2 of 2). 37
Figure 5-4. Threatened Ecological Communities (BC Act-listed Critically Endangered Ecological Communities) within the subject site (1 of 2). 38
Figure 5-5. Threatened Ecological Communities (BC Act-listed Critically Endangered Ecological Communities) within the subject site (2 of 2). 39
Figure 5-6. Large rocks adjacent to the dam within the extraction area. 43

TABLES

Table 1-1. Minimum lot size and allowable clearing threshold under the BAM 2020 7
Table 1-2. Regional context for the proposal. 7
Table 3-1 Summary of OzArk personnel qualifications. 17
Table 3-2. Presence and/or proximity of environmental considerations. 19
Table 4-1. Description of the NSW South Western Slopes Bioregion (DPE, 2003). 23
Table 5-1. Plant Community Types (PCTs) within the subject site 33
Table 5-2. Assessment of PCT 266 and 277 under the BC Act CEEC criteria. 34
Table 6-1. Significant weeds encountered at the subject site. 47
Table 7-1. Mitigation measures and environmental safeguards. 50

ABBREVIATIONS

Term	Description
^{0}C	Degrees Celsius
AOBV	Areas of Outstanding Biodiversity Value
ASL	Above Sea Level
BAM	Biodiversity Assessment Method 2020
BAR	Biodiversity Assessment Report
BDAR	Biodiversity Development Assessment Report
BC Act	NSW *Biodiversity Conservation Act 2016*
BOS	NSW Biodiversity Offsets Scheme
CAMBA	China-Australia Migratory Bird Agreement
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DCCEEW	Commonwealth Department of Climate Change, Energy the Environment and Water
DoE	Department of Environment
DPI	NSW Department of Primary Industries
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sediment Control Plan
FM Act	NSW *Fisheries Management Act 1994*
GDEs	Groundwater dependent ecosystems
GPS	Global Positioning System
ha	Hectare
HTE	High Threat Exotic
IBRA	Interim Biogeographic Regionalisation of Australia. Each region is a land area made up of a group of interacting ecosystems repeated in similar form across the landscape.
JAMBA	Japan-Australia Migratory Bird Agreement
KFH	Key Fish Habitat
KTP	Key Threatening Process
LEP	Local Environmental Plan
LGA	Local Government Area
mm/cm/m/m^2/km	Millimetre/centimetre/metre/square metre/kilometre
MNES	Matters of National Environmental Significance
NPW Act	NSW *National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool

Term	Description
PW	Priority Weed
RAMSAR	Convention on Wetlands of International Importance
REF	Review of Environmental Factors
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
TECs	Threatened Ecological Communities
TSPD	Threatened Species Profile Database
VIS	Vegetation information system
WoNS	Weeds of National Significance

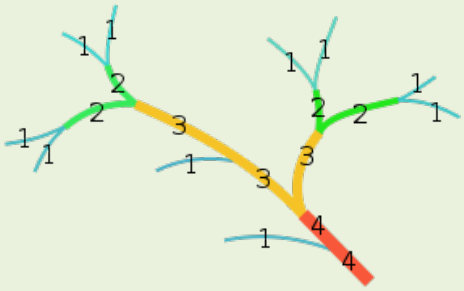
GLOSSARY OF TERMS

Term	Description

Areas of outstanding biodiversity	An area of outstanding biodiversity value is:
	• an area important at a State, national or global scale, and
	• an area that makes a significant contribution to the persistence of at least one of the following:
	  ○ multiple species or at least one threatened species or ecological community
	  ○ irreplaceable biological distinctiveness
	  ○ ecological processes or ecological integrity
	  ○ outstanding ecological value for education or scientific research.
	
	The declaration of an area may relate, but is not limited, to protecting threatened species or ecological communities, connectivity, climate refuges and migratory species (BC Act).

Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Refer to Clause 228(2) of the EP&A Regulation 2000 for cumulative impact assessment requirements.
Direct impacts	Are those that directly affect the habitat of species and ecological communities and of individuals using the study area. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat (OEH 2018).
Habitat	The area occupied or used, including areas periodically or occasionally occupied or used, by any threatened species or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycle (OEH 2018).
Important population	Is a population that is necessary for a species long-term survival and recovery; this may include populations identified as such in recovery plans, and/or that are: • key source populations either for breeding or dispersal • populations that are necessary for maintaining genetic diversity, and/or • populations that are near the limit of the species range (DE 2013).
Indirect impact	Occur when project-related activities affect species or ecological communities in a manner other than direct loss within the subject site. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas (OEH 2018).
Invasive species	Is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.
Local occurrence (EEC)	The ecological community present within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of

Term	Description
	a larger contiguous area of the ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
Local population (in regard to a threatened or migratory species)	A local population of a threatened plant species comprises those individuals occurring in a defined area or a cluster of individuals extends into habitat adjoining and contiguous with the study area where the individuals could reasonably be expected to cross-pollinate. A local population of fauna species comprises those individuals known or likely to occur in a defined area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the study area from time to time (DECC 2007).
Low condition (vegetation)	Either: a) woody native vegetation with native over-storey percent foliage cover less than 50% of the lower value of the over-story percent foliage cover benchmark for that vegetation type, and where either: • less than 50% of ground cover vegetation is indigenous species, or • greater than 90% of ground cover vegetation is cleared or b) native grassland, wetland or herb field where either: • less than 50% of ground cover vegetation is indigenous species, or • more than 90% of ground cover vegetation is cleared. Note: The percentages for the ground cover calculations must be made in a season when the proportion of native ground cover vegetated compared to non-native ground cover vegetation is likely to be at its maximum.
Moderate to good condition (vegetation)	If native vegetation is not in low condition (above), it is in moderate to good condition.
Mitigation	Action to reduce the severity of an impact.
Mitigation measure	Any measure that prevents, reduce or controls adverse environmental effects of a project.
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000 (OEH 2018).
Proposal	Is considered to include 'all activities likely to be undertaken within the subject site to achieve the objective of the proposed development' (DECC 2007).
Risk of extinction	The likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
Search area	Is considered to 'include the lands that surround the subject site for a distance of 10 km' (DECC 2007). The search area has been used to search information sources to establish the landscape context of the subject site.
Significant impact	A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity.
Strahler stream order	Strahler stream orders are used to define stream size based on a hierarchy of tributaries, based on the diagram below.

Term	Description
	
Study area	Means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account (OEH 2018). In this instance, the study area extends 1,500 m from the site.
Subject site	Means the area directly affected by the proposal. The subject site includes the footprint of the proposal and any ancillary works, facilities, accesses or hazard reduction zones that support the construction or operation of the development or activity (OEH 2018).
Target species	A species that is the focus of a study or intended beneficiary of a conservation action or connectivity measure.

1 INTRODUCTION

1.1 BACKGROUND

OzArk Environment & Heritage (OzArk) has been engaged by R.W. Corkery to complete a Biodiversity Assessment Report (BAR) concerning expanding the McNaught's Quarry, 16 kilometres (km) north of Canowindra, New South Wales (NSW). Work will be occurring in the Cabonne Shire Local Government Area (LGA).

The site access route will lead south from the Extraction Area, with a site entrance on Canowindra Road, a Regional Road, south of the Quarry. This option has reasonable sight distance at the proposed intersection and is located entirely within the Company's land. A deceleration lane on Canowindra Lane will likely be required.

The access road site uses formed or semi-formed existing tracks with various impacts to native vegetation. There are possible upgrades to Canowindra Road in the form of deceleration lanes required within the current footprint at the chosen site access (Option 1 variation).

Regarding this proposal, a Biodiversity Assessment Report (BAR) is appropriate, rather than a Biodiversity Development Assessment Report (BDAR), as entry into the NSW Biodiversity Offsets Scheme (BOS) will not be triggered. Entry into the BOS is triggered when one, or more, of the following conditions are met:

- The proposal exceeds the clearing threshold for the relevant property,
- The proposal will impact a mapped area of biodiversity value on the state-wide Biodiversity Values Map, and
- The proposal will result in a significant impact to one or more listed threatened entities.

The subject site does not occur on land mapped on the Biodiversity Values Map (**Appendix A**), and the proposal will not have a significant impact on a *Biodiversity Conservation Act* 2016- listed threatened species or population (**Appendices D-E**). The Cabonne Shire Local Environment Plan 2012 (LEP) gives the minimum lot size associated with the property as 100 hectares (ha). Under the Biodiversity Assessment Method 2020 (BAM), the clearing threshold for entry into the BOS for a property with a minimum lot size is 1 ha (see **Table 1-1**). As this proposal will entail the removal of up to 0.350 ha of vegetation (**Section 5.1**) it will not exceed the clearing threshold, and thus will not trigger the requirement to offset and to prepare a BDAR.

Table 1-1. Minimum lot size and allowable clearing threshold under the BAM 2020

Minimum Lot Size	Clearing Threshold
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.50 ha or more
40 ha to less than 1000 ha	**1 ha or more**
1000 ha or more	2 ha or more

This biodiversity assessment has been undertaken in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For this proposal, McNaught Earthworks Pty Ltd is the proponent, and the Cabonne Shire Council is the determining authority (EP&A Act s.4.3). The biodiversity assessment has been prepared in accordance with Clause 171 of the EP&A Regulation (2021).

1.2 PROJECT LOCATION AND CONTEXT

1.2.1 Regional Context

The regional context of the proposal is explored in **Table 1-2** and depicted in **Figure 1-1** and **Figure 1-2**.

Table 1-2. Regional context for the proposal.

Criteria	Value
Interim Biogeographic Regionalisation for Australia (IBRA Region)	• NSW South Western Slopes Bioregion
Interim Biogeographic Regionalisation for Australia Sub-region (IBRA Sub-Region)	• Inland Slopes subregion
State	• New South Wales
Local Government Area	• Cabonne Shire Council
Nearest town	• Canowindra
Nearest park, state forest or reserve	• Nangar National Park (~9.1 km)
Mitchell Landscapes	• Canobolas Slopes
Nearest waterway (Name, Type)	• Unnamed Strahler 1st order, minor non-perennial (within the subject site) • Unnamed Strahler 2nd order, minor non-perennial (within the subject site)
Surrounding land use	• Cropping • Grazing modified pastures • Grazing native vegetation • Residential and farm infrastructure • Transport and communication
Surrounding land zone	• RU1 – Primary Production • SP2 – Infrastructure



Figure 1-1. Subject site specific to the proposal.

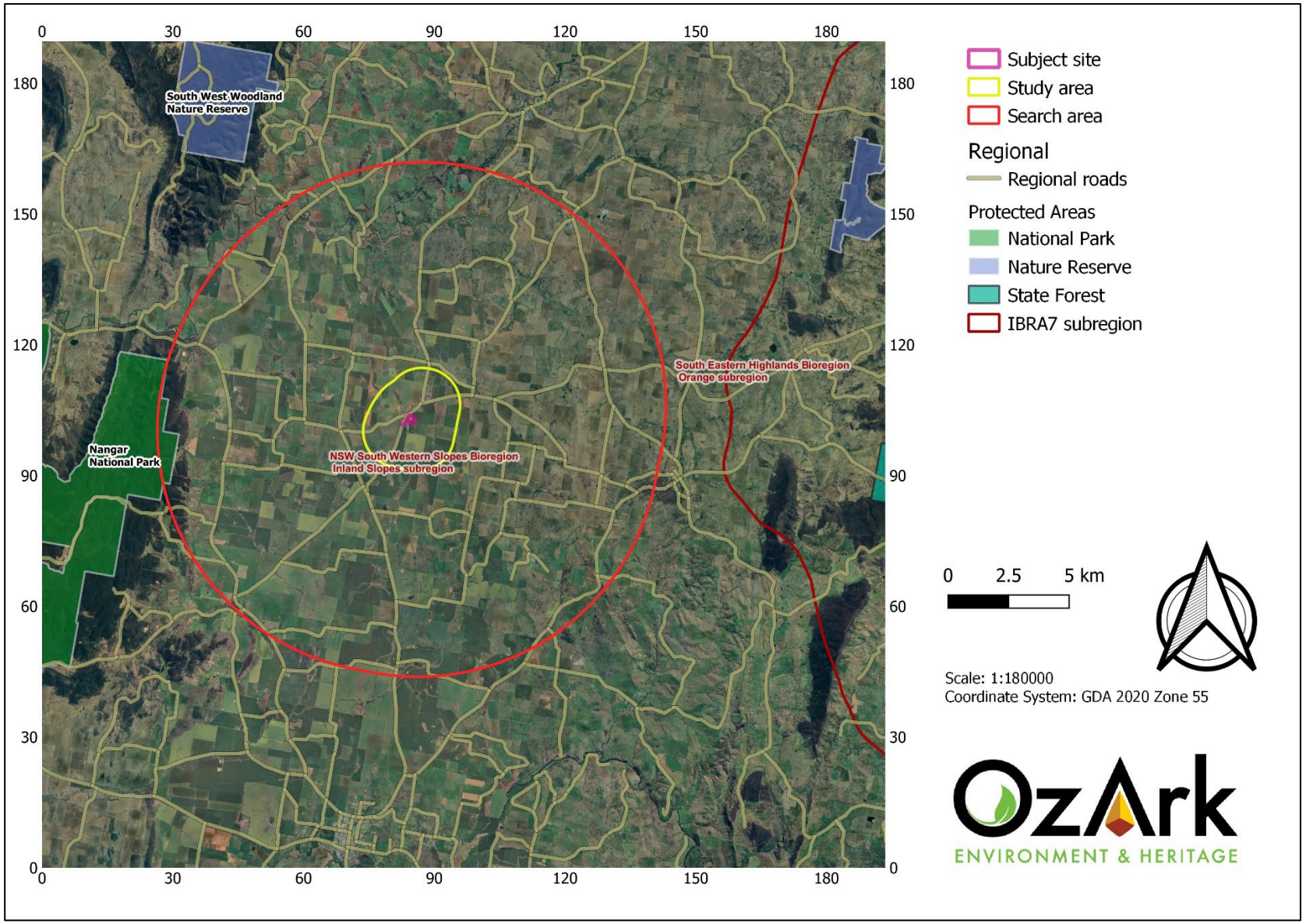


Figure 1-2. Regional context of the proposal showing the subject site, study area, and search area.

1.2.2 Impact Footprint

The total disturbance footprint for the proposal, depicted in **Figure 1-1** amounts to 9.541 ha. Although vegetation clearance will be restricted to the minimum for the operating quarry expansion, this BAR will conservatively assess impacts necessary to the full 9.541 ha. The scope of works involves the construction of the quarry footprint expansion as well as upgrades to internal access roads from Canowindra Road.

1.3 SUBJECT SITE, STUDY AREA AND SEARCH AREA

This report uses the following terms to describe and contextualise the development location:

10 km search area — the area within a 10 km radius of the subject site (**Figure 1-2**). This 10 km buffer has been used to search information sources to establish the landscape context of the subject site.

Study area — the area within a 1,500 m radius of the subject site. Native vegetation has been mapped within this 1,500 m buffer to provide some context regarding the connectivity and cover of native vegetation in the area affected by the proposal, and to inform the impact assessment of the proposal (**Figure 1-2**).

Subject site — the footprint of the proposal and the area directly affected by the development activities (**Figure 1-2**).

2 STATUTORY AND PLANNING CONTEXT

2.1 COMMONWEALTH LEGISLATION

2.1.1 *Environment Protection & Biodiversity Conservation Act* 1999 (EPBC Act)

To assist with nationally listed matters assessments, the Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) are followed.

Birds which are listed in the following international agreements are listed as migratory birds under the EPBC Act.

- Japan-Australia Migratory Bird Agreement (JAMBA).
- China-Australia Migratory Bird Agreement (CAMBA).
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Matters which fall under this legislation are addressed in **Section 5.7** and **Appendix E**.

2.2 STATE LEGISLATION

2.2.1 *Environmental Planning and Assessment Act* 1979 (EP&A Act)

The EP&A Act is the principal planning legislation for NSW by providing the framework for environmental planning and the assessment of proposals.

Part 4 of this Act requires that a determination be made as to whether a proposed action is likely to significantly affect threatened species or ecological communities, or their habitats listed on Schedule 1 and 2 of the BC Act. Where found, the assessment criteria under Section 7.3 of the BC Act (the 'Assessment of Significance') will be drawn upon to determine whether there would be a significant effect on these species.

2.2.2 *Biodiversity Conservation Act* 2016 (BC Act)

The BC Act relates to the terrestrial environment and includes threatened species, ecological communities, key threatening processes and other protected animals and plants.

Section 7.3 of the BC Act contains a five-part test of significance for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Where a significant impact is likely to occur, the proponent must either opt into the BOS and prepare a BDAR or prepare a SIS for each significantly impacted BC listed entity.

BC Act-listed species and communities are addressed in **Sections 5.2** and **5.4** and **Appendices C** and **D**.

2.2.3 *Biosecurity Act* 2015

The Biosecurity Act aims to manage biosecurity risks from animal and plant pests and diseases, weeds, and contaminants in NSW. The Biosecurity Act imposes a general biosecurity duty to ensure that, so far as is reasonably practicable, any biosecurity risk is prevented, eliminated, or minimised. The proponent is required to manage the presence of weeds in the study area.

2.2.4 *Local Land Services Act* 2013

The objects of the Act include 'to ensure the proper management of natural resources in the social, economic, and environmental interests of the State, consistently with the principles of ecologically sustainable development. The Act regulates the clearing of native vegetation on rural land.

2.2.5 *Fisheries Management Act* 1994

Part 7A of the FM Act along with schedules within the act, list threatened aquatic and marine species, populations and ecological communities and key threatening processes which must be considered as part of obligations under Section 5.5 of the EP&A Act.

Section 201 of the FM Act states that a person (other than a public or local government authority) must not carry out dredging work or reclamation work except under the authority of a permit issued by the Minister. Dredging work means any work that involves excavating water land. Reclamation work means any work that involves depositing any material on water land.

Under section 198A of the FM Act:

"water land" means land submerged by water:

(a) whether permanently or intermittently, or

(b) whether forming an artificial or natural body of water,

and includes wetlands and any other land prescribed by the regulations as water land to which this Division applies.

A permit for dredging and/or reclamation is therefore required under Part 7, Section 201 of the FM Act.

Section 219 of the FM Act establishes that a permit is also required for works that involve constructing or altering a causeway or otherwise creating an obstruction across or within a creek so that 'the free passage of fish will or could be obstructed'. A permit to obstruct fish passage will not be required under Part 7, Section 219 of the FM Act, as no such works are planned for the subject site. No perennial, significant watercourses are present.

Refer to **Section 4.4** for consideration of issues relating to watercourses and the FM Act.

2.2.6 *Water Management Act* 2000 (WM Act)

The WM Act aims to provide for the 'sustainable and integrated management of the water sources of the state for the benefit of both present and future generations.'

The WM Act provides for the granting of various licenses and approvals, including for the use of water and water supply work. Additionally, the WM Act identifies provisions relating to 'controlled activities' carried out on 'waterfront land' (within 40 m of a river-bank, lake shore, or estuary's high-water mark). Controlled activities include:

- erecting a building,
- carrying out works,
- removing material (e.g., plants and rocks),
- depositing material (e.g., gravel and fill),
- any activity which affects the quantity or flow of water in a water source.

Examples of controlled activities include:

- construction of watercourse crossings (e.g., bridges, bed level crossings),
- laying pipes and cables,
- sand and gravel extraction.

As the activities will not be occurring within designated "waterfront land", obtaining approval in the form of a "controlled activity" approval from the Department of Planning and Environment (DPE) under the WM Act is not necessary.

2.2.7 Cabonne Local Environmental Plan 2012

A Local Environmental Plan (LEP) is a legal document prepared by Council and approved by the State Government to regulate land use and development. LEPs guide planning decisions for local governments. The plan allows Council to regulate the ways in which all land both private and public may be used and protected through zoning and development controls.

The aims of this Plan, relevant to the proposal, are as follows:

(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,

(a) to encourage development that complements and enhances the unique character and amenity of Cabonne, including its settlements, localities, and rural areas,

(b) to provide for a range of development opportunities that contribute to the social, economic and environmental resources of Cabonne in a manner that allows present and future generations to meet their needs by implementing the principles of ecologically sustainable development,

(c) to facilitate and encourage sustainable growth and development that achieves the following—

(i) contributes to continued economic productivity, including agriculture, business, tourism, industry and other employment opportunities,

(ii) allows for the orderly growth of land uses while minimising conflict between land uses within the relevant zone and land uses within adjoining zones,

(iii) encourages a range of housing choices and densities in planned urban and rural locations that is compatible with the residential and rural environment and meets the diverse needs of the community,

(iv) promotes the integration of land uses and transport to improve access and reduce dependence on private vehicles and travel demand,

(v) protects, enhances and conserves agricultural land and the contributions that agriculture makes to the regional economy,

(vi) avoids or minimises adverse impacts on drinking water catchments to protect and enhance water availability and safety for human consumption,

(vii) protects and enhances places and buildings of environmental, archaeological, cultural or heritage significance, including Aboriginal relics and places,

(viii) protects and enhances environmentally sensitive areas, ecological systems, and areas that have the potential to contribute to improved environmental, scenic or landscape outcomes.

As per the Cabonne LEP (see **Figure 2-1**), areas mapped as having high terrestrial biodiversity value are present within the subject site.

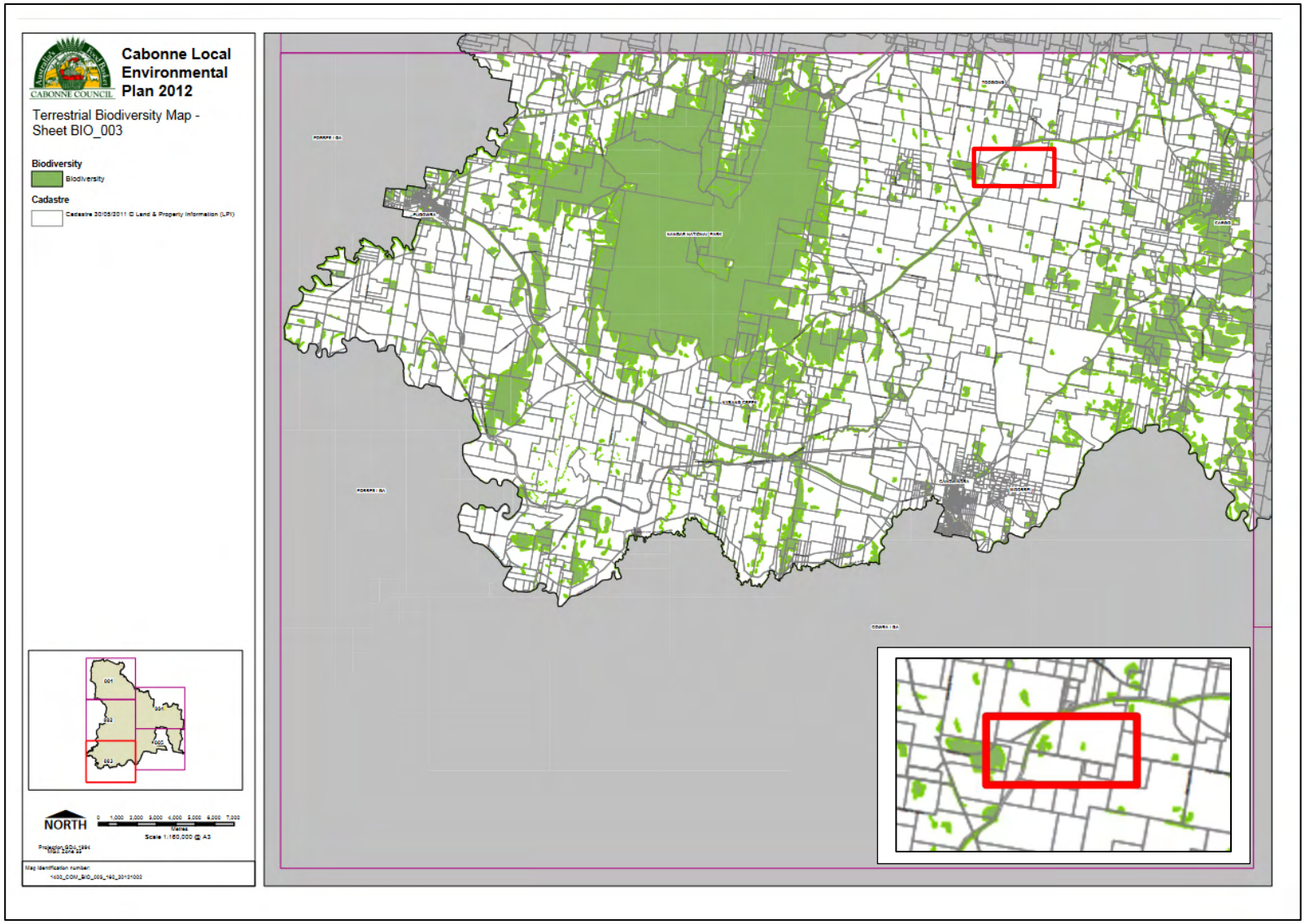


Figure 2-1. Cabonne LEP 2012 - Terrestrial Biodiversity Map. Green shaded areas indicate high terrestrial biodiversity; red polygon approximates the subject site (enlarged inset of subject site in the bottom right)

2.3 STATE ENVIRONMENTAL PLANNING POLICIES UNDER THE EP&A ACT 1979

2.3.1 *State Environmental Planning Policy (Biodiversity and Conservation)* 2021

The *SEPP (Biodiversity and Conservation)* 2021 is the collation of biodiversity and conservation related SEPP. Chapters 3 and 4 of this SEPP aim to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'. It includes provisions for councils to ensure potential impacts on Koalas and Koala habitat are properly considered when assessing developments. It also provides a process for councils to strategically manage habitat through development of Koala plans of management.

As a Part 4 development (under the EP&A Act) on land zoned RU1, Chapter 3 of the SEPP (*Biodiversity and Conservation*) 2021 applies. Cabonne LGA is specified under Schedule 1 of Chapter 3 of the 2021 SEPP.

Under Chapter 3 of the SEPP (*Biodiversity and Conservation*) 2021, this BAR must assess whether the subject site is potential koala habitat, and if so, whether it is core koala habitat.

potential koala habitat *means areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.*

core koala habitat *means an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population.*

Of those feed tree species listed in the relevant schedule of the SEPP, White Box did occur on the subject site, however the canopy was restricted to scattered paddock trees (see **Figure 5-**, PCTs 266 and 277). Nonetheless, it could be considered potential koala habitat.

Historical Koala occupation of the 10 km search area was assessed by considering BioNet records; this desktop analysis yielded no records, therefore the subject site could not be considered core koala habitat.

As such, this proposal does not require a Koala Assessment Report, or further consideration under Chapter 3 of the SEPP (*Biodiversity and Conservation*) 2021.

3 METHODS

The ecological assessment was carried out in three stages:

1. Desktop searches and review of ecological databases and information to identify threatened species, populations or ecological communities listed in the BC, FM, and/or EPBC Acts that have the potential to occur in the study area.

2. Field survey of the subject site for the purposes of:

    - Determining the extent of the proposed impact.
    - Collating lists of those plants present these being used to assist with the identification of the site's vegetation communities.
    - Determining habitat availability for fauna species recorded or expected to occur.
    - Documenting the nature and extent of any protected matter, such as a threatened species or community or a significant habitat feature.

3. Preparation of a written BAR that describes the impacts of the proposed activity on native vegetation and threatened species, populations, and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts.

3.1 PERSONNEL

OzArk operates under NSW Scientific Research License 101908, and NSW Department of Primary Industries (DPI) Accreditation of a corporation as an animal research establishment Ref No. AW2022/012.

The field survey was completed by Ecologist Sam Bulling on the 25th of October 2023. Reporting components were also completed by Jeff Lewis, with quality control provided by Senior Ecologist Dr Crystal Graham. Key details of personnel involved are available below.

Table 3-1 Summary of OzArk personnel qualifications.

Name	Position	CV Details
Dr Crystal Graham	Senior Ecologist	• BAM-accredited Assessor #BAAS22024 • Postdoctoral Fellow – Smithsonian Tropical Research Institute • Doctor of Philosophy (Biology) – University of Sydney • Honours in Biology – University of Sydney • Bachelor of Advanced Science – University of Sydney • 4WD Training • First Aid Training • WH&S Induction Training for Construction Work • Worker at Heights Training
Sam Bulling	Ecologist – Field Survey	• Bachelor of Science (Wildlife Conservation Biology) – University of Adelaide • First Aid Training

		• WH&S Induction Training for Construction Work • Rail Industry Worker Card • Worker at Heights Training
Jeff Lewis	Ecologist - Reporting	• Bachelor of Science in Ecology and Biodiversity – Victoria University of Wellington, New Zealand • Certificates in GIS – UC Davis • Certificate in Wild Animal Management – Unitec, New Zealand • WH&S Induction Training for Construction Work • First Aid Training

3.2 BACKGROUND RESEARCH

Preliminary assessments drew on local experience, previous reporting and information held on government databases and archives. Results of database searches were used to assist in identifying distributions, suitable habitats and known records of threatened species to increase the effectiveness of field investigations. Information sources reviewed included the following:

- NSW Government online aerial imagery (www.maps.six.nsw.gov.au).
- Critical habitat register, available on the DPIE website at: https://www.environment.gov.au/cgi-bin/sprat/public/publicregisterofcriticalhabitat.pl
- NSW Government Biodiversity Values Map which identifies land with high biodiversity value, as defined by the Biodiversity Conservation Regulation 2017 https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap
- Flora and fauna records and profiles contained in the NSW Threatened Species Database, EPBC Protected Matters Search Tool and DPI threatened fish distribution maps.
- BioNet (www.bionet.nsw.gov.au) Wildlife Atlas and Plant Community Type databases.
- Flora of NSW (Harden 1991-2002) and Flora NSW Online https://plantnet.rbgsyd.nsw.gov.au/floraonline.htm, and
- Regional Scale State Vegetation Map: C1.1.M1.1(DPE, 2022)

Database searches were undertaken before the field assessment to determine the predicted species and those previously recorded within 10 km of the subject site. The results of these searches led to the identification of key species for field survey effort and targeted searches. Results of the database searches are provided in **Appendix A.** A series of other background searches were performed to comply with legal standards (please refer to **Table 3-2**).

Table 3-2. Presence and/or proximity of environmental considerations.

Environmental Considerations	In the study area?
Land identified on the Biodiversity Values Map under the NSW *BC Act 2016*	No
Area of Outstanding Biodiversity Value (AOBV) under the NSW *BC Act 2016*	No
Critical habitat nationally?	No
An area reserved or dedicated under the *National Parks and Wildlife Act 1974*?	No
Is the proposal located within land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation of other environmental protection purposes?	No
A World Heritage Area?	No
Environmental Protection Zones in environmental planning instruments?	No
Lands protected under *SEPP (Biodiversity and Conservation) 2021*?	Yes (see **Section 2.3.1**).
Land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness under the *National Parks and Wildlife Act 1974?*	No
Aquatic reserves dedicated under the *Fisheries Management Act 1994*?	No
Aquatic Threatened Ecological Community?	No
Wetland areas dedicated under the Ramsar Wetlands Convention?	No
Land subject to a conservation agreement under the *National Parks and Wildlife Act 1974*?	No
Land identified as State Forest under the *Forestry Act 1916*?	No
Acid sulphate area?	No
Protected riparian habitat?	No
Mapped Key Fish Habitat?	No

3.3 HABITAT ASSESSMENT

The results of the desktop review and the field assessment were collated and reviewed in the context of local ecological knowledge to determine the likelihood of occurrence of threatened species and ecological communities, and potential impacts of the proposal (**Appendix C**). For instance, some threatened species may be predicted to occur locally but, on assessment of the site, key habitat elements or conditions are not present, in which case the species is assessed as not being present or impacted.

The likelihood of occurrence of threatened species, populations or ecological communities was categorised as follows:

- 'Present' – the species was observed or has been previously recorded on the site.
- 'High' – a medium to high probability that a species uses the site, based on nearby records and suitable habitat being present.

- ‘Moderate’ – suitable habitat for a species occurs on the site, but the species has not been observed or previously recorded at the site, or habitat not ideal but the species has been recorded nearby.
- ‘Low’ – a very low likelihood that the species uses the site, based on lack of the preferred type and size of habitat.
- ‘Absent’ – habitat on-site and in the vicinity is unsuitable for the species.

The species known or considered to have a moderate-high likelihood of occurring at the site were then considered as to whether the extent and type of development would be likely to impact on them.

Tests of significance were then completed for these species and ecological communities in accordance with the BC Act (**Appendix D**) and/or the assessment of significance under the EPBC Act (**Appendix E**), and the relevant guidelines for these assessments.

3.4 FIELD SURVEY

The objectives of the field survey were to:

- Identify native species and vegetation communities present.
- Describe the quality and value of the vegetation and the flora and fauna habitat at the development site.
- Determine if species, populations or ecological communities listed as threatened under the BC Act or EPBC Act are/may be present.
- Determine the significance of impact to any threatened entities present or likely to be present.

3.4.1 Vegetation surveys

Vegetation communities were identified in accordance with the online NSW Master Plant Community Type Classification (DPE, 2022), which is the current state-wide vegetation classification system for Plant Community Types (PCT). This classification system is used for vegetation mapping, development assessment and site planning purposes. It describes over 1,500 PCTs across the state, and groups the vegetation communities into vegetation Class and Formation / Sub-formation as per Keith (2004).

In this study PCTs were identified based on the following inputs:

- Regional Scale State Vegetation Map: C1.1.M1(DPE, 2022), which provides predictive mapping of PCTs in and around the subject site. This mapping is indicative only. It is not necessarily accurate at a fine scale for the purposes of the current study.

- Professional ecological knowledge about locally occurring vegetation types and landscape, soil, and topographic patterns, including transitions from one community to another and potential for intergrades between plant communities.
- Field survey results confirming the flora species present, vegetation structure, landscape position and soil type at the subject site and the extent and condition of native vegetation.
- The BioNet Vegetation Classification database was used to identify the candidate vegetation communities likely to be present based on the site conditions (flora species present, vegetation structure, bioregion, and landscape position and soil type) and the relevant published PCT descriptions.

If any of the PCTs were identified as having potential to be part of a Threatened Ecological Community (TEC), the relevant identification guidelines (NSW Scientific Committee listing criteria and Commonwealth identification guides) were consulted to determine the status of the vegetation community present on the subject site. These guidelines provide the identification criteria used to positively identify the community as being part of the TEC. The criteria include location, species present, overstorey species, weed cover, number and type of native species including whether certain 'important' native species are present. Plant identification followed nomenclature in the Royal Botanic Gardens PlantNet online database (Royal Botanic Gardens and Domain Trust, 2023).

3.4.2 Targeted fauna surveys

The subject site was incidentally searched for fauna using a meander method while undertaking floristic and habitat surveys. All habitat trees (i.e., hollow-bearing trees or trees containing nests) were GPS tagged. The size, number of hollows and/or type of nest were also recorded for each tree. Potential habitat such as rocks, logs, loose bark, and coarse woody debris was examined for cryptic species. Areas of suitable substrate were searched for animal tracks. Other evidence of fauna presence on the subject site, such as scats, feathers and sloughed skins were also recorded. Herpetological searches were conducted by overturning logs and rocks while traversing the site.

Considering the scope of works proposed, combined with the condition of the fauna habitats observed during the site inspection, no targeted surveys such as live trapping, nocturnal searches, deployment of bat echolocation detectors and so forth, were carried out.

3.5 LIMITATIONS

This study is based upon the species data available at the time of the study, and the environmental conditions, season, and time constraints imposed by the project for the field survey. Specific limitations on this study include the following:

- The field survey was in a single day in spring, when certain species may not have been present, visible, or identifiable. Therefore, the species list provided in **Appendix B** should not be considered wholly comprehensive, as a greater diversity of species is likely to make use of the site,
- Fauna trapping, frog surveys and nocturnal spotlighting were not undertaken for the current assessment, and
- Microbat ultrasonic call capture and analysis was not undertaken.

To compensate for these limitations, a 'precautionary approach' for species presence has been adopted. If suitable habitat for a particular threatened species is present at the subject site or is known to occur within the wider study area, then the species is assumed to be present, and the impact assessment is completed on that basis.

The above-mentioned constraints were also considered when preparing the recommendations of avoiding, minimising, and mitigating potential impacts.

4 EXISTING ENVIRONMENT

4.1 BIOREGION

The study area falls entirely within the Inland Slopes subregion (North West Slopes Bioregion), as per the Interim Biogeographic Regionalisation of Australia's categorisation (IBRA) (Thackway & Cresswell, 1995). As this subregion's geology, landforms, soil types and vegetational composition have not been described, see below for a broader categorisation of the NSW South Western Slopes Bioregion (see **Table 4-1**).

Table 4-1. Description of the NSW South Western Slopes Bioregion (DPE, 2003).

Bioregion	NSW South Western Slopes Bioregion
Geology	This bioregion lies wholly in the eastern part of the Lachlan Fold Belt, which consists of a complex series of north to north-westerly trending folded bodies of Cambrian to Early Carboniferous sedimentary and volcanic rocks. Granites are common and mostly located in large scale upfolded bodies of rock. Granite landscapes occur either as central basins surrounded by steep hills formed on contact metamorphic rocks, or as high blocky plateau features with rock outcrops and tors.
Landforms	The South Western Slopes Bioregion is a large area of foothills and ranges comprising the western fall of the Great Dividing Range to the edge of the Riverina Bioregion. A very wide range of rock types is found across the bioregion, which is also affected by topographic and rainfall gradients that decrease towards the west. These physical differences have an impact on the nature of the soils and vegetation found across the bioregion. Inland streams pass across the slopes in confined valleys with terraces and local areas of sedimentation. Geology, soils and vegetation are complex and diverse but typified by granites and meta-sediments, texture contrast soils and a variety of eucalypt woodlands, making this bioregion the southern equivalent of the Nandewar Bioregion.
Soils	The overall pattern of soils in these landscapes is one where shallow, stony soil are found on the tops of ridges and hills. Moving downslope, texture contrast soils are the norm with subsoils derived from the underlying weather rock and the topsoils being a homogenised surface mantle of coarser material derived from all parts of the slope. On valley floors subsoils have drabber colours indicative of poor drainage and they may accumulate soluble salts. Dryland salinity is widespread. Alluvial sands and loams are more common than clays in most parts of the landscape, but alluvial clays become more important nearer to the Riverine Plain. Over the Quaternary, soils in these landscapes have accumulated a considerable quantity of wind-blow silt and clay from western NSW.
Vegetation	In the higher rainfall eastern hill country, woodlands and open woodlands of white box are dominant. To the west and north these give way to vegetation communities dominated by grey box and white cypress pine. Other tree species characteristic of the bioregion include red stringybark on higher slopes, with black cypress pine, red ironbark, white gum, yellow box and Blakely's red gum occupying the lower slopes. Valley flats are dominated by rough-barked apple, with river oak found along eastern streams and river red gum lining the larger central and western streams. In the western half of the bioregion, where altitude and rainfall are lower, Dwyer's mallee gum dominates areas of granite-derived soils and red ironbark communities occupy areas of sandy soils derived from sedimentary rock. Other common trees include hill red gum, white cypress pine, and red stringybark in the ranges and grey box woodlands, with yellow box, white cypress pine and belah occupying lower areas. Vegetation communities in the northwest are dominated by poplar box, kurrajong, wilga and red box, and limited areas of bull mallee, blue mallee, green mallee and congoo mallee also occur in the central west.

4.2 NSW LANDSCAPES

NSW (Mitchell) landscapes were mapped in 2002 to provide a framework for reporting reserve establishment and for determining over-cleared landscapes (Mitchell, 2002). These landscapes broadly describe areas of similar topography, geology, soils, and vegetation. The subject site and the study area are wholly represented by the **Canobolas Slopes** (see **Figure 4-1**).

Canobolas Slopes

Strike ridges, rounded hills, peaks and ranges on variable Ordovician-Silurian felspathic sandstone, tuffaceous sandstone and thin limestone units, Silurian lithic sandstone, quartz sandstone, tuff and quartz-felspar porphyry, Silurian-Devonian granite. General elevation 500 to 900 m, local relief to 100 m. Marked altitudinal shift in vegetation communities as rainfall declines to the west.

Red and yellow earth and yellow texture-contrast soils in the east. Grassy woodlands of yellow box, grey box, Blakely's red gum, apple box, and broad-leaved peppermint. Brown and gradational sandy loams and harsh yellow texture-contrast soils in the west with woodlands and grassy open forest of white box, grey box, red ironbark, red stringybark, with yellow box and rough-barked apple on the flats and river oak along the streams.

Clearing Status – 96% of this landscape has been cleared.

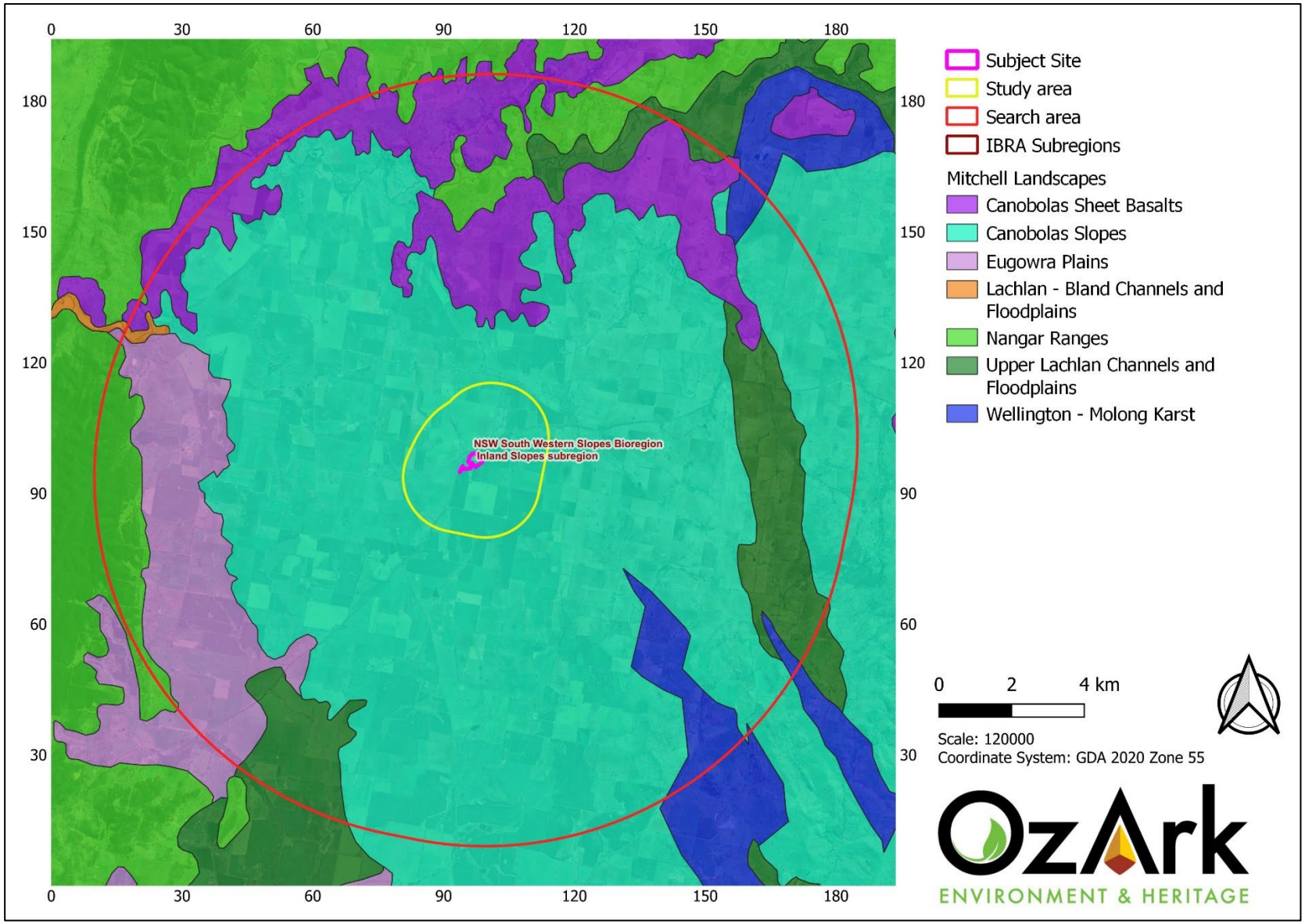


Figure 4-1. NSW (Mitchell) Landscapes of the search area (Mitchell, 2002).

4.3 CLIMATE

The closest operating weather monitoring facility is located at the Orange Agricultural Institute (ID 063254), approximately 40 km to the northeast of the subject site. Records at this station began in 1996.

The Orange area experiences warm summers, with the highest average maximum in January (26.6 °C), and cold winters, with the lowest average maximum in July (9.5°C).

The average annual rainfall at this station is 927.2 mm. Rainfall is high year-round, with August receiving the greatest amount (94.9 mm) and April the lowest (54.4 mm).

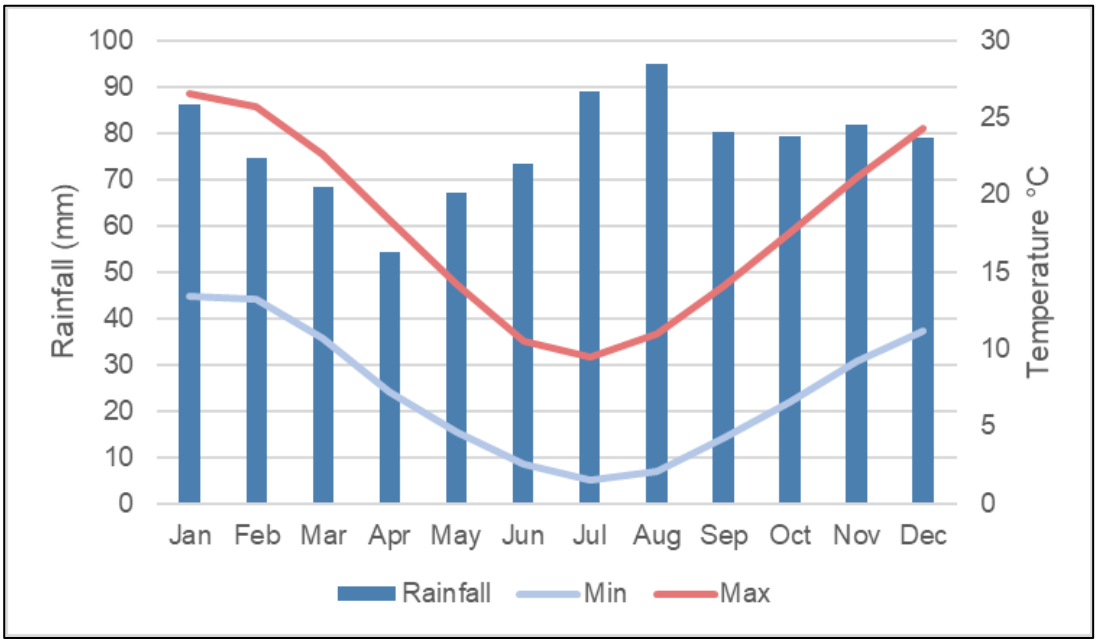


Figure 4-2. Climate statistics for the Orange Agricultural Institute weather station (ID 063254).

4.4 WATERCOURSES

Representative photographs of habitat, including dams, are shown in **Figure 4-3**. No watercourses intersect the subject site. Seventeen minor watercourses are present within the study area (**Figure 4-4**; **Figure 4-5**). One minor unnamed non-perennial watercourse to the north-east of the subject site, within the study area, is mapped by the Department of Primary Industries – Fisheries (DPI) as Key Fish Habitat (KFH) (see **Figure 4-4**). Mandagery and Boree Creeks are two major perennial watercourses found near the search area perimeter, containing KFH and Protected Riparian Land (PRL). PRL is mapped as being at its closest point 4.45 km from the subject site in the search area, and KFH is mapped as being in the study area at 1.34 km from the subject site.

Purple-spotted Gudgeon and Eel-tailed Catfish, threatened fish species, have distribution mapped near the perimeter of the study area and search area respectively. Two watercourses flowing into the study area are mapped for Purple-spotted Gudgeon, the closer of the two being 1.2 km from the subject site. Eel-tailed Catfish habitat is mapped at approximately 7.1 km from the subject site at it closest.

As KFH threatened fish species distribution occurs on the margin of the study area but not the subject site (see **Figure 4-4**) and the scope of works does not require dredging and reclamation, permits for dredging and reclamation or to obstruct the free passage of fish, will not need to be obtained from the Minister under Part 7 of the FM Act. The scope works of the subject site will not have a significant impact on the KFH of the study area.



Figure 4-3. Representative photographs of the condition of McNaught's Quarry. Left, looking north towards Canowindra Road into the extraction area. Right, looking south from the internal access road between the extraction area site buildings (both within the subject site).

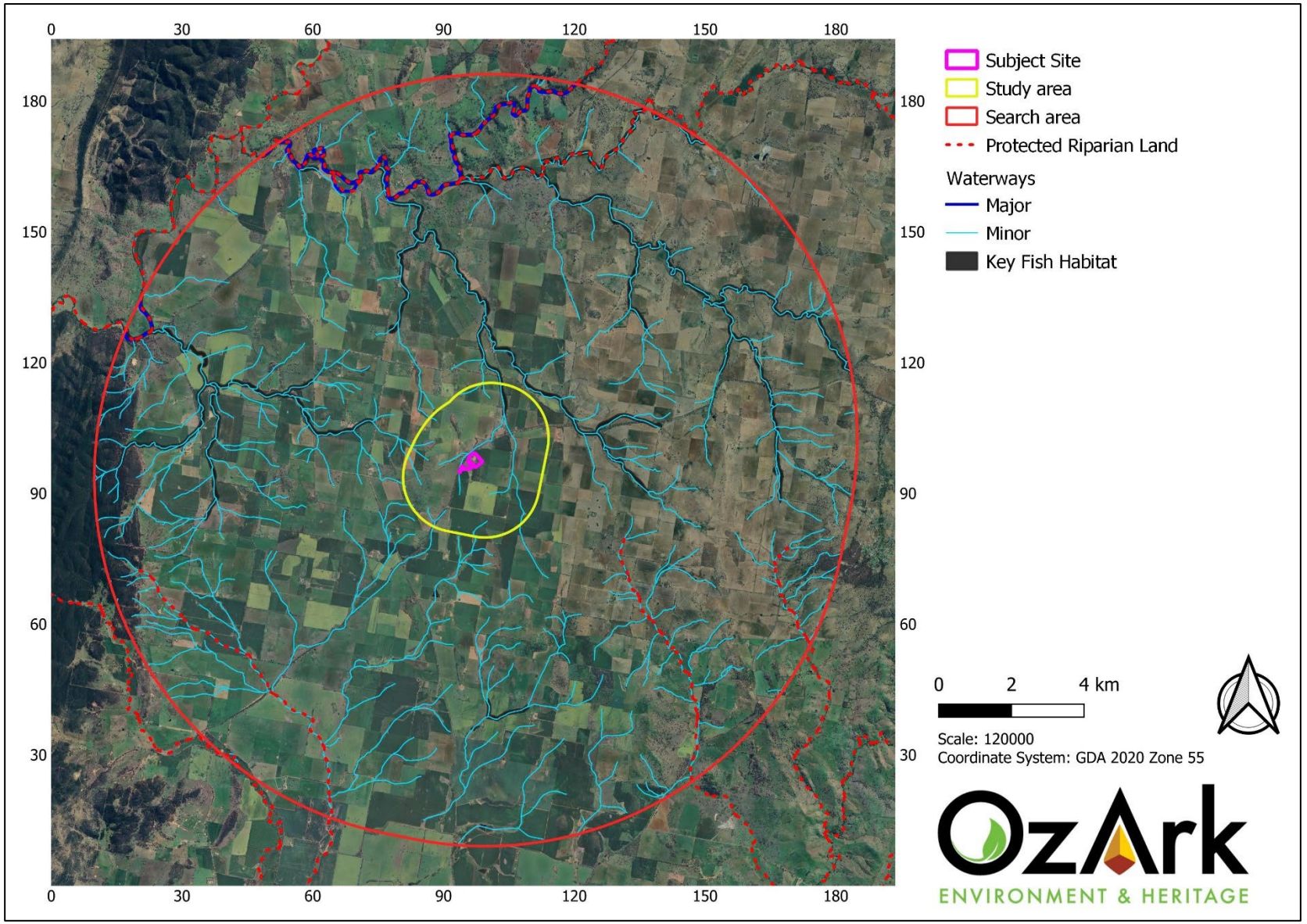


Figure 4-4. Key Fish Habitat, Protected Riparian Land, and watercourses within the search area.



Figure 4-5. Key Fish Habitat, Protected Riparian Land, and watercourses within the study area (magnified view).

4.5 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment. Aquifer ecosystems are inherently groundwater dependent (QLD Department of Environment and Heritage Protection, 2017).

The degree of groundwater dependence of ecosystems can be categorised into three broad categories:

- Non-dependent ecosystems that occur mostly in recharge areas and have no connection with groundwater.
- Facultative GDEs that require groundwater in some locations but not in others, particularly where an alternative source of water can be accessed to maintain ecological function. Minor changes to the groundwater regime in facultative GDEs with proportional or opportunistic groundwater dependence may not have any adverse impacts but these ecosystems can be damaged or destroyed if a lack of access to groundwater is prolonged.
- Obligate GDEs that are restricted to locations of groundwater discharge and ecosystems located within aquifers (e.g., subterranean cave and stygofauna communities (Kuginis et al. 2012).

Groundwater dependent ecosystems have been classified into seven types under two broad categories as follows (Kuginis et al. 2012):

- Subsurface ecosystems – Underground ecosystems
  - Karst systems and caves (limestone geology)
  - Subsurface aquifer (phreatic) ecosystems
  - Baseflow streams (hyporheic or subsurface component)
- Surface ecosystems – Above ground ecosystems
  - Groundwater dependent wetlands
  - Baseflow surface streams (surface/free-water component)
  - Estuarine and near shore marine ecosystems
  - Groundwater dependent terrestrial ecosystems; dependent on subsurface groundwater (phreatophytic).

No GDEs associated with either the Lachlan or Central Tablelands catchments are mapped, based on the available data within the 10 km Search Area (see **Figure 4-6**). No significant impacts to GDEs via bulldozer and truck use for extending the operating quarry are anticipated.

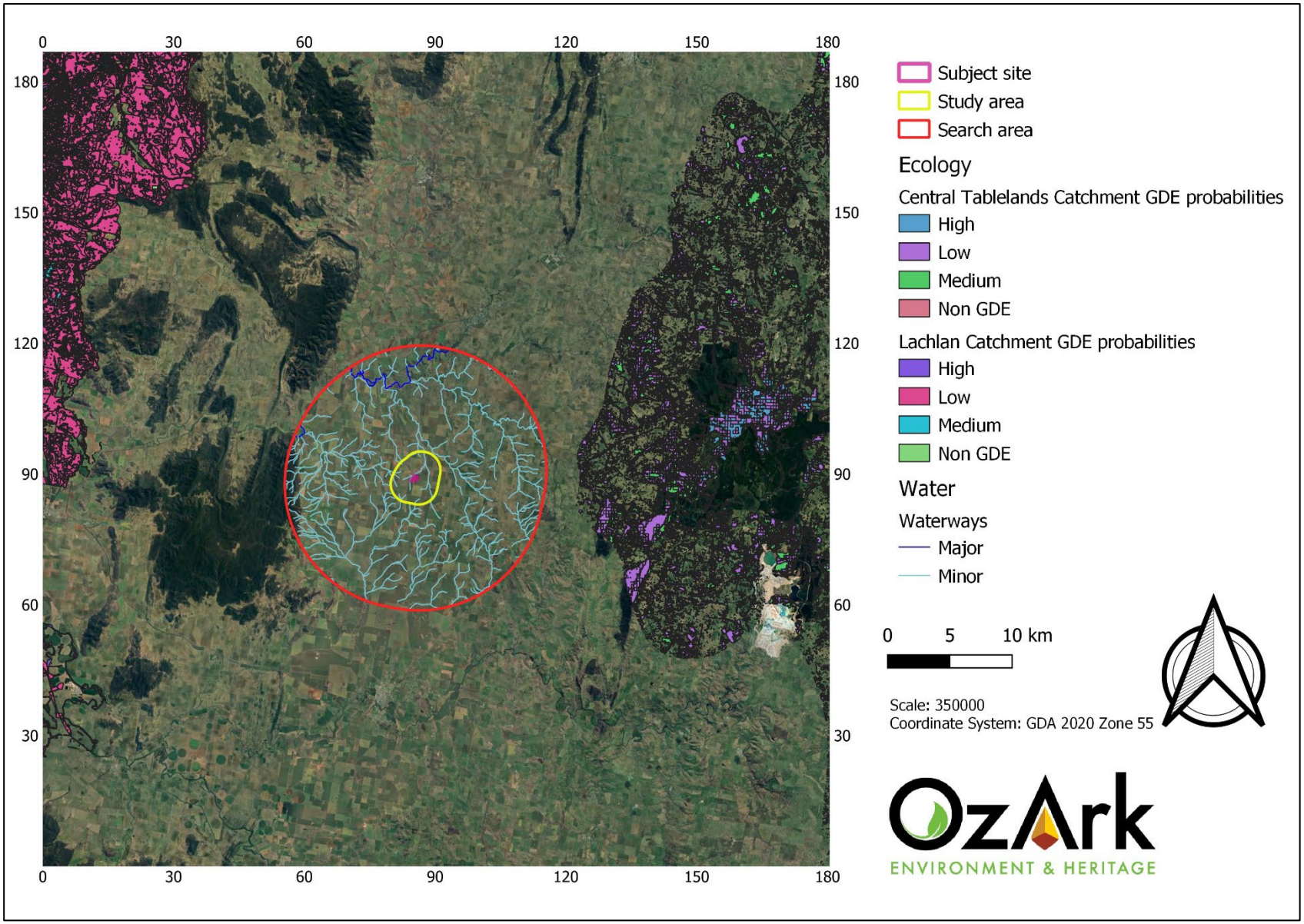


Figure 4-6. Groundwater Dependent Ecosystems adjacent to search area.

5 RESULTS

5.1 PLANT COMMUNITY TYPES

Computer modelling, through the application of the NSW State Vegetation Type Map: C1.1.M1.1, anticipated one Plant Community Type (PCT) to be present within the study area:

- PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.

The field survey encountered this aforementioned PCT, as well two other PCTs:

- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.

Much of the subject site (9.191 ha) was devoid of native vegetation. Rather, it consisted of an operating quarry, internal access roads and largely cleared farmland.

All native vegetation was concentrated in fragmented pockets, south of the quarry footprint. The examples of PCT 266 and 277 represent relics of what was once (presumably) a more extensive White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Mapped PCT distributions are provided in **Figure 5-2** and **Figure 5-3**, their areas are available in **Table 5-1**, and representative photographs are accessible in **Appendix B**. In total, 0.350 ha of native vegetation belonging to three defined PCTs was present at the subject site.

Although 0.010 ha of PCT 277 occurs within the section of Canowindra Road intended for upgrade, this vegetation has already been trimmed by council and R.W. Corkery has indicated that no further clearing is required. As such, this additional area has not been assessed in this report.

Table 5-1. Plant Community Types (PCTs) within the subject site.

PCT ID	PCT Name	Threatened Ecological Community?	Area (ha) in Subject Site
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	No	0.054
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Yes	0.218
277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Yes	0.078
Non-native vegetation, bare ground, road surface, and McNaught's Quarry			9.191
Total			**9.541**

5.2 THREATENED ECOLOGICAL COMMUNITIES

PCT 266 and 277 are recognised as examples of the BC Act-listed Critically Endangered Ecological Community (CEEC), *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland*, *in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. The former being White Box, and latter Blakely's Red Gum-Yellow Box as White Box and Yellow Box were the dominant tree species (**Table 5-2**). It, however, failed to satisfy its EPBC Act CEEC equivalent, as it failed to attain the necessary patch size (of 0.5 ha) and quality native understorey was not present (**Figure 5-1**). As such, only the BC Act form of this TEC was present at site. The distribution of this CEEC is mapped in **Figure 5-4** and **Figure 5-5.**

The 0.010 ha of PCT 277 that occurs within the intersection on Canowindra Road (**Figure 5-4**) also forms part of the above-mentioned BC Act-listed CEEC, and potentially, the EPBC Act CEEC equivalent, however this patch was not assessed against the EPBC Act CEEC guidelines in the field as the impacts to this section were not known at the time. Considering this vegetation has already been trimmed by Council and the client has indicated that no further clearing is required, this area of CEEC has not been assessed in this report.

Table 5-2. Assessment of PCT 266 and 277 under the BC Act CEEC criteria.

Condition	Condition met?
Is the site on the tablelands or western slopes of NSW?	Yes. South Western Slopes
Does the site contain, or would the site have recently been likely to contain, White Box, Yellow Box or Blakely's Red Gum?	Yes. White box and Yellow Box were the dominant tree species.
Is the ground layer mainly grassy?	Yes. A mixture of native and exotic species was present. The main cover consisted of Common Wheat, African Lovegrass, Perennial Ryegrass, Purple Top and Soft Brome.
If the site has been degraded, is there potential for assisted natural regeneration of the tree layer or the understorey (e.g. by removing grazing, weeds, etc)?	Yes. It is cleared agricultural land and an operating quarry that is dominated by exotic grass species, however if managed there is potential for assisted natural regeneration. White Box and Yellow Box provide a seed bank.
Meets criteria under the BC Act?	Yes. The entirety of PCT 266 and 277 within the subject site meets the criteria under the BC Act.

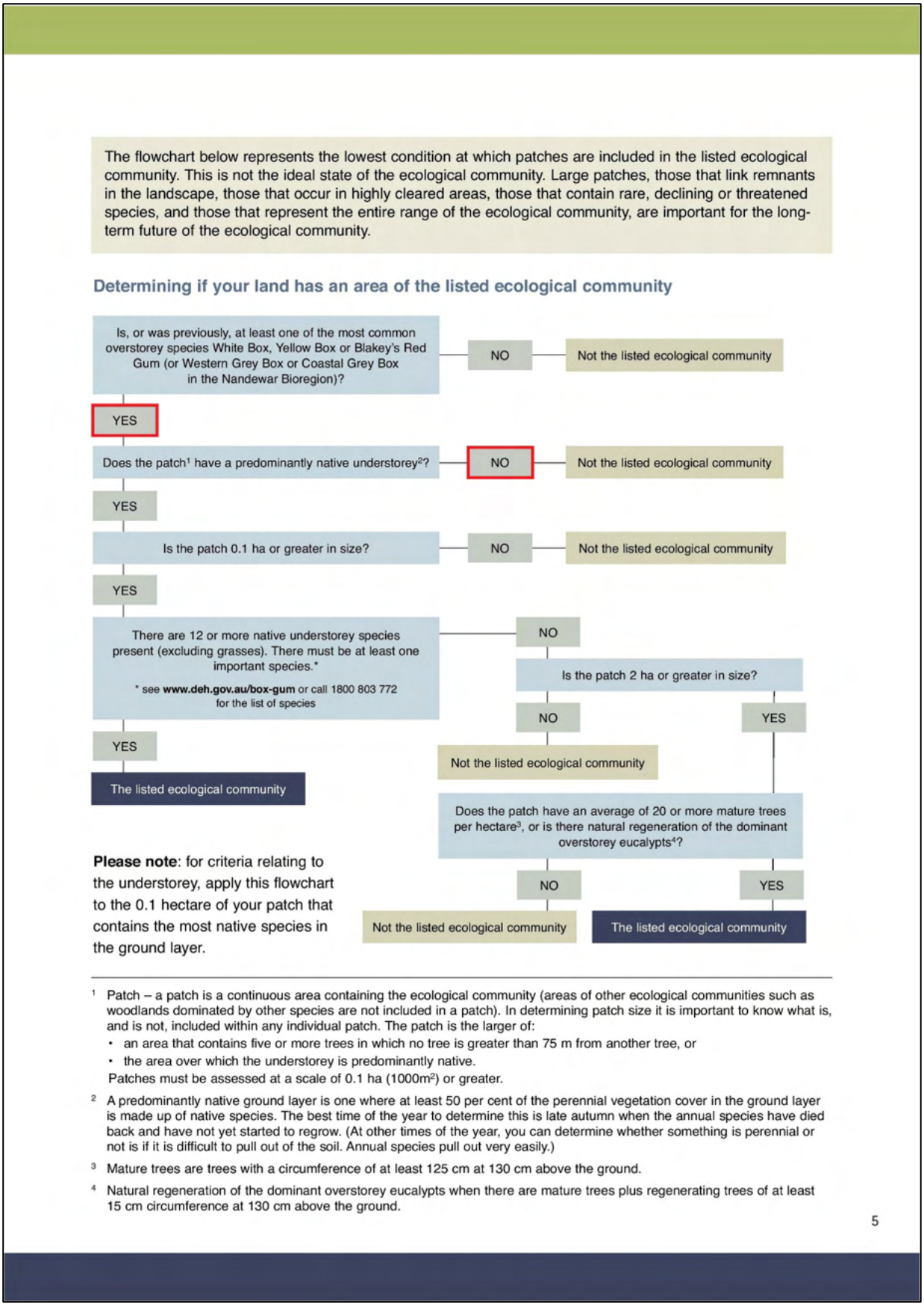


Figure 5-1. Assessment of PCT 266 and 277 according to the EPBC Box-Gum Woodland guidelines.



Figure 5-2. Confirmed Plant Community Types and habitat trees within the subject site (1 of 2).

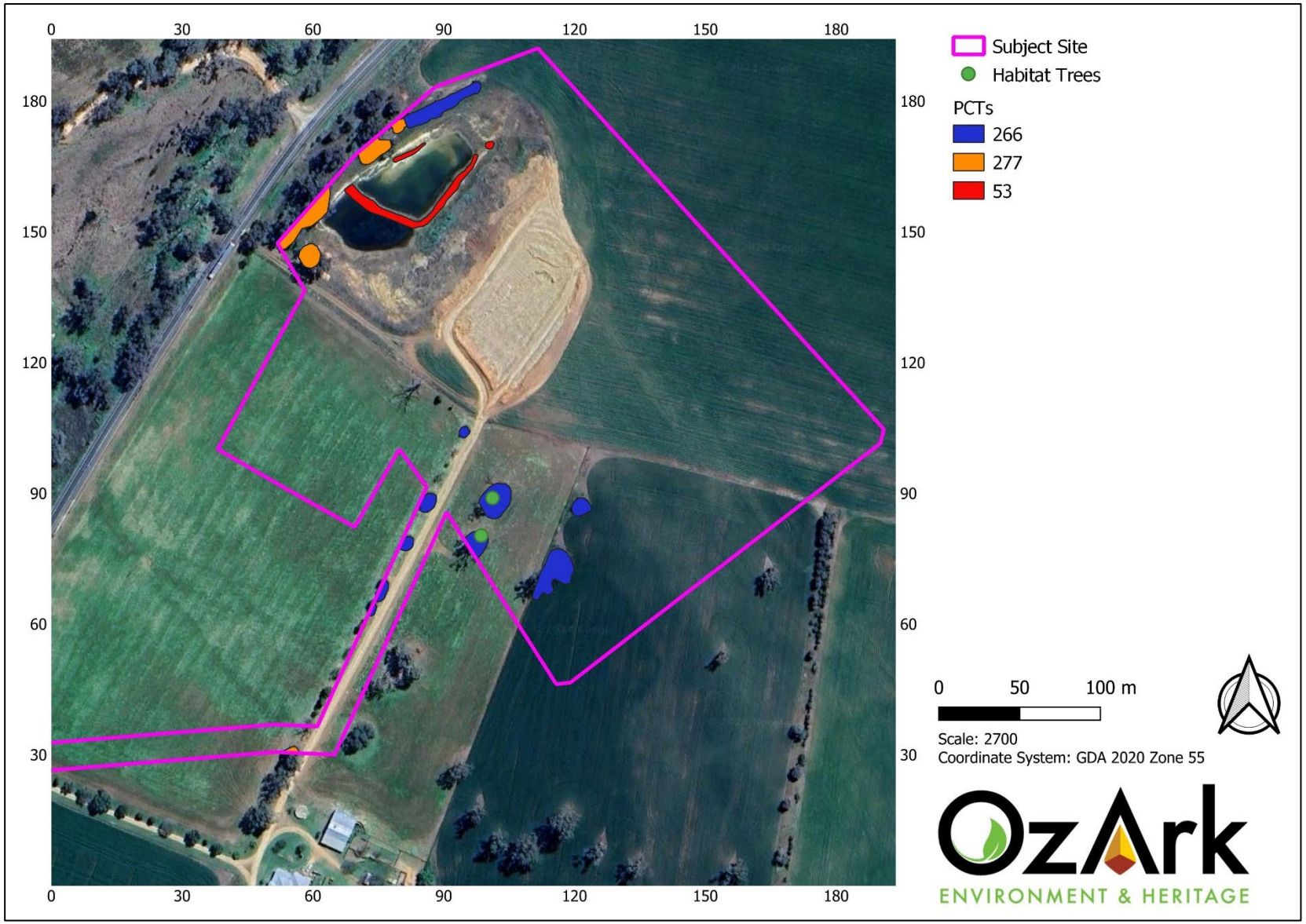


Figure 5-3. Confirmed Plant Community Types and habitat trees within the subject site (2 of 2).



Figure 5-4. Threatened Ecological Communities (BC Act-listed Critically Endangered Ecological Communities) within the subject site (1 of 2).

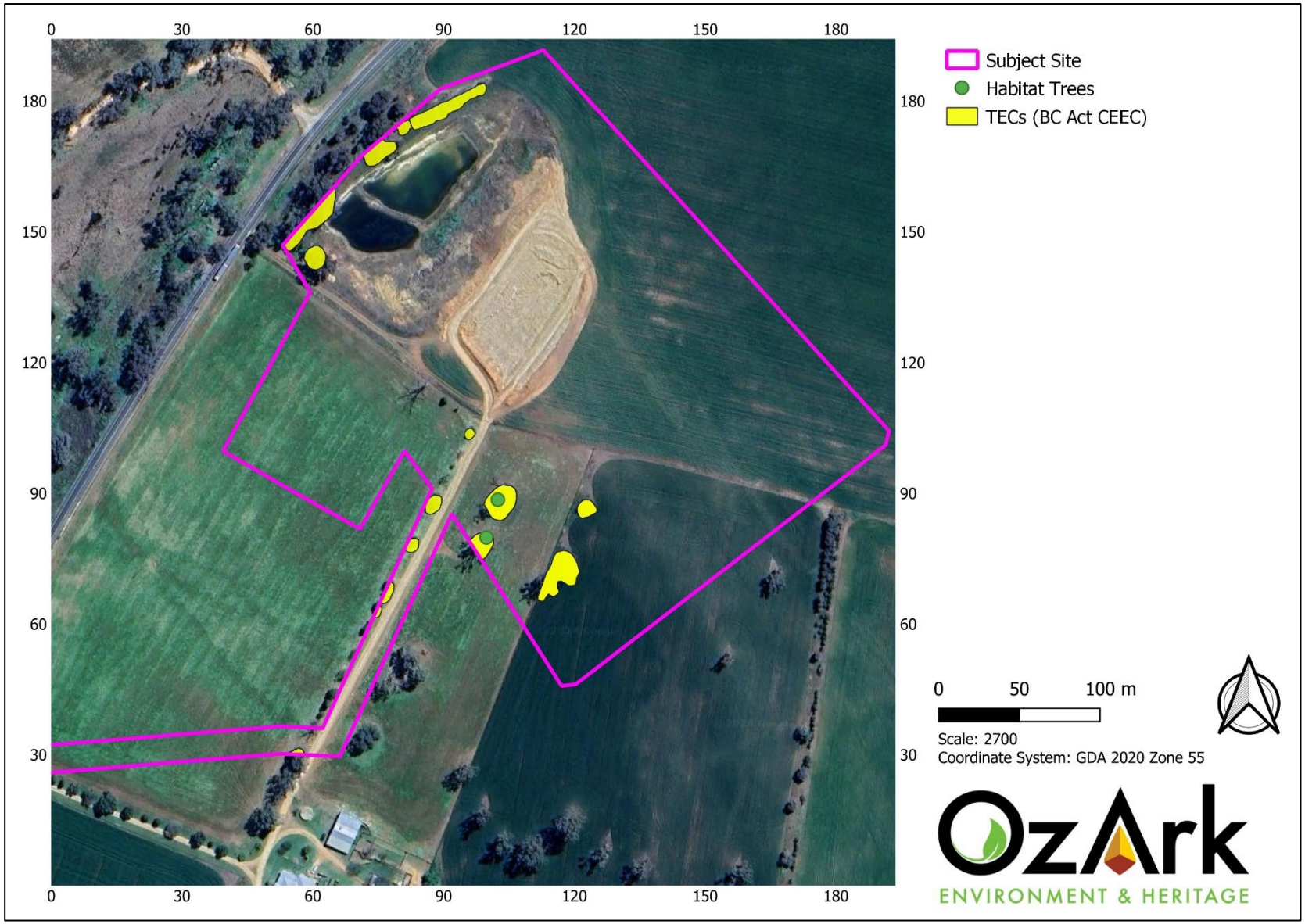


Figure 5-5. Threatened Ecological Communities (BC Act-listed Critically Endangered Ecological Communities) within the subject site (2 of 2).

5.3 THREATENED SPECIES AND POPULATIONS

A review of the Threatened Species Profiles database found 134 threatened or migratory fauna and flora species, or populations, listed under the BC and/or EPBC Acts that are known, or predicted, to occur within the Orange, Lower Slopes, and Northern Inland/Upper Slopes subregions of the NSW South Western Slopes and South Eastern Highlands Bioregions, respectively. Based on the proximity of past records, habitat requirements, and the results of the field survey, 67 listed species or populations were assessed as having a moderate-to-high likelihood of occurrence (**Appendix C**). These species and populations are listed below in **Table 5-3**.

Forty-two flora species were detected during the field survey (**Appendix B**), of twelve native species, three were associated with Threatened Ecological Communities – *Eucalyptus albens, Eucalyptus blakelyi and Eucalyptus melliodora* (White Box, Blakely's Red Gum and Yellow Box). Due to the short duration of the survey and the lack of targeted surveys, non-detection will not be treated as confirmation of absence.

Seven fauna species were observed during the field survey (**Appendix B**), although none are acknowledged as threatened or migratory under either the BC or EBPC Acts. As above, given the short duration of the field survey and the lack of targeted surveys, detection failures will not be considered as confirmation of their absence.

Table 5-3. BC and EPBC Act-listed threatened or migratory, species or populations, with the potential to be impacted by the proposal.

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km
Litoria booroolongensis	Booroolong Frog	E1,P	E	No
Litoria raniformis	Southern Bell Frog	E1,P	V	No
Aprasia parapulchella	Pink-tailed Legless Lizard	V,P	V	No
Delma impar	Striped Legless Lizard	V,P	V	No
Hoplocephalus bitorquatus	Pale-headed Snake	V,P		No
Anseranas semipalmata	Magpie Goose	V,P		No
Oxyura australis	Blue-billed Duck	V,P		No
Stictonetta naevosa	Freckled Duck	V,P		No
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	No
Ephippiorhynchus asiaticus	Black-necked Stork	E1,P		No
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	No
Circus assimilis	Spotted Harrier	V,P		Yes
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		No
Hieraaetus morphnoides	Little Eagle	V,P		No
^^Lophoictinia isura	Square-tailed Kite	V,P,3		No
Falco subniger	Black Falcon	V,P		No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km
Grus rubicunda	Brolga	V,P		No
Burhinus grallarius	Bush Stone-curlew	E1,P		No
Rostratula australis	Australian Painted Snipe	E1,P	E	No
Calidirs ferruginea	Curlew Sandpiper	E1,P	CE,C,J,K	No
Limosa limosa	Black-tailed Godwit	V,P	C,J,K	No
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3	E	No
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V,P,2	V	No
Glossopsitta pusilla	Little Lorikeet	V,P		No
Lathamus discolor	Swift Parrot	E1,P	CE	No
Neophema pulchella	Turquoise Parrot	V,P,3		No
^^*Polytelis swainsonii*	Superb Parrot	V,P,3	V	Yes
^^*Ninox connivens*	Barking Owl	V,P,3		No
^^*Tyto novaehollandiae*	Masked Owl	V,P,3		No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	V	Yes
Chthonicola sagittata	Speckled Warbler	V,P		No
Anthochaera phrygia	Regent Honeyeater	E4A,P,2	CE	Yes
Epthianura albifrons	White-fronted Chat	V,P		No
Grantiella picta	Painted Honeyeater	V,P	V	No
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		No
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		Yes
Daphoenositta chrysoptera	Varied Sittella	V,P		No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		No
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P	E	No
Petroica boodang	Scarlet Robin	V,P		No
Petroica phoenicea	Flame Robin	V,P		Yes
Stagonopleura guttata	Diamond Firetail	V,P	V	No
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	No
Phascogale tapoatafa	Brush-tailed Phascogale	V,P		No
Phascolarctos cinereus	Koala	E1,P	E	No
Cercartetus nanus	Eastern Pygmy-possum	V,P		No
Petaurus norfolcensis	Squirrel Glider	V,P		No
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	No
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	No
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		No
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	No
Chalinolobus picatus	Little Pied Bat	V,P		No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		No
Nyctophilus corbeni	Corben's Long-eared Bat	V,P	V	No
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		No
Synemon plana	Golden Sun Moth	V	V	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km
Keyacris scurra	Key's Matchstick Grasshopper	E1		No
Ammobium craspedioides	Yass Daisy	V	V	No
Cullen parvum	Small Scurf-pea	E1		No
Swainsona recta	Small Purple-pea	E1	E	No
Swainsona sericea	Silky Swainson-pea	V		No
Acacia ausfeldii	Ausfeld's Wattle	V		No
^^*Pilularia novae-hollandiae*	Austral Pillwort	E1,3		No
Prasophyllum petilum	Tarengo Leek Orchid	E1,P,2	E	No
Prasophyllum sp. Wybong		P	CE	No
Euphrasia arguta		E4A	CE	No
Grevillea wilkinsonii	Tumut Grevillea	E4A	E	No

***NSW Status:** P=Protected, V=Vulnerable, E1=Endangered, E4A=Critically Endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+ Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable

5.4 AQUATIC ECOLOGICAL COMMUNITIES

Endangered aquatic ecological communities are determined by the NSW Fisheries Scientific Committee and are listed under the FM Act as aquatic systems that have undergone a very large reduction in ecological function, geographic distribution, or genetic diversity, and continue to be affected by a threatening process (NSW Department of Primary Industries, 2016). As there are no threatened aquatic communities mapped to the subject site, it is highly unlikely that Aquatic Endangered Ecological Communities would be impacted by this proposal.

5.5 HABITAT TREES AND FEATURES

In total, two habitat trees (e.g., hollow-bearing) were recorded within the subject site (see **Figure 5-3**). These were two mature White Box (*Eucalyptus albens* – PCT 266, BC Act-listed CEEC; **Figure 5-5**) which cumulatively contained three small (< 20 cm in diameter) hollows. No large hollows or fallen timber deposits were encountered during the field survey. Large rocks were located immediately adjacent to the dam in the extraction area and the related PCT 53 and may be of value to herpetofauna (**Figure 5-6**).



Figure 5-6. Large rocks adjacent to the dam within the extraction area.

5.6 WILDLIFE CONNECTIVITY CORRIDORS

The subject site borders the fringing vegetation of Canowindra Road and is the main potential area of connectivity for wildlife due to the fragmented and degraded habitat the subject site and study area largely consists of. This area is not of ideal use, due to the proximity to the road and risk of vehicle strike.

5.7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Under the environmental assessment provisions of the EPBC Act, Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government DoEE. The EPBC Act protected matters search has identified four TECs, 33 threatened species and 10 migratory species that could possibly occur in the study area (**Appendix A**). Although four Wetlands of International Importance (Ramsar) are connected to the development area by way of watercourses, these are all several hundred kilometres from the subject site and will not be impacted by the proposal.

A summary of these matters and whether the proposal is likely to impact them is provided in **Table 5-4**.

Table 5-4. Impacts to Matters of National Environmental Significance and Commonwealth land.

Consideration	Potential impact?
Any impact on a listed threatened species or communities?	Yes (non-significant, **Appendix E**)
Any impacts on listed migratory species?	Yes (non-significant, **Appendix E**)
Any impacts on a Ramsar wetland of international importance?	No
Any impacts on a Commonwealth marine environment?	No
Any impacts on a World Heritage property?	No
Any impacts on a National Heritage place?	No
Any impacts on the Great Barrier Reef Marine Park?	No
Does the proposal involve a nuclear action (including uranium mining)?	No
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	No
Additionally, any impact (direct or indirect) on Commonwealth land?	No

6 IMPACT ASSESSMENT

6.1 CONSTRUCTION IMPACTS

6.1.1 Impacts to native vegetation and threatened ecological communities

The subject site, which is 9.541 ha in size, was largely comprised of exotic weeds and agricultural crops, bare earth, the surface of the existing McNaught's Quarry and two minor non-perennial watercourses. In total, 0.350 ha consisted of native vegetation. Although 0.010 ha of PCT 277 occurs within the intersection on Canowindra Road (**Figure 5-2**), this vegetation has already been trimmed by council and the client has indicated that no further clearing is required. As such, this additional area has not been assessed in this report.

All of PCT 266 and PCT 277 were considered an examples of the BC Act-listed CEEC *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.* As such, this proposal will remove up to 0.296 ha of this TEC.

The clearing of any native vegetation is recognised as a Key Threatening Process (KTP) under the BC Act. However, due to the relatively low magnitude of clearing required for this proposal, these impacts are not considered significant under either the BC or EPBC Act (see **Appendices D-E**), although efforts should still be made to reduce the amount of clearing required.

6.1.2 Impact to threatened fauna and associated habitat

Fifty-seven threatened or migratory fauna species, or populations, listed under the BC and

EPBC Acts are considered to have a moderate, or greater, probability of occurring at the subject site. Although no threatened fauna species or population was encountered during the deployment, targeted surveys (e.g., trapping, spotlighting) were not performed. In total, ten habitat trees that contained three small hollows were recorded within the subject site. The field survey failed to detect any nests or timber deposits. Bushrock was present in piles within the current extraction area, adjacent to PCT 53. If required to be disturbed, these should be relocated rather than disposed of, to retain habitat from reptiles and amphibians associated with that PCT.

Given the amount of native vegetation (0.350 ha) that the proposal intends to remove/modify, relative to the study area, it is highly unlikely that such works would have a significant impact on any fauna species or population (**Appendices D-E**).

6.1.3 Impact to threatened flora

Ten threatened flora species, listed under the BC and/or the EPBC Acts, were considered to have a moderate, or greater, probability of occurrence at the subject site. Although no threatened flora

species were detected during the field survey, targeted surveys were not performed, and the time of year (spring) may not have been conducive to detecting certain species. However, October is an ideal time to survey for most threatened flora species. Given the amount of vegetation (0.350 ha) that the proposal intends to remove/modify, relative to the study area, it is highly unlikely that such works would have a significant impact on any flora species (**Appendices D-E**).

6.1.4 Fauna injury and mortality

During the construction phase of the proposal, the removal of bushrock, habitat trees and other vegetation could potentially disturb or injure fauna. Further, fauna may become trapped in or choose to shelter within machinery stored at the subject site overnight (resulting in fatalities). Mitigation measures designed to reduce injury and mortality of fauna are provided in **Section 7.**

6.2 INDIRECT/OPERATIONAL IMPACTS

6.2.1 Wildlife connectivity and habitat fragmentation

The subject site borders the fringing vegetation of Canowindra Road and is the main potential area of connectivity for wildlife due to the fragmented and degraded habitat the subject site and study area largely consists of.

Although the proposal will be detrimental to overall connectivity and fauna movement patterns, removing areas of the fringing vegetation along the road, it will not sever any existing corridor in already degraded land. Fauna will still be able to traverse the site, albeit at greater secondary risks (e.g., vehicular collisions). This corridor is not of significant importance to wildlife connectivity.

6.2.2 Edge effects on adjacent native vegetation and habitat

By generating additional habitat edges, the proposal will encourage the spread of weeds into the remnant vegetation outside the direct impact footprint of the proposal.

6.2.3 Invasion and spread of weeds

The survey identified 30 exotic weed species within the subject site. Of these, two are regarded as high-threat exotics (HTEs), as per the Biodiversity Assessment Method 2020 (BAM) (see **Table 6-1**).

The proliferation of weed and pest species is an indirect impact of proposal activities. The most likely causes of weed dispersal and importation associated with the proposal include earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. Mitigation measures designed to limit the spread of weeds are provided in **Section 7**.

Table 6-1. Significant weeds encountered at the subject site.

Growth Form	Scientific Name	Common Name	HTE	WoNS	PW
FG	*Carthamus lanatus*	Saffron Thistle	Y	N	N
GG	*Eragrostis curvula*	African Lovegrass	Y	N	N

6.2.4 Invasion and spread of pests

The study area is likely already habitat for a range of pest species, such as European rabbits (*Oryctolagus cuniculus*), foxes (*Vulpes vulpes*), cats (*Felis catus)*, feral pigs (*Sus scrofa*) and wild dogs (*Canis lupus*). Mitigation measures designed to limit the spread of pests are provided in **Section 7.**

6.2.5 Invasion and spread of pathogens and disease

Several pathogens known from NSW have the potential to impact on biodiversity due to their movement and infection during construction. Of these, three are listed as a key threatening process under either the EPBC Act and/or BC Act including:

- Dieback caused by *Phytophthora* (Root Rot; EPBC Act and BC Act)
- Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis (EPBC Act and BC Act)
- Introduction and establishment of exotic Rust Fungi of the order *Pucciniales* on plants of the family *Myrtaceae* (BC Act).

These pathogens were not observed or tested for in the study area. The most likely causes of pathogen dispersal and importation associated with the proposal include earthworks, movement of soil, and attachment of plant matter to vehicles and machinery. Mitigation measures designed to limit the invasion and spread of pathogens and disease are provided in **Section 7**.

6.2.6 Noise, light and vibration

Given the current levels of noise, light and vibration caused by vehicular activity on Canowindra Road and the current operating McNaught's Quarry site, along with that produced by agricultural activities, it is unlikely that there would be a significant increase associated with the operational phase of the proposal.

6.3 CUMULATIVE IMPACTS

It is imperative to acknowledge the ecological consequences stemming from this project are not isolated occurrences; instead, they will constitute a component of the broader trend of declining biodiversity value in NSW. This BAR serves as a valuable platform for us to comprehend the

cumulative impacts resulting from a combination of historical disturbances and the ongoing repercussions of contemporary activities. Cumulative impacts underscore the idea that these losses and disturbances accumulate over time, compounding the challenges faced by ecosystems.

Disturbance to native vegetation within the NSW South Western Slopes Bioregion has been extreme, with contiguous areas of coverage largely confined to road corridors and creek/drainage lines. Paddock trees, although widely distributed across agricultural properties, will eventually expire – and the lack of recruitment will further compound biodiversity losses into the future. As in the past, today the pressure of agricultural practises and the conversion of land into crops and orchards and for natural resource extraction is driving biodiversity declines.

Although we accept that the proposal will contribute further to this loss, we have judged that it will not significantly exacerbate the issue. Whilst the loss of 0.350 ha of native vegetation is undesirable, a much greater quantity of higher quality vegetation will continue to exist within the wider study and search areas. Of greater concern is the alteration of the example of the BC Act-listed CEECs, *White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, and Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*.

We consider the loss of 0.296 hectares of these TECs regrettable, though not significant. Larger examples of this CEEC have been documented in the road corridors surrounding the currently operating quarry site and subject site for extension.

6.4 IMPACT SUMMARY

An Assessment of Significance has been conducted for each BC and EPBC Act-listed threatened species or communities that are considered to have a moderate-high likelihood of occurring within the subject site due to the presence of suitable habitat (**Appendices C, D & E**).

Based on the assessments above, the proposal is unlikely to have a significant impact on biodiversity, including on predicted populations of threatened species and threatened ecological communities (**Appendices D** & **E**).

7 AVOID, MINIMISE AND MITIGATE IMPACTS

A key part of the proponent's management of biodiversity for this proposal is the application of the 'avoid, minimise, mitigate and offset' hierarchy as follows:

1. Avoid and minimise impacts as the highest priority,

2. Mitigate impacts where avoidance is not feasible or practicable in the circumstance, and

3. Offset where residual, significant unavoidable impacts would occur

7.1 AVOIDANCE AND MINIMISATION

The following impact avoidance methods are recommended to be implemented:

- To avoid impacts associated with weed introduction and spread, inspect all machinery before entering and exiting the subject site. Machinery must be clean of all mud, soil and vegetation material.

In addition, the following minimisation measures are proposed:

- The construction works and vehicle access to the construction site is to be constrained to the minimum area practical. The proposed access will provide the sole access to the construction site.

- Material stockpiles, equipment and machinery storage and laydown areas will be consolidated within a defined impact area to minimise the overall impact footprint.

- The impact footprint will be minimised by restricting access across the site to the defined development footprint, including avoiding unnecessary vehicle and personnel movements across unused land.

7.2 MITIGATION MEASURES

Mitigation measures are to be undertaken during the construction and operational phases, including managing the vegetation clearing process, weed management, and installation of erosion and sediment controls as appropriate.

The following mitigation measures are recommended for implementation (see **Table 7-1**).

Table 7-1. Mitigation measures and environmental safeguards.

Aspect	Environmental safeguards	Responsibility	Timing
General	1. Any change in design outside the assessed impact footprint (subject site) will require further ecological survey and assessment. 2. All personnel working on site will be made aware of the environmental sensitivities of the site and safeguards/mitigations to be implemented, e.g., site induction and 'toolbox' style briefings. In particular, this must include the White Box and Blakely's Red Gum-Yellow Box TEC (**Section 5.2** and photographs in **Appendix B**), all native vegetation, and the potential threatened flora and fauna species listed in **Table**.	Proponent	Pre-construction, construction, operation
Clearing of native vegetation (including habitat trees)	3. All construction personnel should be inducted to be aware that any deliberate or accidental damage of a stand of native vegetation outside the subject site has legislative consequences under Part 4 or 5 of the EP&A Act. Evidence of all personnel receiving this induction would be kept on file (signed induction sheets etc.). 4. Before starting work, a physical vegetation clearing boundary at the approved clearing limit is to be demarcated and implemented. The delineation of such a boundary may include the use of temporary fencing, parawebbing, etc. 5. Where possible, hollow-bearing trees should be avoided. If any hollow-bearing trees need to be removed, the following measures should be implemented: a. A pre-clearance survey should be conducted by a suitably qualified ecologist prior to any vegetation disturbance. All potential habitat trees must be clearly marked during the pre-clearance survey. b. Non-habitat trees should be cleared prior to the removal of habitat trees. c. All habitat tree removal must occur under the supervision of an ecologist or fauna spotter catcher, to ensure that no animals are injured. d. Prior to felling, the tree should be struck with an excavator (or similar equipment) to scare resident fauna away. e. Once fallen, the habitat tree should remain in place for 24 hours to enable time for any fauna to disperse. 6. Vegetation would be removed in such a way as to avoid damage to surrounding vegetation. 7. Groundcover disturbance would be kept to a minimum. 8. Any stockpile and compound sites should be located using the following criteria: a. At least 40 m away from the nearest waterway b. In areas of low ecological conservation significance (i.e., previously disturbed land) c. On relatively level ground d. Outside the one in 10-year Average Recurrence Interval (ARI) floodplain	Proponent / contractor	Pre-construction, construction, operation

Aspect	Environmental safeguards	Responsibility	Timing
	9. Stockpiling materials and equipment and parking vehicles would be avoided within the dripline (extent of foliage cover) of any tree. 10. Where possible, vegetation to be removed would be mulched on-site and re-used to stabilise disturbed areas.		
Accidental death of fauna	11. If habitat trees are to be removed, a fauna spotter catcher should be present during their removal to ensure that no animals are injured. The fauna spotter catcher should conduct a preclearance check of all fallen timber, surface debris, and habitat trees to be removed. 12. Where fauna is encountered, the fauna spotter catcher will remove the animal(s) and relocate them nearby, or if necessary, deliver them to a veterinarian or wildlife carer for rehabilitation.	Contractor	Construction
Light	13. Any artificial lighting to be used during construction or operation should follow the Best Practice Lighting Design within the National Light Pollution Guidelines (DoEE 2020).	Proponent, contractor	Construction
Soil Management	14. Install erosion and sediment controls in line with Landcom's Managing Urban Stormwater, Soils & Construction Guidelines (The Blue Book. Landcom 2004). 15. Where practicable, spread mulch made from vegetation cleared on site on areas of bare soil to stabilise, preventing dust and erosion. 16. Erosion and sedimentation controls are to be checked and maintained on a regular basis. This includes clearing of sediment from behind barriers and after heavy rainfall events. 17. Erosion and sediment control measures are not to be removed until the works are complete, and areas are stabilised. 18. Stockpile topsoil removed to be redistributed across site at completion of construction. 19. Implement dust suppression activities.	Contractor	Pre-construction and construction
Introduction and spread of priority weeds and pathogens	20. Construction crew should be briefed on the identification of significant weeds that occur on site during inductions (**Table 6-1**). 21. If declared priority weeds are identified during construction, they will be managed according to the requirements of the *Biosecurity Act 2015*. 22. Construction machinery (bulldozers, excavators, trucks, loaders, and graders) will be cleaned using a high-pressure washer or other suitable device before entering and exiting work sites. 23. Machinery will be inspected by designated personnel following washdown to ensure no soil, mud, or vegetative material remains. Records of inspections to be maintained. 24. All pesticides will be used in accordance with the requirements on the label. Any person carrying out pesticide (including herbicide) application will be trained to do so and have the proper certificate of completion/competency or statement of attainment issued by a registered training organisation. 25. Keep records of any weed control activities that take place.	Contractor	Construction

Aspect	Environmental safeguards	Responsibility	Timing
Disturbance to fallen timber, dead wood, and bush rock	26. Any fallen timber, dead wood, and bush rock encountered on site would be left *in situ* (where possible) or relocated to a suitable place nearby. 27. Rock would be removed with suitable machinery so as not to damage the underlying rock or result in excessive soil disturbance.	Contractor	Construction
Rehabilitating cleared areas	28. Revegetation of any bare soil or cleared areas with locally occurring native flora species typical of the original habitat types is usually recommended. 29. Stockpiled topsoil to be re-spread over cleared areas.	Proponent, contractor	Construction and post-construction
Exacerbating invasive fauna	30. All food scraps and rubbish are to be appropriately disposed of in sealed receptacles to prevent providing forage habitats for foxes, rats, dogs, and cats.	Contractor	Construction
Increased risk of fire	31. If any “hot works” are to be undertaken, these activities will not take place on days of extreme fire danger (where possible).	Contractor	Construction

8 CONCLUSION

OzArk have been engaged by R.W. Corkery to complete the above BAR for McNaught's Quarry.

An onsite field survey, conducted on the 25th of October 2023, identified 0.350 ha of native vegetation belonging to three PCTs within the impact footprint:

- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains,
- PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, and
- PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

PCT 266 and PCT 277 were judged to be examples of the BC Act-listed CEEC: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. As such, up to 0.296 ha of this CEEC will be cleared for this proposal.

The aforementioned CEEC also occurs on Canowindra Road, a small area (0.010 ha) of which has been impacted by road upgrades required to support this proposal. Considering that mature vegetation has already been trimmed by Cabonne Shire Council, and the client has indicated that no further clearing is required in this area, this area of native vegetation clearing has not been included in the impact assessments of this report.

In total, two habitat trees were recorded within the subject site, which cumulatively contained three small hollows. No large hollows or fallen timber deposits were encountered during the field survey.

No permits are required in accordance with the WM or FM Act as no watercourses occur within the subject site, and no KFH or PRL occurs.

Fifty-seven threatened or migratory fauna species or populations and 10 threatened flora species were considered to have a moderate or greater probability of occurrence at the subject site. However, no listed species or population were encountered during the field survey. Subject to implementation of the mitigation measures proposed, it has been concluded that no significant biodiversity impacts are likely, including to any threatened or migratory species, population or ecological community, or their habitats. As such, the proposal does not require referral to the DCCEEW in respect of these matters or trigger the need for a SIS or a BDAR.

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment. If entry into the BOS is triggered by a changed footprint impacting

additional native vegetation, then additional field work and reporting completed according to the BAM may be required.

9 REFERENCES

Briggs, J and Leigh, J 1996, *Rare or Threatened Australian Plants*, CSIRO Publishing, Collingwood, Victoria

Bureau of Meteorology 2023a, *Bureau of Meteorology Climate Averages*, viewed November 2023, <http://www.bom.gov.au/climate/averages>

– 2023b, *Atlas of Groundwater Dependent Ecosystems*, viewed November 2023 http://www.bom.gov.au/water/groundwater/gde/map.shtml

Churchill, S 2008, *Australian bats - 2nd Edition*, Allen and Unwin, Crows Nest, NSW

Cogger, H 2014, *Reptiles and Amphibians of Australia,* CSIRO Publishing, Collingwood, Victoria

Cropper, S 1993, *Management of Endangered Plants*, CSIRO Publishing, Collingwood, Victoria

Cunningham, GM., Mulham, WE., Milthorpe, Pl. and Leigh, JH 1992, *Plants of Western New South Wales.* CSIRO Publishing, Collingwood, Victoria

Department of the Environment 2013, *Matters of National Environmental Significance: Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*, viewed November 2023, <http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf>

Department of the Environment 2018, *Consultation Document on Listing Eligibility and Conservation Actions Hirundapus caudacutus (White-throated Needletail)*, viewed December 2023, <https://www.dcceew.gov.au/sites/default/files/env/consultations/a171b06e-3690-4ca9-a560-170ee5d806b3/files/consultation-document-hirundapus-caudacutus.pdf>

Department of the Environment and Energy 2023a, *Protected Matters Search Tool*, viewed November 2023, <http://www.environment.gov.au/epbc/db/index.html>

– 2023b, *Species profile and threats database*, viewed November 2023, <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

– 2023c, *Register of Critical Habitat*, viewed November 2023, <http://www.environment.gov.au/cgi-bin/sprat/public/publicregisterofcriticalhabitat.pl>

– 2023d, *Weeds of National Significance*, viewed November 2023, <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html>

Department of Environment and Climate Change 2007, *Threatened species assessment guidelines: The assessment of significance*, Department of Environment and Climate Change, Hurstville, NSW

Department of Environment and Conservation 2004 [Working draft], *Threatened Species Survey and Assessment: Guidelines for developments and activities*, New South Wales Department of Environment and Conservation, Hurstville, NSW

– 2010a, *Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia Barton, ACT

– 2010b, *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia Barton, ACT

– 2010c, *Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia Barton, ACT

Department of Land and Water Conservation 2002, *The NSW State Groundwater Dependent Ecosystems Policy,* <http://www.water.nsw.gov.au/__data/assets/pdf_file/0005/547844/groundwater_dependent_ecosystem_policy_300402.pdf>

Department of Planning and Environment 2003, Retrieved from South Western Slopes bioregion chapter (10) of 'Bioregions of New South Wales', viewed April 2023 <https://www.environment.nsw.gov.au/bioregions/NSWSouthWesternSlopesBioregion.htm>

Department of Planning and Environment 2022a, Koala (*Phascolarctos cinereus*). Biodiversity Assessment Method Survey Guide.

– 2022b, NSW State Vegetation Type Map: C1.1.M1.1, <https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map>

– 2022c, Threatened Reptiles. Biodiversity Assessment Method Survey Guide. <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/threatened-reptiles-biodiversity-assessment-method-survey-guide-20220563.pdf>

Department of Primary Industries 2016, *Grasses of the New South Wales slopes and adjacent plains*. Department of Primary Industries

– 2023a, *NSW WeedWise: Priority weeds for the Central West,* viewed November 2023 <https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=63

– 2023b, *Key Fish Habitat Maps*, viewed November 2023

– 2023c, *Freshwater threatened species distribution maps*, viewed November 2023 <https://www.dpi.nsw.gov.au/fishing/threatened-species/threatened-species-distributions-in-nsw/freshwater-threatened-species-distribution-maps>

Department of Planning, Industry and Environment 2020a, *Surveying Threatened Plants and Their Habitats. NSW Survey Guide for the Biodiversity Assessment Method.* <https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method>

– 2020b, *NSW Survey Guide for Threatened Frogs. A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method.* <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/nsw-survey-guide-for-threatened-frogs-200440.pdf>

Fairfull, S and Witheridge, G 2003, *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*, NSW Fisheries, Cronulla, NSW, viewed November 2023, <https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/633505/Why-do-fish-need-to-cross-the-road_booklet.pdf>

Fairfull, S. (2013). *Policy and Guidelines for Fish Habitat Conservation and Management.* Sydney: NSW Department of Primary Industries.

Frith, HJ (Ed) 2007, *Complete book of Australian birds*, Readers Digest, Surry Hills, NSW

Harden, G (Ed) 1992-2002, *Flora of New South Wales Vols 1, 2, 3 and 4*, NSW University Press, Kensington, NSW

Keith, D. 2004, *Ocean Shores to Desert Dunes: The Vegetation of New South Wales and the ACT.* Department of Environment and Conservation NSW.

Lintermans, M 2007, *Fishes of the Murray-Darling Basin: An introductory guide.*

Mitchell. 2002, *Descriptions for NSW (Mitchell) Landscapes.* NSW: Department of Environment and Climate Change.

NSW Roadside Environment Committee, Managing Roadsides Implementation. < https://roads-waterways.transport.nsw.gov.au/documents/about/environment/rec-fact3-managing-roadsides-implementation.pdf>

Office of Environment and Heritage 2016, *NSW Guide to Surveying Threatened Plants*, Office of Environment and Heritage, Sydney South, NSW, viewed November 2023, <http://www.environment.nsw.gov.au/resources/threatenedspecies/160129-threatened-plants-survey-guide.pdf>

– 2018, *Threatened Species Test of Significance Guidelines*, viewed November 2023, <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/threatened-species-test-significance-guidelines-170634.pdf>

– 2023a, *BioNet Vegetation Classification database*, viewed November 2023, <https://www.environment.nsw.gov.au/NSWVCA20PRapp/>

– 2023b, *BioNet (Atlas of NSW Wildlife) Database*, data downloaded June 2023, <http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx>

– 2023c, *Threatened Biodiversity Data Collection* database, viewed November 2023, <https://data.nsw.gov.au/data/dataset/nsw-bionet-threatened-entity-profile-data-collection8f027>

– 2023d, *Threatened biodiversity profile search*, viewed November 2023, <http://www.environment.nsw.gov.au/threatenedSpeciesApp/>

– 2023e, *Critical Habitat Register*, viewed November 2023, <http://www.environment.nsw.gov.au/criticalhabitat/CriticalHabitatProtectionByDoctype.htm>

Richardson, F.J., Richardson, R.G. and Shepherd, R.C.H. 2011, *Weeds of the south-east: An identification guide for Australia*. R.G and F.J. Richardson, Meredith, Victoria.

The Royal Botanic Gardens and Domain Trust 2022, *PlantNET*. viewed November 2023, <www.plantnet.rbgsyd.nsw.gov.au>

Simpson, K and Day, N 2010, *Field guide to the birds of Australia*, 8th Edition, Penguin Books Australia, Victoria

Thackway, R and Cresswell I.D 1995, *An Interim Biogeographic Regionalisation for Australia: A Framework for Setting Priorities in the National Reserves System Cooperative Program*, Australian Nature Conservation Agency, Canberra, viewed November 2023,

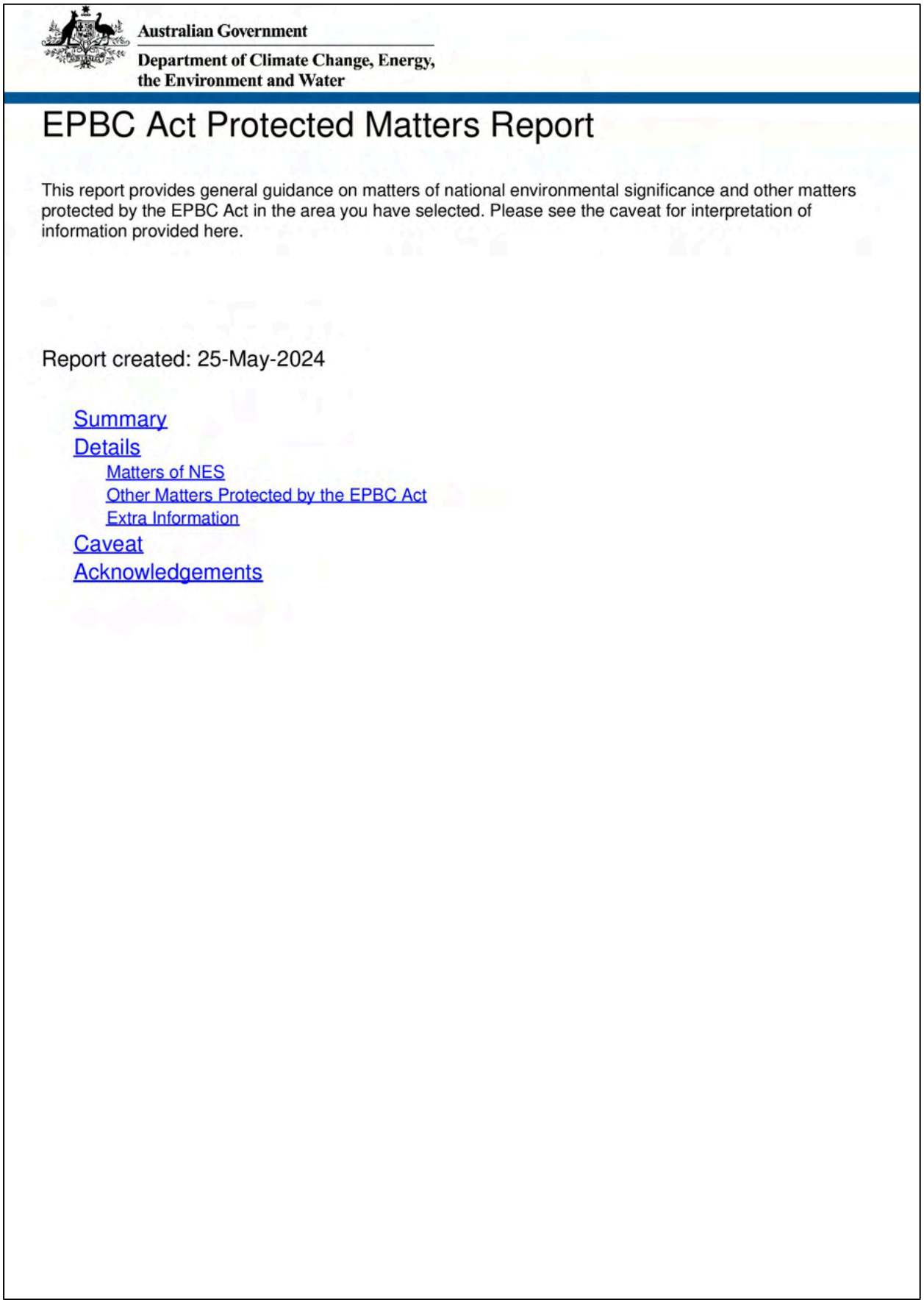
<https://www.environment.gov.au/system/files/resources/4263c26f-f2a7-4a07-9a29-b1a81ac85acc/files/ibra-framework-setting-priorities-nrs-cooperative-program.pdf>

Triggs, B 1996, *Tracks, scats and other traces: a field guide to Australian mammals*, Oxford University Press, Melbourne, Victoria

Van Dyck, S and Strahan, R (Eds) 2008, *The mammals of Australia (3rd edition)*. Reed New Holland, Sydney, NSW

APPENDIX A – DATABASE SEARCH RESULTS

EPBC Act Protected Matters Report



Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 25-May-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	33
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Banrock station wetland complex	700 - 800km upstream from Ramsar site
Hattah-kulkyne lakes	500 - 600km upstream from Ramsar site
Riverland	700 - 800km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		

Scientific Name	Threatened Category	Presence Text
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Lophochroa leadbeateri leadbeateri		
Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat may occur within area
Melanodryas cucullata cucullata		
South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysostoma		
Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area
Polytelis swainsonii		
Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Stagonopleura guttata		
Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
FISH		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Species or species habitat may occur within area
PLANT		
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Lepidium aschersonii		
Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Vincetoxicum forsteri listed as Tylophora linearis		
[92384]	Endangered	Species or species habitat may occur within area
REPTILE		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

© Commonwealth of Australia
Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

BioNET Atlas search – threatened species predicted to occur within the Inland Slopes subregion of the NSW South Western Slopes Bioregion.

Class	Scientific Name	Common Name	NSW status*	Comm. status+	Records
Amphibia	*Crinia sloanei*	Sloane's Froglet	E1,P	E	267
Amphibia	*Litoria booroolongensis*	Booroolong Frog	E1,P	E	37
Amphibia	*Litoria raniformis*	Southern Bell Frog	E1,P	V	12
Reptilia	*Aprasia parapulchella*	Pink-tailed Legless Lizard	V,P	V	192
Reptilia	*Delma impar*	Striped Legless Lizard	V,P	V	4
Reptilia	*Varanus rosenbergi*	Rosenberg's Goanna	V,P		6
Reptilia	*Hoplocephalus bitorquatus*	Pale-headed Snake	V,P		P
Aves	*Leipoa ocellata*	Malleefowl	E1,P	V	4
Aves	*Anseranas semipalmata*	Magpie Goose	V,P		5
Aves	*Oxyura australis*	Blue-billed Duck	V,P		13
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		7
Aves	*Apus pacificus*	Fork-tailed Swift	P	C,J,K	17
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	31
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		K
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	3
Aves	*Ixobrychus flavicollis*	Black Bittern	V,P		1
Aves	*Circus assimilis*	Spotted Harrier	V,P		35
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		40
Aves	*^^Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		2
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		164
Aves	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		9
Aves	*^^Pandion cristatus*	Eastern Osprey	V,P,3		1
Aves	*^Falco hypoleucos*	Grey Falcon	V,P,2	V	3
Aves	*Falco subniger*	Black Falcon	V,P		55
Aves	*Grus rubicunda*	Brolga	V,P		7
Aves	*Ardeotis australis*	Australian Bustard	E1,P		1
Aves	*Burhinus grallarius*	Bush Stone-curlew	E1,P		15
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	1
Aves	*Actitis hypoleucos*	Common Sandpiper	P	C,J,K	3
Aves	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	22
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	3
Aves	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	6
Aves	*Gallinago hardwickii*	Latham's Snipe	P	J,K	28
Aves	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	P
Aves	*Tringa nebularia*	Common Greenshank	P	C,J,K	4
Aves	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	5
Aves	*Gelochelidon nilotica*	Gull-billed Tern	P	C	1
Aves	*Hydroprogne caspia*	Caspian Tern	P	J	1
Aves	*Thalasseus bergii*	Crested Tern	P	J	1

Class	Scientific Name	Common Name	NSW status*	Comm. status+	Records
Aves	^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3	E	291
Aves	^*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V	96
Aves	^*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		8
Aves	^^*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	V,P,3		5
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		196
Aves	*Lathamus discolor*	Swift Parrot	E1,P	CE	184
Aves	*Neophema chrysostoma*	Blue-winged Parrot	V,P	V	5
Aves	^^*Neophema pulchella*	Turquoise Parrot	V,P,3		268
Aves	^^*Polytelis swainsonii*	Superb Parrot	V,P,3	V	2692
Aves	*Cuculus optatus*	Oriental Cuckoo	P	C,J,K	1
Aves	^^*Ninox connivens*	Barking Owl	V,P,3		57
Aves	^^*Ninox strenua*	Powerful Owl	V,P,3		15
Aves	^^*Tyto novaehollandiae*	Masked Owl	V,P,3		9
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P	V	3044
Aves	*Pycnoptilus floccosus*	Pilotbird	P	V	1
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		665
Aves	^*Anthochaera phrygia*	Regent Honeyeater	E4A,P,2	CE	133
Aves	*Certhionyx variegatus*	Pied Honeyeater	V,P		1
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		69
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	21
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		345
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		592
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		263
Aves	*Pachycephala inornata*	Gilbert's Whistler	V,P		39
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		944
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		293
Aves	*Petroica boodang*	Scarlet Robin	V,P		413
Aves	*Petroica phoenicea*	Flame Robin	V,P		438
Aves	*Petroica rodinogaster*	Pink Robin	V,P		2
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P	V	896
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	47
Mammalia	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		P
Mammalia	*Macrotis lagotis*	Bilby	E4,P	V	3
Mammalia	*Phascolarctos cinereus*	Koala	E1,P	E	115
Mammalia	*Cercartetus nanus*	Eastern Pygmy-possum	V,P		6
Mammalia	*Petaurus australis*	Yellow-bellied Glider	V,P	V	2

Class	Scientific Name	Common Name	NSW status*	Comm. status+	Records
Mammalia	*Petaurus norfolcensis*	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		544
Mammalia	*Petaurus norfolcensis*	Squirrel Glider	V,P		1271
Mammalia	*Petauroides volans*	Southern Greater Glider	E1,P	E	124
Mammalia	*Bettongia lesueur graii*	Boodie, Burrowing Bettong (mainland)	E4,P	X	1
Mammalia	*Petrogale penicillata*	Brush-tailed Rock-wallaby	E1,P	V	3
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	394
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		25
Mammalia	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	19
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		15
Mammalia	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		20
Mammalia	*Myotis macropus*	Southern Myotis	V,P		20
Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	9
Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		4
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		106
Mammalia	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	8
Insecta	*Synemon plana*	Golden Sun Moth	V	V	134
Insecta	*Keyacris scurra*	Key's Matchstick Grasshopper	E1		5
Flora	*Caesia parviflora var. minor*	Small Pale Grass-lily	E1		3
Flora	*Tylophora linearis*		V	E	25
Flora	*Ammobium craspedioides*	Yass Daisy	V	V	1276
Flora	*Brachyscome muelleroides*	Claypan Daisy	V	V	1
Flora	*Leucochrysum albicans subsp. tricolor*	Hoary Sunray	E1	E	33
Flora	*Senecio garlandii*	Woolly Ragwort	V		72
Flora	*Carex raleighii*	Raleigh Sedge	E1		1
Flora	*Bossiaea fragrans*		E4A	CE	55
Flora	*Cullen parvum*	Small Scurf-pea	E1		7
Flora	^^*Indigofera efoliata*	Leafless Indigo	E1,3	E	5
Flora	*Pultenaea humilis*	Dwarf Bush-pea	V		8
Flora	*Swainsona recta*	Small Purple-pea	E1	E	736
Flora	*Swainsona sericea*	Silky Swainson-pea	V		232
Flora	*Acacia ausfeldii*	Ausfeld's Wattle	V		4005
Flora	*Acacia meiantha*		E1	E	P
Flora	*Acacia phasmoides*	Phantom Wattle	V	V	95
Flora	^^*Pilularia novae-hollandiae*	Austral Pillwort	E1,3		5
Flora	*Eucalyptus aggregata*	Black Gum	V	V	1
Flora	*Eucalyptus alligatrix subsp. alligatrix*		V	V	2
Flora	*Eucalyptus cannonii*	Capertee Stringybark	V		5

Class	Scientific Name	Common Name	NSW status*	Comm. status+	Records
Flora	*Eucalyptus robertsonii subsp. hemisphaerica*	Robertson's Peppermint	V	V	P
Flora	*Homoranthus darwinioides*	Fairy Bells	V	V	P
Flora	*^Caladenia arenaria*	Sand-hill Spider Orchid	E1,P,2	E	6
Flora	*^Caladenia concolor*	Crimson Spider Orchid	E1,P,2	V	504
Flora	*^Caladenia rosella*	Rosella Spider Orchid	E4,P,2	E	1
Flora	*^Caladenia tessellata*	Thick Lip Spider Orchid	E1,P,2	V	1
Flora	*^Diuris tricolor*	Pine Donkey Orchid	V,P,2		21
Flora	*^Prasophyllum petilum*	Tarengo Leek Orchid	E1,P,2	E	25
Flora	*Prasophyllum sp. Wybong*		P	CE	P
Flora	*Euphrasia arguta*		E4A	CE	1
Flora	*Euphrasia collina subsp. muelleri*	Mueller's Eyebright	E1	E	P
Flora	*Amphibromus fluitans*	Floating Swamp Wallaby-grass	V	V	30
Flora	*Austrostipa wakoolica*	A spear-grass	E1	E	P
Flora	*Dichanthium setosum*	Bluegrass	V	V	3
Flora	*Grevillea wilkinsonii*	Tumut Grevillea	E4A	E	17
Flora	*Persoonia marginata*	Clandulla Geebung	V,P	V	P
Flora	*Pomaderris cotoneaster*	Cotoneaster Pomaderris	E1	E	P
Flora	*Pomaderris queenslandica*	Scant Pomaderris	E1		4
Flora	*Zieria ingramii*	Keith's Zieria	E1	E	2
Flora	*Zieria obcordata*	Granite Zieria	E1	E	28
Flora	*Thesium australe*	Austral Toadflax	V	V	66
Flora	*Pimelea bracteata*		E4A		1

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+ Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable.
- Number of Records: P = predicted to occur.

BioNET Atlas search – threatened ecological communities predicted to occur within the Inland Slopes subregion of the NSW South Western Slopes Bioregion.

Community Name	*NSW status	+Comm. Status	Records
Alpine Sphagnum Bogs and Associated Fens		E	K
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		E	K
Central Hunter Valley eucalypt forest and woodland		CE	K
Coolac-Tumut Serpentinite Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions	E3		K
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions		E	K
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	E3		K
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		E	K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3		K
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland		CE	K
Poplar Box Grassy Woodland on Alluvial Plains		E	K
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	E3		P
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion		E	K
Weeping Myall Woodlands		E	K
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	E4B		K
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE	K

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+Comm. Status: CE=Critically endangered, E=Endangered, V=Vulnerable.
- Number of Records: P = predicted to occur.

BioNET Atlas search – Key Threatening Processes predicted to occur within the Inland Slopes subregion of the NSW South Western Slopes Bioregion.

Threats	NSW status	Comm. status	Records
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	P
Alteration of habitat following subsidence due to longwall mining	KTP		P
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		P
Anthropogenic Climate Change	KTP	KTP	P
Bushrock removal	KTP		P
Clearing of native vegetation	KTP	KTP	P
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	KTP	KTP	P
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	KTP	KTP	P
Competition from feral honey bees, *Apis mellifera* L.	KTP		P
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		P
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758	KTP		P
Herbivory and environmental degradation caused by feral deer	KTP		P
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		P
Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	P
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	P
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	P
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	P
Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.)	KTP		P
Invasion and establishment of exotic vines and scramblers	KTP		P
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		P
Invasion and establishment of the Cane Toad (*Bufo marinus*)	KTP	KTP	P
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		P
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		P
Invasion of native plant communities by exotic perennial grasses	KTP		P
Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW	KTP		P
Invasion, establishment and spread of Lantana (*Lantana camara L. sens*. Lat)	KTP		P
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	P
Loss of Hollow-bearing Trees	KTP		P
Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		P
Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		P
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		P
Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)	KTP	KTP	P
Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	P
Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758	KTP	KTP	P
Removal of dead wood and dead trees	KTP		P

Biodiversity Values Map

NSW GOVERNMENT Department of Planning and Environment

Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to your local council to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

Biodiversity Values Map and Threshold Report

Date of Report Generation		25/05/2024 12:13 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	**Does the development Footprint intersect with BV mapping?**	no
1.2	**Was ALL BV Mapping within the development footprinted added in the last 90 days?** (dark purple mapping only, no light purple mapping present)	no
1.3	**Date of expiry of dark purple 90 day mapping**	N/A
1.4	**Is the Biodiversity Values Map threshold exceeded?**	no
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	**Size of the development or clearing footprint**	87,482.7 sqm
2.2	**Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint)	4,564.8 sqm
2.3	**Method for determining Minimum Lot Size**	LEP
2.4	**Minimum Lot Size** (10,000sqm = 1ha)	1,000,000 sqm
2.5	**Area Clearing Threshold** (10,000sqm = 1ha)	10,000 sqm
2.6	**Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance)	no
REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)		**no**

Page 1 of 4

Department of Planning and Environment

What do I do with this report?

• If the result above indicates the BOS Threshold has been exceeded, your local council **may require** a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor.

• If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.

• If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.

• If **all** Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

For more detailed advice about actions required, refer to the **Interpreting the evaluation report** section of the Biodiversity Values Map Threshold Tool User Guide .

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the Guide for reviewing area clearing threshold results from the BMAT Tool.

Acknowledgement

I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: _____ Date: _____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

25/05/2024 12:13 PM

Page 2 of 4

Department of Planning and Environment

Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The BV map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Scheme applies to a clearing or development proposal. You have used the Threshold Tool in the map viewer to generate this BV Threshold Report for your nominated area. This report calculates results for your proposed development footprint and indicates whether Council may require you to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

What's new? For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the Biodiversity Values Map webpage.

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the Biodiversity Values Map Review webpage.

If you need help using this map tool see our Biodiversity Values Map and Threshold Tool User Guide or contact the Map Review Team at map.review@environment.nsw.gov.au or on 1800 001 490.

Biodiversity Values Map



476.8 0 238.40 476.8 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

25/05/2024 12:13 PM

Imagery © Airbus DS/Spot Image 2016

© NSW Department of Customer Service, Basemaps 2019

© NSW Department of Planning and Environment

The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

APPENDIX B – FIELD SURVEY RESULTS

Flora species list

In total, 42 plant species were detected during the October field survey. Of these, twelve were native (28.57%) and 30 were introduced (71.43%). Of the introduced species, three are listed as High-threat Exotic species (HTE) under the Biodiversity Assessment Method (2020).

[1]Growth Form	Scientific Name	Common Name	[2]Status	[3]HTE	[4]WoNS	[5]PW
FG	*Wahlenbergia* sp.	Bluebell	N	-	-	-
GG	*Austrostipa scabra*	Rough speargrass	N	-	-	-
GG	*Chloris truncata*	Windmill Grass	N	-	-	-
GG	*Juncus* sp.		N	-	-	-
GG	*Enteropogon ramosus*	Curly Windmill Grass	N	-	-	-
GG	*Paspalum distichum*	Water Couch	N	-	-	-
GG	*Rytidosperma bipartitum*	Wallaby Grass	N	-	-	-
TG	*Brachychiton poulneus*	Kurrajong	N	-	-	-
TG	*Eucalyptus albens*	White Box	N	-	-	-
TG	*Eucalyptus blakelyi*	Blakely's Red Gum	N	-	-	-
TG	*Eucalyptus malacoxylon*	Apple Box	N	-	-	-
TG	*Eucalyptus melliodora*	Yellow Box	N	-	-	-
FG	*Conyza bonariensis*	Flaxleaf Fleabane	I	N	N	N
FG	*Arctotheca calendula*	Capeweed	I	N	N	N
FG	*Capsella bursa-pastoris*	Shepherd's Purse	I	N	N	N
FG	*Carthamus lanatus*	Saffron Thistle	I	Y	N	N
FG	*Cirsium vulgare*	Spear Thistle	I	N	N	N
FG	*Foeniculum vulgare*	Fennel	I	N	N	N
FG	*Galium aparine*	Cleavers	I	N	N	N
FG	*Glandularia aristagera*	Mayne's Pest	I	N	N	N
FG	*Hypochaeris radicata*	Catsear	I	N	N	N
FG	*Latuca serriola*	Prickly Lettuce	I	N	N	N
FG	*Lepidium africanum*	African Peppercress	I	N	N	N
FG	*Marrubium vulgare*	White Horehound	I	N	N	N
FG	*Plantago lanceolata*	Plantain	I	N	N	N
FG	*Onopordum acanthium*	Scotch Thistle	I	N	N	N
FG	*Rumex crispus*	Curled Dock	I	N	N	N
FG	*Rumex acetosella*	Sorrel	I	N	N	N
FG	*Sonchus oleraceus*	Common Sowthistle	I	N	N	N
FG	*Silybum marianum*	Variegated Thistle	I	N	N	N
FG	*Verbena bonariensis*	Purple Top	I	N	N	N
GG	*Avena barbata*	Bearded Oats	I	N	N	N
GG	*Bromus hordeaceous*	Soft Brome	I	N	N	N
GG	*Horedum leporidum*	Barley Grass	I	N	N	N
GG	*Triticum aestivum*	Common Wheat	I	N	N	N
GG	*Eragrostis curvula*	African Lovegrass	I	Y	N	N

[1]Growth Form	Scientific Name	Common Name	[2]Status	[3]HTE	[4]WoNS	[5]PW
GG	*Lolium perenne*	Perennial Ryegrass	I	N	N	N
SG	*Citrus x taitensis*	Lemon Tree	I	N	N	N
SG	*Rosa sp.*	Rose	I	N	N	N
TG	*Callistemon sp.*		I	N	N	N
TG	*Melia azedarach*	White Cedar	I	N	N	N
TG	*Schinus molle*	Peppercorn	I	N	N	N

1: FG = Forb, GG = Grass and Grass-like, SG = Shrub, TG = Tree, EG = Fern, OG = Other

2: N = Native I = Introduced;

3: HTE = High Threat Exotic under the BAM (2020);

4: Weed of National Significance;

5: Priority Weed for the Central Tablelands (Cabonne LGA).

Fauna species list

In total, seven fauna species were identified at site during the October 2023 field survey. All were native to the local area.

Class	Scientific Name	Common Name	*Status
Aves	*Anas superciliosa*	Pacific Black Duck	N
Aves	*Gymnorhina tibicen*	Australian Magpie	N
Aves	*Corvus coronoides*	Australian Raven	N
Aves	*Dacelo novaeguineae*	Laughing Kookaburra	N
Aves	*Ocyphaps lophotes*	Crested Pigeon	N
Aves	*Rhipidura leucophrys*	Willie Wagtail	N
Mammalia	*Macropus giganteus*	Eastern Grey Kangaroo	N

*Status: N = native

PCT	Site Photographs
PCT 53 - Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.	

PCT 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.



PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.



APPENDIX C – BC & EPBC ACT HABITAT ASSESSMENT FOR THREATENED SPECIES AND COMMUNITIES PREDICTED TO OCCUR

List generated by conducting a vegetation associations report for the Inland Slopes subregion of the NSW South Western Slopes Bioregion. To determine whether any threatened species were known to occur near the subject site, BioNet Atlas records of threatened species within these subregions were downloaded and the records clipped to within 10 km of the subject site in QGIS.

Likelihood of occurrence description is sourced from https://www.environment.nsw.gov.au/threatenedSpeciesApp

The likelihood of occurrence of threatened species, populations or ecological communities was categorised as follows:

- 'Present' – the species was observed or has been previously recorded on the site.
- 'High' – a medium to high probability that a species uses the site, based on nearby records and suitable habitat being present.
- 'Moderate' – suitable habitat for a species occurs on the site, but the species has not been observed or previously recorded at the site or habitat not ideal, but there are nearby records of the species.
- 'Low' – a very low likelihood that the species uses the site, based on lack of the preferred type and size of habitat.
- 'Absent' – the species does not occur at the site, due to local/global extinction, locality outside of its geographic distribution, and/or a lack of suitable habitat.

Likelihood of occurrence table for BC and EPBC Act listed species and populations

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Crinia sloanei	Sloane's Froglet	E1,P	E	No	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and no records within 10 km.**	No
Litoria booroolongensis	Booroolong Frog	E1,P	E	No	The Booroolong Frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from much of the Northern Tablelands; however, several populations have recently been recorded in the Namoi catchment. The species is rare throughout most of the remainder of its range. Live along permanent streams with some fringing vegetation cover such as ferns, sedges, or grasses. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Litoria raniformis	Southern Bell Frog	E1,P	V	No	In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few yet unconfirmed records have also been made in the Murray Irrigation Area in recent years. The species is also found in Victoria, Tasmania and South Australia, where it has also become endangered. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.	
Aprasia parapulchella	Pink-tailed Legless Lizard	V,P	V	No	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Delma impar	Striped Legless Lizard	V,P	V	No	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Varanus rosenbergi	Rosenberg's Goanna	V,P		No	Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Also occurs in South Australia and Western Australia. Found in heath, open forest and woodland. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and no records within 10 km.**	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Hoplocephalus bitorquatus	Pale-headed Snake	V,P		No	A patchy distribution from north-east Queensland to the north-eastern quarter of NSW. In NSW it has historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north west slopes, and from the north coast from Queensland to Sydney. A small number of historical records are known for the New England Tablelands from Glenn Innes and Tenterfield; however, the majority of records appear to be from sites of relatively lower elevation. Although the Pale-headed snake distribution is very cryptic, it now appears to have contracted to a patchy and fragmented distribution. The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. **Moderate – Subject site is within the species predicted geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Leipoa ocellata	Malleefowl	E1,P	V	No	The stronghold for this species in NSW is the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary and is part of a larger population north of the Murray River in South Australia. The population in central NSW has been significantly reduced through land clearance and fox predation and now occurs chiefly in Yathong, Nombinnie and Round Hill NRs and surrounding areas, though birds continue to survive in Loughnan NR. To the south of this area the species is probably locally extinct in such reserves as Pulletop NR (last recorded 1989), Ingalba NR (1982) and Buddigower NR (1990) and the intensely studied population at Yalgogrin was still known to have at least one active mound in 2017. Further east, a population continues to persist in the Goonoo Forest near Dubbo, though the size of this population is unknown. Outside these areas, occasional records have been made in the Pilliga forests (most recently 1999), around Cobar (1991) and Goulburn River NP (1989) though the extent and status of populations in these areas are unknown. Predominantly inhabit mallee communities, preferring the tall, dense and floristically rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and no records within 10 km.**	
Anseranas semipalmata	Magpie Goose	V,P		No	The Magpie Goose is still relatively common in the Australian northern tropics but had disappeared from south-east Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW. Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	Yes
Oxyura australis	Blue-billed Duck	V,P		No	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	Yes
Stictonetta naevosa	Freckled Duck	V,P		No	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally, rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	
Apus pacificus	Fork-tailed Swift	P	C,J,K	No	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide; however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs (Higgins 1999). The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. **Absent – No suitable habitat occurs within the subject site.**	No
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	No	The White-throated Needletail is widespread in eastern and south-eastern. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitats, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Ephippiorhynchus asiaticus	Black-necked Stork	E1,P		No	In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	Yes
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	No	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	Yes
Ixobrychus flavicollis	Black Bittern	V,P		No	The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. The species also occurs in the south-west of Western Australia. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.	
Circus assimilis	Spotted Harrier	V,P		No	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. **High – Subject site is within the species known geographic distribution, there are three associated vegetation communities present, and there are three records within 10 km, the closest being 4.7 km.**	Yes
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		No	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground. May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however there are no records within 10 km.	
^^*Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		No	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and no records within 10 km.**	No
Hieraaetus morphnoides	Little Eagle	V,P		No	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however there are no records within 10 km.**	Yes
^^*Lophoictinia isura*	Square-tailed Kite	V,P,3		No	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
^^*Pandion cristatus*	Eastern Osprey	V,P,3		No	The Osprey has a global distribution with four subspecies previously recognised throughout its range. Eastern Ospreys are found right around the Australian coastline, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
^*Falco hypoleucos*	Grey Falcon	V,P,2	V	No	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. **Low – Subject site is relatively adjacent to the species known geographic distribution, however, there are no associated vegetation communities present and no records within 10 km.**	No
Falco subniger	Black Falcon	V,P		No	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres. The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Grus rubicunda	Brolga	V,P		No	The Brolga was formerly found across Australia, except for the south-east corner, Tasmania and the south-western third of the country. It is still abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. They feed using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however there are no records within 10 km.**	Yes
Ardeotis australis	Australian Bustard	E1,P		No	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Breeding now only occurs in the north-west region of NSW. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Burhinus grallarius	Bush Stone-curlew	E1,P		No	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east, it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Rostratula australis	Australian Painted Snipe	E1,P	E	No	The Australian Painted Snipe is restricted to Australia. Most records are from the southeast, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Actitis hypoleucos	Common Sandpiper	P	C,J,K	No	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
Calidris acuminata	Sharp-tailed Sandpiper	P	C,J,K	No	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	
Calidris ferruginea	Curlew Sandpiper	E1,P	CE,C,J,K	No	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and during the breeding season when many non-breeding one-year old birds remain in Australia rather than migrating north. In NSW, they are widespread east of the Great Divide, especially in coastal regions. They are occasionally recorded in the Tablelands and are widespread in the Riverina and south-west NSW, with scattered records elsewhere. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Calidris ruficollis	Red-necked Stint	P	C,J,K	No	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Gallinago hardwickii	Latham's Snipe	P	J,K	No	Latham's Snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia (i.e., it travels through northern Australia to reach non-breeding areas located further south). The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia (including the Adelaide plains and Mount Lofty Ranges, and the Eyre Peninsula). The range extends inland over the eastern tablelands in south-eastern Queensland (and occasionally from Rockhampton in the north), and to west of the Great Dividing Range in New South. The species is widespread in Tasmania and is found in all regions of Victoria except for the north-west. Most birds spend the non-breeding period at sites located south of the Richmond River in New South Wales. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g., swamps, flooded grasslands or heathlands, around bogs and other water bodies. However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Limosa limosa	Black-tailed Godwit	V,P	C,J,K	No	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. In NSW, it is most frequently recorded at Kooragang Island (Hunter River	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					estuary), with occasional records elsewhere along the coast, and inland. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. The species has been recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state. Primarily a coastal species. **Moderate – Subject site is within the species predicted geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	
Tringa nebularia	Common Greenshank	P	C,J,K	No	The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayment's, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and salt flats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Tringa stagnatilis	Marsh Sandpiper	P	C,J,K	No	The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. It is recorded in all regions of NSW but especially the central and south coasts and (inland) on the western slopes of Great Divide and western plains. The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia they prefer intertidal mudflats (Higgins & Davies 1996), although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide (Bamford 1988). At the Top End they often use ephemeral pools on inundated freshwater and tidal floodplains (Higgins & Davies 1996). Three of the five sites with highest recorded numbers are saltwater habitats (Hunter Estuary, NSW; Port Hedland Saltworks, Western Australia; Tullakool Evaporation Ponds, NSW) (Watkins 1993). In the south-east Gulf of Carpentaria they have been recorded round both saline and fresh waters (Garnett 1989). Elsewhere they said to avoid, or rarely occur in, tidal habitats, and rarely occur on beaches. In Western Australia they prefer freshwater to marine environments. In south-east Australia they prefer inland saline lakes and coastal saltworks. They are found infrequently around mangroves (Higgins & Davies 1996). **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Gelochelidon nilotica	Gull-billed Tern	P	C	No	The Gull-billed Tern occurs on all continents except Antarctica. Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Hydroprogne caspia	Caspian Tern	P	J	No	Within Australia, the Caspian Tern has a widespread occurrence and can be found in both coastal and inland habitat (Higgins & Davies 1996). The following table presents the distribution and breeding sites of the Caspian Tern in Australia. Widespread east of the Great Divide, mainly in coastal regions, and also in the Riverina and Lower and Upper Western Regions, with occasional records elsewhere (Higgins & Davis 1996). The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs,	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Thalasseus bergii	Crested Tern	P	J	No	Crested Terns are seen along coastal areas throughout Australia and Tasmania. Prefer Islands beaches, lakes and inlets. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3	E	No	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
^*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V	No	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. **Moderate – Subject site is within the species known geographic distribution and there is one associated vegetation community present, however, there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
^*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		No	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^^*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	V,P,3		No	The Purple-crowned Lorikeet occurs across the southern parts of the continent from Victoria to south-west Western Australia. It is uncommon in NSW, with records scattered across the box-ironbark woodlands of the Riverina and south west slopes, the River Red Gum forests and mallee of the Murray Valley as far west as the South Australian border, and, more rarely, the forests of the South Coast. The species is nomadic and most, if not all, records from NSW are associated with flowering events. Found in open forests and woodlands, particularly where there are large flowering eucalypts. Also recorded from mallee habitats. Feed primarily on nectar and pollen of flowering Eucalypts, including planted trees in urban areas. Breeds away from feeding areas, utilising hollow branches or holes in trees. Also roosts in dense vegetation up to several kilometres away from feeding areas. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Glossopsitta pusilla	Little Lorikeet	V,P		No	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. Forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Lathamus discolor	Swift Parrot	E1,P	CE	No	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and southwest slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Neophema chrysostoma	Blue-winged Parrot	V,P	V	No	The main populations of Blue-winged Parrots are in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania. Sparser populations are found in western New South Wales and eastern South Australia, extending to south-west Queensland and occasionally into the Northern Territory. **Absent – No suitable habitat occurs within the subject site.**	No
^^*Neophema pulchella*	Turquoise Parrot	V,P,3		No	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
^^*Polytelis swainsonii*	Superb Parrot	V,P,3	V	No	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. This species inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds' nest in the hollows of large trees (dead or	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, and feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Cuculus optatus	Oriental Cuckoo	P	C,J,K	No	The Oriental Cuckoo is not believed to breed in Australia. Mostly found in top end of Australia and coastal Queensland. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
^^*Ninox connivens*	Barking Owl	V,P,3		No	The Barking Owl is found throughout continental Australia except for the central arid regions. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g., western NSW) due to the higher density of prey on these fertile riparian soils. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however, there are no records within 10 km.**	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
^^*Ninox strenua*	Powerful Owl	V,P,3		No	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^^*Tyto novaehollandiae*	Masked Owl	V,P,3		No	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however, there are no records within 10 km.**	Yes
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	V	No	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus* which then occupies the remaining parts of the state. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares, that have been isolated or fragmented for more than 50 years. **High – Subject site is within the species known geographic distribution, there are two associated vegetation communities present, and there is one record within 10 km at 4.6 km.**	
Pycnoptilus floccosus	Pilotbird	P	V	No	Pilotbirds are a common resident of mountain gullies, on the coast and inland to the Great Divide, from the Blue Mountains to eastern Victoria including Gippsland. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
Chthonicola sagittata	Speckled Warbler	V,P		No	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
^*Anthochaera phrygia*	Regent Honeyeater	E4A,P,2	CE	No	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. **High – Subject site is within the species known geographic distribution, there are two associated vegetation communities present, and there is one record within 10 km. However, that record is near the edge of the search area buffer at 9.7 km.**	Yes
Certhionyx variegatus	Pied Honeyeater	V,P		No	Pied Honeyeater is widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. Inhabits wattle shrub, primarily Mulga (*Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also, from mistletoes and various other shrubs (e.g., *Grevillea* spp.);	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Epthianura albifrons	White-fronted Chat	V,P		No	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Grantiella picta	Painted Honeyeater	V,P	V	No	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		No	The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW. The eastern subspecies extends south from central Queensland, through NSW, Victoria into southeastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		No	The eastern subspecies (*temporalis*) occurs from Cape York south through Queensland, NSW and Victoria and formerly to the southeast of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Lives in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen individuals. Feed on invertebrates and nests in several conspicuous, dome-shaped stick structures that are about the size of a football. A nest is used as a dormitory for roosting each night. Nests are maintained year-round, and old nests are often dismantled to build new ones. **High – Subject site is within the species known geographic distribution, there are two associated vegetation communities present, and there is one record within 10 km. However, that record is near the edge of the search area buffer at 8.06 km.**	Yes
Daphoenositta chrysoptera	Varied Sittella	V,P		No	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Pachycephala inornata	Gilbert's Whistler	V,P		No	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. The species was probably once distributed almost continuously across the woodlands and mallee of southern NSW, but this range has been greatly reduced. The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including wattles, hakeas, sennas and hopbushes. In woodland habitats, the understorey comprises dense patches of shrubs, particularly thickets of regrowth Callitris pine. Parasitic 'cherries' (*Exocarpus* species) appear to be an important habitat component in Belah and Red Gum communities, though in the latter case other dense shrubs, such as Lignum and wattles, are also utilised. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		No	Dusky woodswallows are widespread in eastern, southern and southwestern Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however, there are no records within 10 km.	
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P	E	No	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, except for the extreme north-west, where it is replaced by subspecies *picata*. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Petroica boodang	Scarlet Robin	V,P		No	The Scarlet Robin is found from southeast Queensland to southeast South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. The Scarlet Robin is a quiet and unobtrusive species which is often	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					quite tame and easily approached. Birds forage from low perches, fenceposts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Petroica phoenicea	Flame Robin	V,P		No	The Flame Robin is endemic to southeastern Australia, and ranges from near the Queensland border to southeast South Australia and in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. Prefers clearings or areas with open understoreys. In winter, birds migrate to drier more open habitats in the lowlands (i.e., valleys below the ranges, and to the western slopes and plains), in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. **High – Subject site is within the species known geographic distribution, there are two associated vegetation communities present, and there are three records within 10 km, the closest being 4.7 km.**	Yes
Petroica rodinogaster	Pink Robin	V,P		No	Pink Robins are endemic to (only found in) south-eastern Australia. In the breeding season (September to March) Pink Robins are seen singly or in pairs in deep gullies in dense shrub layers of damp and wet forests or rainforests. In winter, they are found in more open and drier habitats. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Stagonopleura guttata	Diamond Firetail	V,P	V	No	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	No	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Phascogale tapoatafa	Brush-tailed Phascogale	V,P		No	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. **Moderate – Subject site is within the species predicted geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Macrotis lagotis	Bilby	E4,P	V	No	Bilbies were common in many habitats throughout Australia, from the dry interior to temperate coastal regions. Changes to the Bilby's habitat have seen their numbers greatly reduced and today the species is nationally listed as vulnerable and is presumed extinct in NSW. They now occur in fragmented populations in mulga shrublands and	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					spinifex grasslands in the Tanami Desert of the Northern Territory; in the Gibson and Great Sandy Deserts and the Pilbara and Kimberley regions of Western Australia; and the Mitchell Grasslands of southwest Queensland. Once widespread in arid, semi-arid and relatively fertile areas, the Bilby is now restricted to arid regions and remains a threatened species. The Bilby prefers arid habitats because of the spinifex grass and acacia shrub. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	
Phascolarctos cinereus	Koala	E1,P	E	No	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however, there are no records within 10 km.**	Yes
Cercartetus nanus	Eastern Pygmy-possum	V,P		No	The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Petaurus australis	Yellow-bellied Glider	V,P	V	No	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
Petaurus norfolcensis	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		No	The extent of the endangered population is legally defined by the boundaries of the Wagga Wagga LGA. The distribution of the Squirrel Glider and its known or potential habitats within, or linked across, this boundary is not well defined. However, potential habitat occurs at low densities and is patchily distributed on public lands (TSRs, NPWS reserves, Bush Heritage Trust reserves), private lands and roadside corridors with remnant vegetation. Inhabits a wide range of open forest, woodland and riverine forest habitats. Utilise remnants of various sizes, including small remnants and even small stands of trees within Travelling Stock Reserves, roadside reserves or private land. Often utilise linear remnant vegetation along roadsides or rivers and streams. **Absent – There are two associated vegetation communities present, however, the subject site is not within the local population geographic distribution (Wagga Wagga LGA).**	No
Petaurus norfolcensis	Squirrel Glider	V,P		No	Inhabits woodlands and dry sclerophyll forests, usually in diverse stands of shrubs and trees. Shelters and breeds in tree hollows, and is primarily an insectivorous animal but, has also been known to ingest plant exudates. **High – Subject site is within the species known geographic distribution, there are two associated vegetation communities present, and there are two records within 10 km, the closest being 6 km.**	Yes
Petauroides volans	Southern Greater Glider	E1,P	E	No	The greater glider is found in southern Queensland, eastern Australia, southeastern New South Wales, and the montane forests of the Victorian central highlands. The greater glider chooses habitat based on several factors, the dominant factor being the presence of specific species of eucalypt. Distribution levels are higher in regions of montane forest containing manna gum (*E. viminalis*) and mountain gum (*E. dalrympleana, E. obliqua*). **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
Bettongia lesueur graii	Boodie, Burrowing Bettong (mainland)	E4,P	X	No	The mainland subspecies (*graii*) is now extinct; however, two subspecies occur on islands off the coast of Western Australia; one undescribed subspecies on Boodie and Barrow Islands off the Pilbara coast; the other (*lesueur*) on Bernier and Dorre Islands off Shark Bay. Both these subspecies are listed nationally as vulnerable. It is the latter subspecies that has been used to establish a population in feral-free enclosures at the Australian Wildlife Conservancy run Scotia Sanctuary in southwestern New South Wales. The Boodie once lived in a range of dry subtropical and tropical habitats, from open Eucalyptus and Acacia woodlands to arid spinifex grasslands. In its current range on the islands, it seems to prefer open *Triodia* (spinifex) and dune habitats but will burrow anywhere except places with rocky substrate. **Absent – No suitable habitat occurs within the subject site, no records within 10 km – extinct in NSW.**	No
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	No	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However, the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Males tend to have larger home ranges than females. The home range consists of a refuge area and a foraging range linked by habitually used commuting routes. Females settle in or near their mother's range, while males mainly disperse between female groups within colonies, and less commonly between colonies. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	No	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		No	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn. **Moderate – Subject site is within the species known geographic distribution and there are three associated vegetation communities present, however, there are no records within 10 km.**	Yes
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	No	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	
Chalinolobus picatus	Little Pied Bat	V,P		No	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		No	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Myotis macropus	Southern Myotis	V,P		No	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
Nyctophilus corbeni	Corben's Long-eared Bat	V,P	V	No	Overall, the distribution of the southeastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. **Moderate – Subject site is within the species known geographic distribution and there is an associated vegetation community present, however, there are no records within 10 km.**	Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		No	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however, does not occur at altitudes above 500 m. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		No	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Pseudomys novaehollandiae	New Holland Mouse	P	V	No	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Genetic evidence indicates that the New Holland Mouse once formed a single continuous population on mainland Australia and the distribution of recent subfossils further suggest that the species has undergone a large range contraction since European settlement. Total population size of mature individuals is now estimated to be less than 10,000 individuals although, given the number of sites from which the species is known to have disappeared between 1999 and 2009, it is likely that the species' distribution is smaller than current estimates. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Synemon plana	Golden Sun Moth	V	V	No	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia* spp. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Keyacris scurra	Key's Matchstick Grasshopper	E1		No	Key's Matchstick grasshopper was originally distributed from Victoria to Orange (NSW) across the wheat/sheep belt, typically recorded in native grasslands and grassy woodland. Its northern boundaries are poorly defined, with its Victorian distribution most notable in the Omeo district, and it has been found in the following land-uses: cemeteries, along railway easements, travelling stock routes and more recently conservation reserves in the ACT. Disturbance appears to be an important determinant of site occupancy and it appears to be absent from sites that are disturbed during	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					inappropriate times of the year (and interrupt the short non-overlapping lifecycle) or have been subjected to erratic management (e.g., periods of over and under grazing). **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	
Caesia parviflora var. minor	Small Pale Grass-lily	E1		No	This variety occurs uncommonly in Tasmania, southern Victoria and south-east South Australia with an outlying population in NSW, in Barcoongere State Forest, between Grafton and Coffs Harbour. This variety may be more common than currently known, as Pale Grass-lilies are often not identified to variety level. Found in damp places in open forest on sandstone. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Tylophora linearis		V	E	No	Occurs from southern Queensland into central NSW, as far south near Temora with the majority of records occurring in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. Grows in dry scrub and open forest. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Ammobium craspedioides	Yass Daisy	V	V	No	Found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the South Western Slopes. Most populations are in the Yass region. Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in association with a large range of eucalypts (*Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida*).	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Brachyscome muelleroides	Claypan Daisy	V	V	No	The Claypan Daisy occurs in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Also occurs in north-central Victoria (only along the Murray from Tocumwal to the Ovens River). Grows in damp areas on the margins of claypans in moist grassland with *Pycnosorus globosus, Agrostis avenacea* and *Austrodanthonia duttoniana*. Also recorded from the margins of lagoons in mud or water, and in association with *Calotis anthemoides*. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
Leucochrysum albicans subsp. tricolor	Hoary Sunray	E1	E	No	Endemic to south-eastern Australia, where it is currently known from three geographically separate areas in Tasmania, Victoria and south-eastern NSW and ACT. In NSW it currently occurs on the Southern Tablelands adjacent areas in an area roughly bounded by Albury, Bega and Goulburn, with a few scattered localities know from beyond this region. Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Senecio garlandii	Woolly Ragwort	V		No	This daisy is found between Temora, Bethungra and Albury and possibly Burrinjuck near Yass. The largest populations are at The Rock and Mt Tabletop (and surrounds). There is a single population in Victoria at Chiltern. Woolly Ragwort occurs on sheltered slopes of rocky outcrops. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Carex raleighii	Raleigh Sedge	E1		No	In NSW Raleigh Sedge is found only in areas above about 1000 metres on the Southern Tablelands. Most populations are in Kosciuzsko National Park (e.g., Charlottes Pass area, Muellers Pass, Tantangara area and the upper Tooma and Tumut valleys). Also occurs in vicinity of Snowy Plain (private land and travelling stock reserve) and on the	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					coastal escarpment at the headwaters of Tantawangalo Creek within South East Forests National Park. Grows in sphagnum bogs and high mountain wetlands, as well as damp grasslands and stream-edges of sub-alpine plains. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	
Bossiaea fragrans		E4A	CE	No	Currently only known from the Abercrombie Karst Conservation Reserve, south of Bathurst on the NSW central tablelands. It is highly restricted, with only a small number of known populations. Occurs on spilite, rhyolite or slate and volcanic substrates and is often associated with Red Stringybark (*Eucalyptus macrorhyncha*) - Red Box (*Eucalyptus polyanthemos*) woodland +/- White Box (*Eucalyptus albens*). **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Cullen parvum	Small Scurf-pea	E1		No	The Small Scurf-pea is known in NSW from only two herbarium collections: one from Wagga Wagga in 1884 and the other from Jindera (near Albury) in 1967. A small population was recently reported from near Jerilderie (although it has not been relocated). In recent years, two populations have been recorded in travelling stock reserves south-west of Wagga Wagga, and a population reputedly exists on a roadside near Galong. Another population has recently been discovered on private land near Young. Large populations have been recorded in grassy gaps in the Red Gum Woodlands of Barmah State Park, just across the border in Victoria. Extensive suitable habitat probably occurs across the border in NSW. In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (Eucalyptus camaldulensis) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm. **Moderate – Subject site is within the species known geographic distribution and there is one associated vegetation community present, however, there are no records within 10 km.**	Yes
^^*Indigofera efoliata*	Leafless Indigo	E1,3	E	No	Very rare and was presumed extinct with the last known collection made in 1955 with three unvouchered reports from Goonoo State Forest in 1963. In spring 2021 the	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					species was rediscovered near Geurie. Indigofera efoliata was only known only from a few collections in the Dubbo area. Known sites were located along the Dubbo to Minore railway line and road, on Wallaringa and Geurie properties and in Goonoo State Forest. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Pultenaea humilis	Dwarf Bush-pea	V		No	*Pultenaea humilis* is rare in New South Wales and Tasmania, but relatively common in Victoria. In NSW it is currently known from three confirmed localities in the NSW South Western Slopes bioregion. The extent of occurrence in NSW is estimated to be approximately 6000 km2. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Swainsona recta	Small Purple-pea	E1	E	No	Small Purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT and a single population of four plants near Chiltern in Victoria. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Swainsona sericea	Silky Swainson-pea	V		No	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro.	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.	
Acacia ausfeldii	Ausfeld's Wattle	V		No	Found to the east of Dubbo in the Mudgee-Ulan-Gulgong area of the NSW South Western Slopes bioregion, with some records in the adjoining Brigalow Belt South, South Eastern Highlands and the Sydney Basin bioregions. Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong. Associated species include *Eucalyptus albens, E. blakelyi* and *Callitris* spp., with an understorey dominated by *Cassinia* spp. and grasses. **Moderate – Subject site is within the species known geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Acacia meiantha		E1	E	No	The species is found in three disjunct populations, all within the Central Tablelands and within 100kms of each other. These populations include Clarence, which covers an area of approximately 1 hectare; Mullions Range, covering approximately 5 hectares; and Aarons Pass, which is confined to 2.5km of road easements. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Acacia phasmoides	Phantom Wattle	V	V	No	The species is only known from one location in NSW: Woomargama National Park in Greater Hume Shire. It is also found at Burrowa-Pine Mountain National Park in Victoria. Grows in shrubby woodland on sandy, granitic soil near creeks or in rocky crevices. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^^*Pilularia novae-hollandiae*	Austral Pillwort	E1,3		No	In NSW, Austral Pillwort has been recorded from suburban Sydney, Khancoban, the Riverina between Albury and Urana (including Henty, Walbundrie, Balldale and Howlong), Oolambeyan National Park near Carathool and at Lake Cowal near West Wyalong. The populations at Lake Cowal and Oolambeyan NP are the only known	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					extant populations in NSW, although the species is obscure and has possibly been overlooked elsewhere. The species has also been recorded in the Australian Capital Territory, Victoria, Tasmania, South Australia and Western Australia. Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. **Moderate – Subject site is within the species predicted geographic distribution and there is one associated vegetation community present, however, there are no records within 10 km.**	
Eucalyptus aggregata	Black Gum	V	V	No	Black Gum is found in the NSW Central and Southern Tablelands, with small, isolated populations in Victoria and the ACT. In NSW it occurs in the South Eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands, for example in the Blayney, Crookwell, Goulburn, Braidwood and Bungendore districts. Grows on alluvial soils, on cold, poorly drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts, such as Snow Gum or White Sallee (*Eucalyptus pauciflora*), Manna or Ribbon Gum (*E. viminalis*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*) and Swamp Gum (*E. ovata*). **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Eucalyptus alligatrix subsp. alligatrix		V	V	No	Only known from a single location south-west of Rylstone; however, the species has reportedly been widely propagated and planted in the Rylstone area. The population is confined to an area of a few hectares where an estimated 3,000 to 4,500 trees survive. Most of the population consists of moderately dense regenerating stands following previous clearing, but there are also larger scattered paddock trees, probably pre-dating European settlement. Grows in dry sclerophyll woodland on shallow relatively infertile soils (grey brown loam with ironstone). It may have been part of a more-extensive open woodland community prior to the commencement of clearing and grazing.	

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
Eucalyptus cannonii	Capertee Stringybark	V		No	The Capertee Stringybark is predominantly restricted to the central tablelands and slopes of NSW between the Golden Highway in the north, and the Mitchell Highway in the south. The species' distribution is bounded from east of Bathurst to Wallerwang near Lithgow, north along the western edge of Wollemi National Park and north-west to Mudgee; isolated occurrences are known from a short way north of Goulburn River National Park between Dunedoo and Merriwa. Within this area the species is often locally frequent. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Eucalyptus robertsonii subsp. hemisphaerica	Robertson's Peppermint	V	V	No	Known only from the central tablelands of NSW, at small disjunct localities from north of Orange to Burraga. Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and often on granite. Usually found in closed grassy woodlands in locally sheltered sites. Habitats include quartzite ridges, upper slopes and a slight rise of shallow clay over volcanics. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Homoranthus darwinioides	Fairy Bells	V	V	No	Rare in the central tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. It is found west of Muswellbrook between Merriwa and Bylong, and north of Muswellbrook to Goonoo SCA. The species has been collected from Lee's Pinch, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook. Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils. Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
^*Caladenia arenaria*	Sand-hill Spider Orchid	E1,P,2	E	No	*Caladenia arenaria* is found mostly on the southwest plains and western south west slopes. The original description is of a plant from Nangus, west of Gundagai (1865) and there is a report of the species from Adelong near Tumut. A record near Cootamundra needs verifying. The Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Occurs in woodland with sandy soil, especially that dominated by White Cypress Pine (*Callitris glaucophylla*). **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^*Caladenia concolor*	Crimson Spider Orchid	E1,P,2	V	No	The current NSW Scientific Committee listing incorporates two populations which have each been described as separate species by D.L. Jones. One of these populations comprises a few hundred plants on private property near Bethungra and the other of about 100 plants occurs in Burrinjuck Nature reserve. The other occurrences of the Crimson Spider Orchid in NSW are from the Nail Can Hill Crown Reserve near Albury. The species also occurs at two localities in Victoria near Beechworth and Chiltern. Habitat is regrowth woodland on granite ridge country that has retained a high diversity of plant species, including other orchids. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^*Caladenia rosella*	Rosella Spider Orchid	E4,P,2	E	No	The single NSW collection of the Rosella Spider Orchid (located in Albury) is undated but is estimated to have been collected before 1896. Today the species is found near Melbourne in Victoria but is listed as endangered because less than 200 plants are known to exist. In Victoria, the species is found in woodlands and low forests of Red Box (*Eucalyptus polyanthemos*), Long-leafed Box (*E. goniocalyx*) and Red Stringybark (*E. macrorhyncha*) in well-drained, skeletal soils.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
^*Caladenia tessellata*	Thick Lip Spider Orchid	E1,P,2	V	No	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
^*Diuris tricolor*	Pine Donkey Orchid	V,P,2		No	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon, and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA, Pilliga National Park and Bibblewindi State Forest in the north (and extending into Queensland) and Muswellbrook in the east. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
^*Prasophyllum petilum*	Tarengo Leek Orchid	E1,P,2	E	No	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population c.10 km west of Muswellbrook. It also occurs at Hall in the Australian Capital Territory. This species has also been recorded at Bowning Cemetery where it was experimentally introduced, though it is not known whether this population has persisted. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock, Black Gum and tea-trees near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT).	Yes

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Moderate – Subject site is within the species known geographic distribution and there is one associated vegetation community present, however, there are no records within 10 km.	
Prasophyllum sp. Wybong		P	CE	No	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. **Moderate – Subject site is within the species predicted geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Euphrasia arguta		E4A	CE	No	Euphrasia arguta was rediscovered in the Nundle area of the NSW northwestern slopes and tablelands in 2008. Prior to this, it had not been collected for 100 years. Historically, Euphrasia arguta has only been recorded from relatively few places within an area extending from Sydney to Bathurst and north to Walcha. The Royal Botanic Gardens Specimen Register records an additional location reported and vouchered in 2002 from near the Hastings River; and Euphrasia arguta was also recorded from the Barrington Tops in 2012. Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. **Moderate – Subject site is within the species predicted geographic distribution and there are two associated vegetation communities present, however, there are no records within 10 km.**	Yes
Euphrasia collina subsp. muelleri	Mueller's Eyebright	E1	E	No	Once widespread in south-eastern Australia, Mueller's Eyebright is now known only from the Mornington Peninsula near Melbourne. In NSW it was recorded more than 100 years ago in the upper Murray and McIntyre Rivers and near Dorrigo and Cootamundra. The only NSW collections in the past 50 years were made in the vicinity of the Tinderry Range between Canberra and Cooma (1970) and between Uralla and Tamorth (1987). Little is known about the habitat this species preferred, although there is a reference to "damp places" in an early von Mueller collection. Extant populations in Victoria occur in heathy woodland.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
Amphibromus fluitans	Floating Swamp Wallaby-grass	V	V	No	There are many historic collections in the City of Greater Albury. It has been recorded recently in lagoons beside the Murray River near Cooks Lagoon (Shire of Greater Hume), Mungabarina Reserve, East Albury, at Ettamogah, Thurgoona (Charles Sturt University Campus), near Narranderra, and further west along the Murray River (near Mathoura) and in Victoria. There is a recent record of this species near Laggan in Upper Lachlan Shire. It is also found in Victoria and in Tasmania. *Amphibromus fluitans* grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile, and which have some bare ground, conditions which are produced by seasonally fluctuating water levels. Habitats in south-western NSW include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with *Potamogeton* and *Chamaeraphis* species. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Austrostipa wakoolica	A spear-grass	E1	E	No	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve). Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine Forest on low sandy range; and a low, rocky rise. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Dichanthium setosum	Bluegrass	V	V	No	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa,*	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea species.* **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Grevillea wilkinsonii	Tumut Grevillea	E4A	E	No	The Tumut Grevillea has a highly restricted distribution in the NSW South-west Slopes region. Its main occurrence is along a 6 km stretch of the Goobarragandra River approximately 20 km east of Tumut where about 1,000 plants are known. The other occurrence is a small population that straddles the boundary of two private properties at Gundagai where only eight mature plants survive. At the Goobarragandra River sites the species generally grows near the water, at altitudes between 310 and 340 m. Most healthy adult plants occur in open sunny areas, and those plants found under the canopy of dense vegetation tend to be spindly and are sometimes subject to sooty mould infestations. **Moderate – Subject site is within the species known geographic distribution and there is one associated vegetation community present, however, there are no records within 10 km.**	Yes
Persoonia marginata	Clandulla Geebung	V,P	V	No	The Clandulla Geebung occurs between Kandos and Clarence in the western Blue Mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks. Grows in dry sclerophyll forest and woodland communities on sandstone. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Pomaderris cotoneaster	Cotoneaster Pomaderris	E1	E	No	Cotoneaster Pomaderris has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, Bungonia State Conservation Area, the Yerranderie area, Kanangra-Boyd	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					National Park, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria. Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs. **Low – Subject site is within the species predicted geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	
Pomaderris queenslandica	Scant Pomaderris	E1		No	Widely scattered but not common in north-east NSW and in Queensland. It is known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolata. Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Zieria ingramii	Keith's Zieria	E1	E	No	Known predominately from Goonoo SCA, about 40 km north-east of Dubbo. An old record exists from a locality east of Mogriguy on the Mendooran Road, however searches of the area have not relocated the species. Grows in dry sclerophyll forest on light sandy soils. All known populations have been recorded in Eucalyptus-Callitris woodland or open forest with a shrubby to heathy understorey. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No
Zieria obcordata	Granite Zieria	E1	E	No	Occurs at two sites with a geographic range of 105 km. These are in the Wuuluman area near Wellington, comprising of a single subpopulation over 3 sites comprising up to 200 plants and Crackerjack Rock/Rock Forests area NW of Bathurst, with a subpopulation comprising of 14 sites, totalling to approximately 700 adults plants after good seasons.	No

Scientific Name	Common Name	*NSW status	+Comm. Status	Records within 10 km?	Likelihood of Occurrence	Test of significance required (Yes/No)
					Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.	
Thesium australe	Austral Toadflax	V	V	No	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. **Low – Subject site is within the species known geographic distribution, however, there are no associated vegetation communities present and there are no records within 10 km.**	No
Pimelea bracteata		E4A		No	*Pimelea bracteata* is endemic to New South Wales where it is currently known from the Southern Tablelands. The main areas of occurrence of *P. bracteata* are in the northern area of Kosciuszko National Park, Scabby Range Nature Reserve, neighbouring State Forests and freehold land. **Absent – No suitable habitat occurs within the subject site, no records within 10 km and outside of geographic distribution.**	No

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.

+Commonwealth Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable

Likelihood of occurrence table for BC Act Threatened Ecological Community

Community	+NSW Status	Likelihood of Occurrence	5-part test required (Yes / No)
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	E	*Acacia melvillei* Shrubland is currently recorded from south-western portion of NSW in the Riverina and Murray-Darling Depression bioregions in the local government areas of Balranald, Carrathool, Central Darling, Conargo, Wakool, and Wentworth and may occur in other local government areas within these bioregions. **Absent – Community was not present on site.**	No
Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	E	*Allocasuarina luehmannii* Woodland has been recorded in the southern part of the Riverina bioregion from near Urana and Mulwala in the east to the Barham district and may extend as far west as Euston in the southern part of the Murray-Darling Depression bioregion. The community occurs in small patches within this range and is currently estimated to cover less than 500-1500ha. Approximately 6 ha of *Allocasuarina luehmannii* Woodland are estimated to occur within Lake Urana and Wiesners Swamp Nature Reserves. The remainder of the community occurs on private land or on public easements. **Absent – Community was not present on site.**	No
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar, and Brigalow Belt South Bioregions	E	Inland Grey Box Woodland occurs predominately within the Riverina and South West Slopes regions of NSW down to the Victorian border. It includes Albury to the east and may extend out west towards Hay. This community also extends across the slopes and plains in Central and Northern NSW up to the Queensland Border. This includes Yetman and Inverell in the North, Molong to the east of the Central Slopes and plains and out towards Nymagee to the west. **Absent – Community was not present on site.**	No
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina, and NSW South Western Slopes bioregions	E	This EEC is known from parts of the Local Government Areas of Berrigan, Bland, Bogan, Carrathool, Conargo, Coolamon, Coonamble, Corowa, Forbes, Gilgandra, Griffith, Gwydir, Inverell, Jerilderee, Lachlan, Leeton, Lockhart, Moree Plains, Murray, Murrumbidgee, Narrabri, Narranderra, Narromine, Parkes, Urana, Wagga Wagga and Warren, and but may occur elsewhere in these bioregions. **Absent – Community was not present on site.**	No
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	E	Sandhill Pine Woodland has been recorded in the far south-western portion of the NSW South Western Slopes bioregion near Urana, extending through the Riverina bioregion,	No

Community	+NSW Status	Likelihood of Occurrence	5-part test required (Yes / No)
		from the Urana – Narrandera district in the east, into the southern part of the Murray-Darling Depression bioregion, as far west as the South Australian border. **Absent – Community was not present on site.**	
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	CE	Box-Gum Woodland is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions **Present – Community was found in the field survey.**	Yes

+ NSW Status: E=Endangered, CE=Critically Endangered

APPENDIX D – BC ACT TESTS OF SIGNIFICANCE

Biodiversity Conservation Act 2016 Test of significance

The threatened species 'test of significance' (or '5-part test') is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The test of significance is set out in s.7.3 of the Biodiversity Conservation Act 2016, and is completed in accordance with the questions set out below:

The following is to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

   i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

   ii. is likely to modify the composition of the ecological community substantially and adversely such that its local occurrence is likely to be placed at risk of extinction,

c) in relation to the habitat of a threatened species or ecological community:

   i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

   ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

   iii. the importance of the habitat to be removed, modified, fragmented, or isolated to the long-term survival of the species or ecological community in the locality,

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Below information has been sourced from https://www.environment.nsw.gov.au/threatenedSpeciesApp

BC Act Tests of Significance for Threatened Species

Species Name	Common Name	a.	b.	c.	d.	e.	Impact Significance
Litoria booroolongensis	Booroolong Frog	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge. As such, this site is lacking in the requirements for inhabitation, with only two minor non-perennial watercourses. The species is associated with PCT 277 within the subject site, however, there are no records of this species from within the 10 km search area. It is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 277. As such, up to 0.078 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and lack of habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Litoria raniformis	Southern Bell Frog	Typically, inhabiting swamps, floodplains, and river valleys, Southern Bell Frogs congregate around permanent waterbodies for reproduction and then disperse away to take shelter amongst terrestrial debris (e.g., fallen timber, bark, rocks, grass, and cracking soil). As such, this site is lacking in the requirements for inhabitation, with only two minor non-perennial	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and lack of habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		watercourses and limited sedge wetland. There are no records of this species from within the 10 km search area. Given that the proposal will be affecting a relatively insignificant amount of already modified associated habitat (0.054 ha), it is unlikely to place a local population at risk of extinction.					
Aprasia parapulchella	Pink-tailed Legless Lizard	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. This site is lacking in quality habitat. However, this species is associated with two of the vegetation communities present, and it could inhabit the soil beneath rocks in farmland. There are no records of this species from within the 10 km search area. Given that the proposal will be affecting a relatively insignificant amount of	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and lack of quality habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		already modified associated habitat (0.296 ha), it is unlikely to place a local population at risk of extinction.					
Delma impar	Striped Legless Lizard	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda australis*, spear-grasses *Austrostipa* spp. and poa tussocks *Poa* spp., and occasionally wallaby grasses *Austrodanthonia* spp. Sometimes present in modified grasslands with a significant content of exotic grasses and significant amounts of surface rocks, which are used for shelter. Sometimes utilises dried cowpats for shelter. This site is lacking in quality habitat. However, this species is associated a present vegetation community, and it could inhabit the soil beneath rocks in farmland. There are no records of this species from within the 10 km search area. Given that the proposal will be affecting a relatively insignificant amount of already modified associated habitat (0.078 ha), it is unlikely to	N/A	i. This species is associated with PCT 277. As such, up to 0.078 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and lack of quality habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		place a local population at risk of extinction.					
Hoplocephalus bitorquatus	Pale-headed Snake	Highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. As such, this site is limited in the requirements for inhabitation, with few habitat trees within the subject site. There are no records of this species from within the 10 km search area. Given that the proposal will be affecting a relatively insignificant amount of already modified associated habitat (0.054 ha), it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and lack of habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Anseranas semipalmata	Magpie Goose	Magpie Geese breed in tall trees over deep permanent bodies of water. The 10 km search area contained a single record which dates to 2003. There is low habitat suitability within the subject site. There are two minor non-perennial water courses present.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of nest structures from the subject site and the absence of records	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		As such, it is unlikely to be critical habitat for the species.		from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Oxyura australis	Blue-billed Duck	Blue-billed Ducks require large permanent wetlands and swamps with dense aquatic vegetation to complete their reproductive cycle. The 10 km search area contained no records. There are two minor non-perennial water courses present. It is unlikely that the subject site is critical to the species.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The proposal will not generate new fragments or significantly exacerbate issues relating to existing fragmentation. iii. Considering the absence of records, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Stictonetta naevosa	Freckled Duck	The Freckled Duck makes use of dense fringing vegetation along lakes, reservoirs, farm dams and sewage ponds for reproduction. The 10 km search area contained a no records. There is low habitat suitability within the subject site. There are two minor non-perennial water courses present. It is unlikely for the subject site to be critical to the species.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Hirundapus caudacutus	White-throated Needletail	Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of	N/A	i. This species is associated with PCT 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		paddocks. In coastal areas, they have been observed flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. The 10 km search area contained no records. It is unlikely for the subject site to be critical to the species.		iii. Considering the absence of records, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Ephippiorhynchus asiaticus	Black-necked Stork	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). There is low habitat suitability within the subject site. There are two minor non-perennial water courses present. There are no records within 10 km. As such, it is unlikely to be critical habitat for the species.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Botaurus poiciloptilus	Australasian Bittern	The Australasian Bittern requires permanent freshwater sources, flanked by tall dense vegetation (particularly by *Typha* sp. and *Eleocharis* sp.) for reproduction. The subject site lacked these specific species and the search area lacked records. As such, it is unlikely for the subject site to be critical to the species.	N/A	i. This species is associated with PCTs 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Circus assimilis	Spotted Harrier	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. There are three records within 10 km of the subject site, the closest being 4.7 km. Given that the proposal will be removing a relatively insignificant amount of associated habitat of already fragmented land (1.587 ha), compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of nests and that a greater quantity of habitat will continue to exist in the study area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Haliaeetus leucogaster	White-bellied Sea-Eagle	The White-bellied Sea-Eagle constructs their large nests at the crowns of large, mature eucalypts – often adjacent to a watercourse. The subject site may therefore represent suitable habitat. There are no records within 10 km of the subject site. Given that the proposal will be removing a relatively insignificant amount of associated habitat (1.587 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of nests and that a greater quantity of habitat will continue to exist in the study area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Hieraaetus morphnoides	Little Eagle	The Little Eagle constructs its twig nests in the forks of large old trees in open woodland and riparian vegetation. The subject site may therefore represent suitable habitat for the species. However, there are no records from within the search area and the field survey failed to encounter any nests. As such, it is unlikely for the subject site to be critical to the species.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of nests from the subject site and of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^^*Lophoictinia isura*	Square-tailed Kite	Square-tailed Kites construct their nests in the forks of large eucalypts, typically adjacent to water. There are no records from within the search area and the field survey failed to encounter any nests.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		As such, it is unlikely for the subject site to be critical to the species.		iii. Considering the absence of nests from the subject site and of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Falco subniger	Black Falcon	The Black Falcon utilises preestablished nests, created by other birds of prey and ravens, close to waterways for reproduction. While the subject site may represent suitable habitat, the field survey did not encounter any nests and there are no records within 10 km. As such, it is unlikely for the subject site to be critical to the species lifecycle.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of nests from the subject site and of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Grus rubicunda	Brolga	Although the Brolga may feed in dry grassland or ploughed paddocks, they are dependent on wetlands for reproduction. A Brolgas nest consists of a platform of grasses and sticks, augmented with mud, that is constructed in the water. The field survey failed to detect any such nesting structure. There are no records within the 10 km search area and only one particularly small area of associated vegetation community present. As such, it is unlikely for the subject site to be critical to the species lifecycle.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The proposal will not generate new fragments or significantly exacerbate issues relating to existing fragmentation. iii. Considering the absence of records, the subject site is unlikely to be of importance to the long-term survival of this species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Burhinus grallarius	Bush Stone-curlew	The Bush Stone-curlew is associated with open forests and woodlands that contain a grassy ground layer, which the site contained. Despite the potential suitability of the subject site, there are no records from the 10 km search area. As such, the subject site is unlikely to be critical to the lifecycle of the species.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering absence of records from the 10 km search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Rostratula australis	Australian Painted Snipe	The Australian Painted Snipe breeds at the margins of swamps, dams, and marshlands, underneath the substantial cover provided by tall grasses, tussocks, and reeds. Although such vegetation was present, it was relatively insignificant and the search area lacked any records of this species. As such, the subject site is unlikely to be critical to the lifecycle of the species.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Calidris ferruginea	Curlew Sandpiper	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed,	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. There are no records within 10 km of the subject site. As such, it is unlikely for the subject site to be critical to the species lifecycle		iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Limosa limosa	Black-tailed Godwit	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. There are no records within 10 km of the subject site and suitable habitat is scarce. As such, it is unlikely for the subject site to be critical to the species lifecycle	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to

		eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground. Although present habitat may be suitable, it is scarce and there are no records within 10 km of the subject site. As such, it is unlikely for the subject site to be critical to the species lifecycle.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.			the undertaking of the proposal.
^*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina and Allocasuarina species*), shredding the cones with the massive bill. There are no records within 10 km of the subject site, no appropriate feed tree species within the subject site and no large hollows	N/A	i. This species is associated with PCTs 266. As such, up to 0.218 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		suitable for breeding in this species. As such, it is unlikely for the subject site to be critical to the species lifecycle.					
Glossopsitta pusilla	Little Lorikeet	Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora*, *Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Although the roadside remnants and scattered paddock trees may be suitable habitat, it would not be ideal, and there are no records within 10 km of the subject site. Further there are no hollow-bearing smooth-barked gums, which are the preferred breeding habitat for this species. As such, it is unlikely for the subject site to be critical to the species lifecycle.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See Appendix F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Lathamus discolor	Swift Parrot	As breeding habitat is restricted to Tasmania and a much greater quantity of higher quality habitat exists in the study area, it is unlikely that the subject site is critical to the long-term survival of the species.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to

				The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that breeding habitat is restricted to Tasmania and the vegetation is already fragmented within the subject site, as well as there being no records within 10 km, it is unlikely that the proposal will jeopardise the long-term survival of the species.			the undertaking of the proposal.
^^*Neophema pulchella*	Turquoise Parrot	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. There are no records within 10 km of the subject site and vegetation is scarce. As such, it is unlikely for the subject site to be critical to the species lifecycle.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^^*Polytelis swainsonii*	Superb Parrot	The Superb Parrot inhabits Box-Gum, Box-Cypress and River Red Gum forests and woodlands. The riparian zone of the Murrumbidgee catchment is part of the species core breeding area in southern NSW. As such there are twenty-eight records within the 10 km search area, the closest being ~ 870 km from the subject site. The	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		majority of sightings were in 2020, with three in 2021, and one as recent as August 2022. Although 3 small tree hollows occur in the subject site, none of these were within the preferred species of Eucalypt for breeding. Further the site is not along the Murrumbidgee, which is the preferred breeding area for this species. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha), it is unlikely that the proposal will place a local population at risk of extinction.		iii. As the proposal will only remove a relatively insignificant amount of associated vegetation (0.296 ha) and two hollow-bearing trees, it is unlikely that the scope of works will jeopardise the long-term survival of the species.			
^^*Ninox connivens*	Barking Owl	The Barking Owl inhabits woodlands and open forests and can persist in areas of fragmented remnants and partly cleared farmland. Nesting, however, requires large hollows which were absent from the subject site. As such, it is unlikely that the proposal will threaten the lifecycle of the species.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of large hollows (required for reproduction) from the subject site, the subject site is unlikely to be of importance to the long-term survival of this species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^^*Tyto novaehollandiae*	Masked Owl	The Masked Owl inhabits dry eucalypt forests and woodlands. Although it nests within heavily forested areas, it often hunts along the edges of forests, such as roadsides and water margins.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to

		Roosting and breeding, however, occurs in large tree hollows and caves, which the subject site lacked. Furthermore, the species has not been observed within the 10 km search area. As such, it is unlikely that the subject site is of value to their lifecycle.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of large hollows and caves, and of records from within 10 km, the subject site is unlikely to be of importance to the long-term survival of this species.			the undertaking of the proposal.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. There is one record within 10 km of the subject site at 4.6 km. Suitable habitat is scarce. As such, it is unlikely that the subject site is of value to their lifecycle.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering there is only one record from the search area and its proximity to the subject site, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Chthonicola sagittata	Speckled Warbler	Inhabits a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. There are no records within the 10 km search area and considering the degraded nature of the site, suitable habitat within the subject site is scarce. As such, it is unlikely that the subject site is of value to their lifecycle.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^*Anthochaera phrygia*	Regent Honeyeater	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		There is one record within 10 km of the subject site, it is at 9.7km. Suitable habitat is already fragmented and scare. As such, it is unlikely that the subject site is of value to their lifecycle.		iii. Considering the limited records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Epthianura albifrons	White-fronted Chat	The White-fronted Chat inhabits areas directly adjacent to wetlands, foraging amongst grasses. There are no records in the 10 km search area. Given that the proposal will be removing a relatively insignificant amount of associated habitat (0.054 ha), it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that associated wetland habitat was largely absent, and no nests were encountered, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Grantiella picta	Painted Honeyeater	The species constructs its nests in the outer canopy of drooping eucalypts, she-oaks, and paperbark. There are no records within the 10 km search area and limited suitable habitat. It is therefore unlikely that the subject site would constitute critical habitat for the species.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the small area of available habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*),	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or	Yes. See Appendix F	No significant impact will arise to the local viability of this species or its

		White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Foraging tree species are present (*E. albens, E. melliodora* and *E. blakelyi*), however, not in large contiguous woodland patches and nesting habitat was not present. There are no records within the 10 km search area and limited suitable habitat. It is therefore unlikely that the subject site would constitute critical habitat for the species.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the small area of available habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	close to the subject site.		habitat due to the undertaking of the proposal.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	A gregarious species, Grey-crowned Babblers inhabit open woodlands in large family groups. The subject site may represent suitable habitat for the species. To this, there is a single record from the search area (dating to 2020), at 4.6 km from the subject site.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		Family clans build and maintain several conspicuous dome-shaped nests year-round that are typically found in shrubs and sapling eucalypts. The field survey failed to detect any individual or group, nor any of their conspicuous nests. This suggests that, if used at all, the subject site would constitute foraging rather than roosting/breeding habitat. Thus, the subject site does not represent critical habitat necessary for the maintenance of their lifecycle.		iii. Considering the absence of nests detected during the field survey, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Daphoenositta chrysoptera	Varied Sittella	The Varied Sittella inhabits eucalypt forests and woodlands. Although the subject site may reflect suitable habitat for the species, there are no records within the search area. The field survey also failed to encounter any of their nests (although they may have been overlooked). Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha), it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and of nests from the subject site, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	The Dusky Woodswallow inhabits dry, open eucalypt forests and woodlands, as well as grasslands. While the subject site may represent suitable habitat for the species, there are no records from the 10 km search area.	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha), it is unlikely to place a local population at risk of extinction.		iii. Considering the absence of records from the search area and the lack of nests at the subject site, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	The Hooded Robin requires a structurally diverse habitat, featuring mature eucalypts, saplings, some small shrubs, and a ground layer of moderately tall native grasses. As such, the subject site did not satisfy the conditional criteria for the species, due to it being largely cleared. There are no records within the 10 km search area. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha), it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and the small size of the impacted habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Petroica boodang	Scarlet Robin	The Scarlet Robin inhabits dry eucalypt forests and woodlands, typically with an understory that is open and grassy. As such, the subject site satisfied the conditional criteria for the species. There are, however, no records from within the 10 km search area. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and the small size of the impacted habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Petroica phoenicea	Flame Robin	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. Birds forage from low perches, from which they pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. There are three records within 10 km of the subject site, the closest being 4.7 km. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and the small size of the impacted habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Stagonopleura guttata	Diamond Firetail	The Diamond Firetail inhabits eucalypt woodlands with a native grass dominated understorey. As such, the subject site satisfied the conditional criteria for the species. There are, however, no records from within the 10 km search area. The field survey also failed to encounter any of their nests (although they may have been overlooked). Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and the small size of the impacted habitat, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Dasyurus maculatus	Spotted-tailed Quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area and lack of suitable den sites, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		There are no records within 10 km of the subject site, habitat is scarce as the subject site is largely cleared. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.					
Phascogale tapoatafa	Brush-tailed Phascogale	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. There are no records within 10 km of the subject site, habitat is scarce as the subject site is largely cleared. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha) compared to that which will continue to exist in the study area, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records from the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Phascolarctos cinereus	Koala	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Highly selective browser, highly	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to

		dependent on the presence of food tree species. As per the Western Slopes and Plains Koala Management Area, three Feed Tree Species (*Eucalyptus albens, Eucalyptus melliodora* and *Eucalyptus blakelyi)* were present at the subject site. There are no records within 10 km of the subject site, habitat is scarce as the subject site is largely cleared. As such, the proposal in its current form is unlikely to place a local population at risk of extinction.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (1.587 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.			the undertaking of the proposal.
Cercartetus nanus	Eastern Pygmy-possum	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten	N/A	i. This species is associated with PCT 277. As such, up to 0.078 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (0.078 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		when flowers are unavailable. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum dreys or thickets of vegetation. Nest-building occurs primarily in tree hollows. Only three small hollows occur within the subject site. Considering that sparse eucalypt woodland adjacent to grassland can support low density populations of this species, the habitat within the subject site may be suitable, despite clearance and scarcity. However, there are no records within the 10 km search area. Indeed, there are only two records of this species for the entire Cabonne LGA, both from near to Goobang National Park. As such, the proposal in its current form is unlikely to place a local population at risk of extinction.					
Petaurus norfolcensis	Squirrel Glider	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Only three small hollows were present. Diet	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the limited records, their proximity, and relatively insignificant area of habitat to be removed (0.296 ha), it is unlikely	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		varies seasonally and consists of *Acacia* gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. There are two records within 10 km of the subject site, the closest being 6 km and the other nearly 10 km. As such, the proposal in its current form is unlikely to place a local population at risk of extinction.		that the proposal will jeopardise the long-term survival of the species.			
Petrogale penicillata	Brush-tailed Rock-wallaby	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Males tend to have larger home ranges than females. There are no records within 10 km of the subject site. The site is lacking in required rock outcrops. As such, the proposal in its current form will not place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records, quality habitat and relatively insignificant area of associated habitat to be removed (0.296 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

Pteropus poliocephalus	Grey-headed Flying-fox	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. The nearest mapped camp is in Cowra, ~50 km south. Considering the large distance to the nearest mapped camp, and lack of records within 10 km of the subject site, the proposal will not place a local population at risk of extinction.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (0.296 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	The Yellow-bellied Sheathtail-bat roosts in groups in small tree hollows. There are no records within 10 km of the subject site and only three hollows potentially suitable for roosting. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha),	N/A	i. This species is associated with PCTs 53, 266 and 277. As such, up to 1.587 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		relative to that which will continue to exist in the wider study and search areas, it is unlikely to place a local population at risk of extinction.		iii. Considering the absence of records and that a greater quantity of vegetation will continue to exist in the wider study and search areas, it is unlikely that the proposal will jeopardise the long-term survival of the species			
Chalinolobus dwyeri	Large-eared Pied Bat	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. There are no records within 10 km of the subject site and suitable habitat, such as caves for roosting, is absent. As such, the proposal in its current form will not place a local population at risk of extinction. The potential extent of impacts to this species can be further minimised by adhering to the mitigation advice outlined in **Section 7**.	N/A	i. This species is associated with PCT 277. As such, up to 0.078 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and that a greater quantity of vegetation will continue to exist in the wider study ad search areas, it is unlikely that the proposal will jeopardise the long-term survival of the species	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Chalinolobus picatus	Little Pied Bat	The Little Pied Bat roosts in caves, rock outcrops, tunnels, and	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or	Yes. See **Appendix F**	No significant impact will arise to the local

		buildings, as well as small tree hollows. There are no records within 10 km of the subject site and a lack of hollows for roosting. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.054 ha), it is unlikely to place a local population at risk of extinction. The potential extent of impacts to this species can be further minimised by adhering to the mitigation advice outlined in **Section 7**.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that there are no records within the 10 km search area and that a greater quantity of vegetation will continue to exist in the wider study and search area, it is unlikely that the proposal will jeopardise the long-term survival of the species	close to the subject site.		viability of this species or its habitat due to the undertaking of the proposal.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. There are no records within 10 km of the subject site and a lack of hollows for roosting. Given that the proposal will be removing a relatively insignificant amount of vegetation (0.296 ha), it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCTs 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that there are no records within the 10 km search area and that a greater quantity of vegetation will continue to exist in the wider study and search area, it is unlikely that the proposal will jeopardise the long-term survival of the species	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Nyctophilus corbeni	Corben's Long-eared Bat	Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine-	N/A	i. This species is associated with PCT 266. As such, up to 0.218 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to

		vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. There are no records within 10 km of the subject site and a lack of preferred tree species. As such, it is unlikely to place a local population at risk of extinction.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that there are no records within the search area and that a greater quantity of vegetation will continue to exist within the wider study and search areas, it is unlikely that the proposal will jeopardise the long-term survival of the species.			the undertaking of the proposal.
Miniopterus orianae oceanensis	Large Bent-winged Bat	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops. There are no records within 10 km of the subject site and roosting caves are absent.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that there are no records within the search area it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		As such, it is unlikely to place a local population at risk of extinction.					
Synemon plana	Golden Sun Moth	Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia* spp. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses *Austrostipa* spp. or Kangaroo Grass *Themeda australis.* Wallaby grass (*R. bipartitum*) is present in the subject site with a balance of bare ground and tussocks in places, as well as *Austrostipa scabra* having been recorded. However, there are no records within 10 km of the subject site and the majority of grass vegetation is cropped or weedy, adjacent to fragmented woodland, therefore there is a lack of suitable habitat.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that the appropriate vegetation composition was not present, and that there are no records from within the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		As such, it is unlikely to place a local population at risk of extinction.					
Keyacris scurra	Key's Matchstick Grasshopper	Typically found in native grasslands and grassy woodlands but it has also been recorded in other vegetation associations usually containing a native grass understory (especially kangaroo grass *Themeda triandra*) and known food plants (particularly Asteraceae). Opportunistic sightings (as opposed to records from systematic surveys) have been reported in a wide range of vegetation types in south-east NSW, including wet sclerophyll forest, montane low forest, dry woodlands, heathland, and montane grasslands. In some reported locations there is an absence of *Themeda* and very few or no Asteraceae. There are no records within 10 km of the subject site and the majority of grass vegetation is cropped, adjacent to fragmented woodland, therefore there is a lack of suitable habitat. As such, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that the appropriate vegetation composition was not present, and that there are no records from within the search area, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Ammobium craspedioides	Yass Daisy	Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its

		association with a large range of eucalypts (*Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida*). Apparently unaffected by light grazing, as populations persist in some grazed sites. Found in a number of TSRs, Crown reserves, cemeteries and roadside reserves within the region. There are associated vegetation communities and species present, however, there are no records within 10 km of the subject site as the species distribution is restricted to localities in the Yass District and south of Wagga Wagga and north of Bigga. As such, it is unlikely to place a local population at risk of extinction.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records due to highly restricted distribution, it is unlikely that the proposal will jeopardise the long-term survival of the species.			habitat due to the undertaking of the proposal.
Cullen parvum	Small Scurf-pea	In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (*Eucalyptus camaldulensis*) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm. There are no records within 10 km of the subject site and no associated vegetation communities present. Suitable	N/A	i. This species is associated with PCT 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and the unsuitability of the subject site for individuals, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		habitat is fragmented and only two minor non-perennial watercourses exist within the site. As such, it is unlikely to place a local population at risk of extinction.					
Swainsona recta	Small Purple-pea	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *E. melliodora*, Candlebark Gum *E. rubida* and Long-leaf Box *E. goniocalyx*. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. There are no records within 10 km of the subject sites and the associated habitat is fragmented. The required quality understorey is not present. As such, it is unlikely to place a local population at risk of extinction.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and the unsuitability of the subject site for individuals, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Swainsona sericea	Silky Swainson-pea	As the Silky Swainson-pea grows in the understorey of Box-Gum Woodlands, the subject site represents suitable canopy habitat for the species. There are, however, no records from within the 10 km search area and habitat is fragmented. The	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		required quality understorey is not present. It is unlikely that the subject site represents critical habitat for the species.		iii. Considering the absence of records and the unsuitability of the subject site for individuals, it is unlikely that the proposal will jeopardise the long-term survival of the species.			
Acacia ausfeldii	Ausfeld's Wattle	Found to the east of Dubbo in the Mudgee-Ulan-Gulgong area of the NSW South Western Slopes bioregion, with some records in the adjoining Brigalow Belt South, South Eastern Highlands and the Sydney Basin bioregions. Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong. Associated species include *Eucalyptus albens, E. blakelyi* and *Callitris* spp., with an understorey dominated by *Cassinia* spp. and grasses. Suitable canopy tree species are present in the associated vegetation communities (*E. albens* and *E. blakelyi*) within the subject site, however *Cassina* spp. were not detected in the understorey, nor were any similar species of *Acacia*. There are no records from within the 10 km search area and habitat is fragmented.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records in the search area and limited understorey habitat within the subject site, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix** F	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		It is unlikely that the subject site represents critical habitat for the species.					
^^*Pilularia novae-hollandiae*	Austral Pillwort	The Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. Sedge habitat was present within PCT 53 at the edge of the extraction area dams, however, there are no suitable waterways present and the species was not detected in the field survey There are no records from within the 10 km search area. As such, it is unlikely that the subject site is critical habitat for the species.	N/A	i. This species is associated with PCT 53. As such, up to 0.054 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering that there are no records within the search area and the relatively insignificant area of PCT (0.054) that will be affected, it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
^*Prasophyllum petilum*	Tarengo Leek Orchid	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock *Poa labillardieri*, Black Gum *Eucalyptus aggregata* and tea-trees *Leptospermum* spp. near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT). Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (near Queanbeyan, Ilford and Hall). Population density at the Boorowa site is higher in the open	N/A	i. This species is associated with PCT 277. As such, up to 0.078 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (0.078 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		grassland dominated by wallaby grasses *Austrodanthonia* spp., compared to that within the denser stands of Kangaroo Grass *Themeda australis*. The associated canopy tree species were not present within the subject site. Common understorey species were also lacking, aside from Wallaby Grass (*R. bipartitum*). There are no records within 10 km of the subject site and the habitat is degraded and generally lacking in associated species. It is unlikely that the subject site represents critical habitat for the species.					
Prasophyllum sp. Wybong		A perennial orchid, appearing as a single leaf over winter and spring. Flowers in spring and dies back to a dormant tuber over summer and autumn. Known to occur in open eucalypt woodland and grassland. There are no records within 10 km of the subject site and the associated habitat is degraded. It is unlikely that the subject site represents critical habitat for the species.	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (0.078 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.
Euphrasia arguta		Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal.	No, AOBV not present within or	Yes. See **Appendix F**	No significant impact will arise to the local viability of this

		the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. As with other species of *Euphrasia*, this species is semi-parasitic and attaches to the roots of other associated plants. There are no records within 10 km of the subject site and the associated habitat is degraded. It is unlikely that the subject site represents critical habitat for the species.		ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and relatively insignificant area of habitat to be removed (0.078 ha), it is unlikely that the proposal will jeopardise the long-term survival of the species.	close to the subject site.		species or its habitat due to the undertaking of the proposal.
Grevillea wilkinsonii	Tumut Grevillea	The associated native vegetation in the Goobarragandra sites are typically remnant riverine shrub communities adjacent to open-forest, with the most common tree species being Blakely's Red Gum (*Eucalyptus blakelyi*), Apple Box (*E. bridgesiana*), Yellow Box (*E. melliodora*), and Red Stringybark (*E. macrorhyncha*) and with Kurrajongs (*Brachychiton populneus*) sometimes growing in nearby paddocks. The population at Gundagai is growing on the	N/A	i. This species is associated with PCT 266 and 277. As such, up to 0.296 ha of associated habitat will be removed/modified by this proposal. ii. The study area is already very fragmented. The proposal will further exacerbate fragmentation, albeit to a minor extent. iii. Considering the absence of records and the unsuitability of the subject site for individuals, it	No, AOBV not present within or close to the subject site.	Yes. See **Appendix F**	No significant impact will arise to the local viability of this species or its habitat due to the undertaking of the proposal.

		upper slope of a steep hill on Serpentinite rock. The associated native vegetation at this site is a grassy White Box (*Eucalyptus albens*) woodland with scattered shrubs of Pink Wedding Bush (*Ricinocarpos bowmanii*) and Hop Bush (*Dodonaea viscosa*). The groundcover is dominated by Kangaroo Grass (*Themeda triandra*) and Snow Grass (*Poa sieberiana*). Associated canopy tree species were present within the subject site, *E. blakeyli* and *E. melliodora*. However, associated understorey species were not detected. There are no records within 10 km of the subject site and the associated habitat is degraded. The natural distribution of this species is highly restricted, two occurrences are recorded, one along the Goobarragandra River (20 km east of Tumut) and one at a dual property boundary at Gundagai. Both are at least 200 km from the subject site. It is unlikely that the subject site represents critical habitat for the species.		is unlikely that the proposal will jeopardise the long-term survival of the species.			

BC Act Test of Significance for Threatened Ecological Communities

Community	a.	b.	c.	d.	e.	Impact Significance
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland, in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes South East Corner and Riverina Bioregions.	N/A	i. The proposal in its current form would remove up to 0.296 ha of this CEEC from the subject site. Occurring as isolated, remnant patches of White Box grassy woodland (total number of habitat trees = 2), this CEEC was highly degraded and was not demonstrating recent recruitment. Although the CEECs broader area of occupancy was not thoroughly investigated, it was incidentally observed to occur in road corridors within the study area. These areas would not experience any edge effects (e.g., weed invasions or changes in water) linked to the proposal. Therefore, while the removal of this pocket of CEEC from the subject site is undesirable, the removal of 0.296 ha will not significantly reduce its area of occupancy. ii. The proposal may remove up to 0.296 ha of this CEEC from the subject site. However, as above, its continued presence in the surrounding road corridors will ensure that its local occurrence will not be jeopardised with extinction.	i. The proposal will impact up to 0.296 ha of this CEEC. While the total area of occupancy within the study area is not known, the community was observed to extend well outside the impact footprint. As such, the proposal will not significantly reduce the occurrence of this TEC. ii. The proposal would eliminate isolated, small pockets of this CEEC. Given the more substantial examples nearby, which displayed connectivity, the impact of this loss will not be significant. iii. Due to its small patch size and poor understorey species assemblage, this example of the CEEC is unlikely to be important to the long term survival of the CEEC in the area. Regardless, if possible, the proponent should aim to avoid impacts to this CEEC.	No. AOBV not present	Yes, the following KTPs would be exacerbated by the proposal: • Anthropogenic Climate Change • Clearing of native vegetation • Competition from feral honeybees, *Apis mellifera* • Invasion of native plant communities by exotic perennial grasses • Loss of Hollow-bearing Trees Additionally, the following KTPs have potential to be exacerbated by the proposal: • Bushrock removal – **Unlikely** • Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.) – **Unlikely** • Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972 – **Unlikely** • Infection by *Psittacine Circoviral* (beak and feather) Disease affecting endangered psittacine species and populations – **Likely** • Infection of frogs by amphibian chytrid causing	No significant impact

					the disease chytridiomycosis – **Unlikely** • Infection of native plants by *Phytophthora cinnamomi* – **Unlikely** • Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.) – **Unlikely** • Invasion and establishment of exotic vines and scramblers – **Unlikely** • Invasion and establishment of Scotch Broom (*Cytisus scoparius*) – **Unlikely** • Invasion and establishment of the Cane Toad (*Bufo marinus*) - **Unlikely** • Invasion of native plant communities by African *Olive Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.- **Unlikely** • Invasion of native plant communities by *Chrysanthemoides monilifera* – **Unlikely** • Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW – **Unlikely** • Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat) – **Unlikely** • Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants - **Unlikely** • Removal of dead wood and dead trees - **Unlikely**	

APPENDIX E – MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

The EPBC Act Protected Matters search has identified four wetlands of international importance, four TECs, 33 threatened species and 10 migratory species that could possibly occur in the study area. Assessment of the subject site determined that no Ramsar wetland would be impacted by the development.

The following tables give an overview of the assessments of these threatened entities and shows that the Proposed activity:

1. Is not likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance are:
    i. World heritage properties.
    ii. National heritage places.
    iii. Wetlands of international importance.
    iv. Threatened species and ecological communities.
    v. Migratory species.
    vi. Commonwealth marine areas.
    vii. The Great Barrier Reef Marine Park. And;
    viii. Nuclear actions (including uranium mines).
    ix. A water resource, in relation to coal seam gas development and large coal mining development.
2. Is not likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

Notes: Important Population as determined by the Environment Protection and Biodiversity Conservation Act 1999, is one that for a vulnerable species:

a) is likely to be key source populations either for breeding or dispersal

b) is likely to be necessary for maintaining genetic diversity

c) is at or near the limit of the species range.

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013).

Wetlands of International Importance

Name	Proximity	Assessment of significance required (Yes / No)
Banrock station wetland complex	700 - 800 km upstream	No, the proposal does not occur close to the wetland.
Hattah-Kulkyne Lakes	500 - 600 km upstream	No, the proposal does not occur close to the wetland.
Riverland	700 - 800 km upstream	No, the proposal does not occur close to the wetland.
The Coorong, and Lakes Alexandrina and Albert Wetland	800 - 900 km upstream	No, the proposal does not occur close to the wetland.

EPBC Act-Listed Threatened Ecological Communities

Name	Status	Assessment of significance required (Yes / No)
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion	Endangered	No, this community does not occur within the subject site.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	No, this community does not occur within the subject site.
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	No, this community does not occur within the subject site.
Weeping Myall Woodlands	Endangered	No, this community does not occur within the subject site.
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	No, the community in this form does not occur within the subject site.

EPBC Act-listed Critically Endangered and Endangered Species

Booroolong Frog (*Litoria booroolongensis*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.078 ha of potential habitat for the Booroolong Frog. This is not a priority management area for the species. It is at the edge of the species known distribution, if a population were to be present, it would be significant. The species inhabit permanent streams with some fringing vegetation cover such as ferns, sedges or grasses; adults occur on or near cobble banks and other rock structures within stream margins; and they shelter under rocks or amongst vegetation near the ground on the stream edge. There are no permanent watercourses within the subject site and any aquatic habitat is degraded. There are no records of the species from within the 10 km search area. The area of associated PCT 277 to be removed/modified (0.078 ha) is relatively insignificant. Therefore, it is unlikely for proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Permanent watercourses and quality fringing aquatic vegetation were absent were absent. The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Booroolong Frogs are present, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.078 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Modification of steam channels and loss of cobble banks; loss of native streamside vegetation; damage to stream margins by stock; predation of eggs and tadpoles by introduced fish; weed invasion of streamside habitats, particularly by willows; disease - chytrid fungus; changes to water quality through sedimentation and use of herbicides or pesticides near streams; stream drying caused by severe drought or water extraction/impoundment; large amounts of sedimentation due to wild horse activity, causing filling of breeding crevices; high density of fossicking and in particular the illegal use of powered sluices and deliberate damming of stretches to facilitate use; feral pig activities that damage habitat and erode stream margins are the main threats to this species. The proposal will not exacerbate these threats further. Therefore, the proposal is unlikely to interfere with species recovery.
Conclusion	**No significant impact**

Australasian Bittern (*Botaurus piciloptilus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.054 ha of potential habitat for the Australasian Bittern. This is not a priority management area for the species. It is at the edge of the species known distribution, if a population were to be present, it would be significant. Australian Bitterns inhabit permanent freshwater bodies flanked by tall dense vegetation, which the subject site contained but it was degraded, and unlikely to be occupied by this species. There are no records of the species from within the 10 km search area and the proposal would remove/modify a relatively insignificant area of the associated PCT 53 (0.054 ha). Therefore, it is unlikely for proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, although the subject site may be conducive to habitation, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	*Typha* and *Eleocharis* species, which are typically associated with breeding habitat, were absent. The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Australasian Bitterns are present, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.054 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Drainage of wetlands and alterations of natural flows; reduced water quality; predation by introduced species; use of herbicides, pesticides, and other chemicals; inappropriate grazing and burning of wetland areas; and changes in rainfall from anthropogenic climate change are the main threats to this species. The proposal will not exacerbate these threats further. Therefore, the proposal is unlikely to interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Australian Painted Snipe (*Rostratula australis*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.054 ha of potential habitat for the Australian Painted Snipe. This is not a priority management area for the species. It is at the edge of the species known distribution, if a population were to be present, it would be significant. The species inhabits swamps, dams, and marshlands, sheltering/nesting underneath tall vegetation (e.g., grasses, tussocks, and reeds). While the water bodies within the subject site may be broadly suitable for the species, there are no records from the 10 km search area. The proposal will impact a relatively insignificant area of associated PCT 53 (0.054 ha). As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. Therefore, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Australian Painted Snipes are present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.054 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Drainage of wetlands and alterations of natural flows; reduced water quality; predation by introduced species; use of herbicides, pesticides, and other chemicals; inappropriate grazing and burning of wetland areas; and exotic weed incursions are the main threats to this species. The proposal will not exacerbate these threats further. Therefore, the proposal is unlikely to interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Curlew Sandpiper (*Calidris ferruginea*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.054 ha of potential habitat for the Curlew Sandpiper. This is not a priority management area for the species. It is at the edge of the species distribution, if a population were to be present, it would be significant. The species generally occupies littoral and estuarine habitats, and in NSW is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. While the subject site may be marginally suitable for the species, there are no records from the 10 km search area. The proposal impacts a relatively insignificant area of associated PCT 53 (0.054 ha). As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. Therefore, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Curlew Sandpipers are present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.054 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Development pressure and human disturbance in roosting foraging sites in coastal areas; tidal feeding grounds abroad are affected by land reclamation for agriculture and industry; recreational human disturbance at roosting and foraging sites; flow reduction in the Murray-Darling Basin due to habitat degradation; climate change; mangrove incursion; groundwater pollution; and weed invasion, are the main threats to this species. The proposal will not exacerbate these threats further. Therefore, the proposal is unlikely to interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Gang-gang Cockatoo (*Callocephalon fimbriatum*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for the Gang-gang Cockatoo. This is not a priority management area for the species. In spring and summer, this species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground. There are no records from the search area. The proposal will impact a relatively insignificant area of PCTs 266 and 277. As the subject site contained only two hollow-bearing trees, and fragmented habitat, it is unlikely to be attractive to this species for nesting or foraging. Therefore, it is unlikely that the proposal would induce a long-term decline in this species.
Reduce the area of occupancy of the species	As indicated above, the absence of records and the lack of ideal woodland habitat within the subject site, the proposal would not reduce the species' area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Given the absence of records and the lack of ideal woodland habitat within the subject site it is unlikely habitat critical for the species.
Disrupt the breeding cycle of a population	No breeding population is present, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of key breeding and foraging habitat from intensive wildfire events and inappropriate hazard reduction burns; loss and degradation of breeding and foraging habitat from rural and urban development; loss of breeding and foraging habitat from forestry management practices; climate change impacts to habitat suitability and distribution; Psittacine circovirus disease; infestation of habitat by invasive weeds.; and aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners are the main threats to this species. The proposal will not exacerbate these threats further. Therefore, the proposal is unlikely to interfere with species' recovery within the region.
Conclusion	**No significant impact**

Swift Parrot (*Lathamus discolor)*	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for the Swift Parrot. This is not a priority management area for the species. Swift Parrots undertake seasonal migrations, breeding in Tasmania in the spring and summer before migrating in the autumn and winter to the Australian mainland. The proposal will remove/modify a relatively insignificant area of associated PCTs 266 and 277 (0.296 ha). Given the absence of records from the 10 km search area, it is unlikely that the proposal would induce a decline in the population of the species.
Reduce the area of occupancy of the species	As indicated above, it is unlikely that the removal of 0.296 ha of potential habitat will significantly reduce the species area of occupancy.
Fragment an existing population into two or more populations	As indicated above, it is unlikely that a population of Swift Parrots are present. As such, the proposal should not reduce the species area of occupancy.
Adversely affect habitat critical to the survival of a species	As indicated above, it is unlikely that the subject site represents habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	As this species breeds exclusively in Tasmania, breeding will not be interrupted by this proposal.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of key breeding and foraging habitats (through intensive wildlife events and to rural and urban development); impacts of anthropogenic climate change; Psittacine circovirus disease; predation by introduced species; illegal capture for use within the wildlife trade; and infestation of habitat by weeds are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Regent Honeyeater (*Anthochaera phrygia*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for the Regent Honeyeater. This is not a priority management area for the species. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. There is one record within the 10 km search area at 9.7 km. The proposal will remove/modify a relatively insignificant area of associated PCTs 266 and 277 (0.296 ha) that does not fit the above criteria for appropriate woodland. It is unlikely that the proposal would induce a decline in the population of the species.
Reduce the area of occupancy of the species	As indicated above, it is unlikely that the removal of 0.296 ha of potential habitat will significantly reduce the species area of occupancy.
Fragment an existing population into two or more populations	As indicated above, it is unlikely that a population of Regent Honeyeaters are present in significant numbers. As such, the proposal should not reduce the species area of occupancy.
Adversely affect habitat critical to the survival of a species	As indicated above, it is unlikely that the subject site represents habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	As there are only three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions, breeding will not be interrupted by this proposal.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss, fragmentation and degradation; competition from larger more aggressive honeyeaters; small population size and restricted habitat availability making the species vulnerable to stochastic events; disturbance at nesting sites; and drought limiting water availability are the main threats to this species. Considering proximity and scarcity of records, and absence of key habitat, the proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Hooded Robin, south-eastern form (*Melanodryas cucullata cucullata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for the Hooded Robin. It is within a priority management area for the species. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. As there are two associated PCTs present (PCTs 266 and 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in structural diversity and quality habitat. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, although the subject site may be conducive to inhabitation, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Hooded Robins are present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Clearing of woodlands; modification and destruction of ground habitat; competition of Noisy Miners; and increasing drought conditions due to anthropogenic climate change are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Spotted-tailed Quoll (*Dasyurus maculatus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for this species. It is not within a priority management area for the species. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. As there are two associated PCTs present (PCTs 266 and 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in quality habitat including suitably large hollows. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, although the subject site may be conducive to inhabitation, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value to the species.
Disrupt the breeding cycle of a population	It is unlikely that a breeding population of Spotted-tailed Quolls are present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss, fragmentation and degradation of habitat; competition with introduced predators such as cats and foxes; deliberate poisoning, shooting and trapping, primarily in response to chicken predation; roadkill; and poisoning from eating cane toads in the wild, are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Koala (*Phascolarctos cinereus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 1.587 ha of potential habitat for the Koala. This is not a priority management area for this species. The Koala is a highly selective browser, dependent on the presence of food tree species. The subject site holds value to the species as it has TECs present that contain food source trees. It associated with PCTs 53, 266 and 277 found within the subject site. However, there are no records within the 10 km search area and the proposal will impact a relatively insignificant area of associated PCTs (1.587 ha). As such, these works will not induce a long-term decline in the population of the Koala.
Reduce the area of occupancy of the species	As other habitat corridors will continue to exist following development, the Koala's area of occupancy will not be significantly reduced.
Fragment an existing population into two or more populations	The proposal would widen the existing fragmentation through the new alignment, although the extent of widening would not be significant, and no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely to be critical habitat for the species.
Disrupt the breeding cycle of a population	Given the insignificant amount of vegetation at site, compared to the rest of the wider study and search areas, it is highly unlikely that the footprint supports a breeding population of the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 1.587 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss, modification, and fragmentation; vehicular strikes; predation by dogs; koala disease; heat stress; anthropogenic climate change; and inadequate support for fauna rehabilitation are the main threats to this species. The proposal is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Small Purple-pea (*Swainsona recta*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for this species. It is not within a priority management area for the species. It is at the edge of the species distribution, if a population were to be present, it would be significant. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. Plants die back in summer, surviving as a rootstocks until they shoot again in autumn. Flowers throughout spring, with a peak in October. The associated understorey species were not present within the subject site. As there are two associated PCTs present (PCTs 266 and 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in quality habitat. The area of PCTs to be impacted is relatively insignificant. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. No population was detected in the field survey or records, therefore there is no risk of fragmentation for this species.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value for the species.
Disrupt the breeding cycle of a population	It is unlikely that any population of this species is present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Grazing and tramping by domestic stock; habitat loss and degradation due to development, inappropriate rail maintenance and weed invasion; increased competition from other native grassland species due to reduced fire frequency; increased competition from Black Cypress Pine; loss of small populations due to natural or un-natural catastrophic events; accidental damage through recreation; construction of inappropriate hazard reduction control lines; railway embankment erosion; and feral pigs, are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Tarengo Leek Orchid (*Prasophyllum petilum*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.078 ha of potential habitat for this species. It is not within a priority management area for the species. It is at the edge of the species distribution, if a population were to be present, it would be significant. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock *Poa labillardieri*, Black Gum *Eucalyptus aggregata* and tea-trees *Leptospermum* spp. near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT). Population density at the Boorowa site is higher in the open grassland dominated by wallaby grasses *Austrodanthonia* spp., compared to that within the denser stands of Kangaroo Grass *Themeda australis*. Wallaby grass is present within the subject site, however, other associated woodland and understorey species are not. As there is an associated PCT present (PCT 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in quality habitat. The area of PCT to be impacted is relatively insignificant. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	No population was detected in the field survey or records, therefore there is no risk of fragmentation for this species.
Adversely affect habitat critical to the survival of a species	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. The lack of records suggests that the site holds no special value for the species.
Disrupt the breeding cycle of a population	It is unlikely that any population of this species is present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss, fragmentation and degradation due to a broad range of development; inappropriate mowing or grazing regimes; competition from other native and non-native plant species; chance extinctions due to their small and few populations; land management practices that are not supportive of conservation; and road widening and other development pressures at the Muswellbrook population, are the main threats to the species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Prasophyllum sp. Wybong	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for this species. It is not within a priority management area for the species. Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. The distribution is highly restricted but does, however, overlap with White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland EPBC Act-listed threatened ecological community. The key eucalypt species of this TEC are present but the understorey is not the EPBC Act-listed quality habitat required to support this species. As there are two associated PCTs present (PCT 266 and 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is approximately 100 km from the closest known population at Yeoval. The area of PCT to be impacted is relatively insignificant. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	No population was detected in the field survey or records, therefore there is no risk of fragmentation for this species.
Adversely affect habitat critical to the survival of a species	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. The lack of records suggests that the site holds no special value for the species.
Disrupt the breeding cycle of a population	It is unlikely that any population of this species is present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat clearance, weed invasion, vehicle traffic, inappropriate disturbance regimes, chemical drift from agricultural properties, illegal collection, trampling by people and climate change, are the main threats to the species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Euphrasia arguta	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.296 ha of potential habitat for this species. It is not within a priority management area for the species or at the edge of the species distribution. Grows in grassy riparian areas, recorded from Bathurst to Walcha area (possibly extinct). It was rediscovered in the Nundle area of the NSW north western slopes and tablelands in 2008, the majority of plants are located in Nundle State Forest. As there are two associated PCTs present (PCT 266 and 277), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in suitable habitat being largely cropped and otherwise disturbed, or having been historically, and not a riparian area. The area of PCTs to be impacted is relatively insignificant. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, no population appears to be present. As such, the proposal should not reduce the species area of occupancy.
Fragment an existing population into two or more populations	No population was detected in the field survey or records, therefore there is no risk of fragmentation for this species.
Adversely affect habitat critical to the survival of a species	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. The lack of records suggests that the site holds no special value for the species.
Disrupt the breeding cycle of a population	It is unlikely that any population of this species is present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Livestock grazing, and road maintenance and clearing of roadside vegetation for fire breaks, are the main threats to the species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Tumut Grevillea (*Grevillea wilksonii*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 0.218 ha of potential habitat for this species. It is not within a priority management area for the species. It is at the edge of the species distribution, if a population were to be present, it would be significant. Most plants occur in open sunny areas, those found under the canopy of dense vegetation tend to be spindly and are sometimes subject to sooty mould infestations. The associated native vegetation in the Goobarragandra sites are typically remnant riverine shrub communities adjacent to open-forest. At Gundagai, it grows on the upper slope of a steep hill on Serpentinite rock.. The groundcover is dominated by Kangaroo Grass (*Themeda triandra*) and Snow Grass (*Poa sieberiana*).The associated understorey species are not present within the subject site. As there is an associated PCT present (PCT 266), it is possible that the subject site could support a population of the species. However, there are no records from the 10 km search area and the subject site is limited in quality habitat. The area of PCT to be impacted is relatively insignificant. As such, it is unlikely for the proposal to induce a long-term decline in the size of a population.
Reduce the area of occupancy of the species	As indicated above, the proposal will not reduce the species area of occupancy.
Fragment an existing population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. No population was detected in the field survey or records, therefore there is no risk of fragmentation for this species.
Adversely affect habitat critical to the survival of a species	The lack of records suggests that the site holds no special value for the species.
Disrupt the breeding cycle of a population	It is unlikely that any population of *G. wilksonii* is present at the subject site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.218 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Grazing by domestic stock; habitat/population loss and degradation due to weed invasion and competition with native species; severe floods and climate change induced extreme events; habitat loss and degradation due to clearance; private land ownership changes leading to non-sympathetic practices; and localised disturbances, are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

EPBC Act-listed Vulnerable Species

Southern Bell Frog (*Litoria raniformis*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.054 ha of potential habitat for the Southern Bell Frog (PCT 53). There are no priority management areas within the study area, nor are there records from within the 10 km search area. However, it is at the edge of the species distribution. Found in bulrushes and other emergent vegetation in or at the edges of permanent or semi-permanent water. Lakes, dams, ponds, swamps, wetlands, slow moving streams, drains, culverts and other human modified environments that hold water may all provide suitable habitat. Considering that PCT 53 is in one of the most disturbed areas of the subject site, the relatively small area to cleared, there are no records in the 10 km search area and this species was not detected in the field survey, the project is unlikely to increase negative impact for an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely to be critical for the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.054 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Alterations to drainage patterns and stormwater runoff; Chytrid Fungus; predation by feral animals (including exotic fish); and loss of habitat are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Pink-tailed Legless Lizard (*Aprasia parapulchella*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Pink-tailed Legless Lizard (PCTs 266 and 277). There are no priority management areas within the study area, nor are there records from within the 10 km search area. The subject site is close to the western range limit for this species, which extends as far west as Forbes. This species' habitat consists of grassland and grassy woodland with rocky outcrops or partially soil-bound rocks with ant galleries present. Predominantly Kangaroo grass (*Themeda australis*) and other native grasses are associated with populations. Although some rocky habitat is present, it does not align with the ideal habitat for this species: partially embedded rock within slopes. Further there is a lack of native grasses as the main understorey within this subject site. Considering the above, the subject site is unlikely to contain an important population of this species.
Reduce the area of occupancy of an important population	The proposal will impact up to 0.296 ha of potential habitat for the Pink-tailed Legless Lizard
Fragment an existing important population into two or more populations	The proposal is not expected to result in any fragmentation for this species.
Adversely affect habitat critical to the survival of a species	Considering the above, the habitat within the subject site is unlikely to be critical for the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss and fragmentation; habitat degradation through rock removal; habitat degradation through pasture improvement including slashing, ploughing and sowing of non-native species; habitat degradation through intensive grazing by stock; habitat degradation through invasion of habitat by weeds or escaped pasture species; lack of knowledge of how habitat management practices influence site occupancy and species persistence; predation by feral or domestic cats and foxes; and changed fire regimes that result in changes to vegetation structure and composition, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Striped Legless Lizard (*Delma impar*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.078 ha of potential habitat for the Striped Legless Lizard (PCT 277). There are no priority management areas within the study area, nor are there records from within the 10 km search area. Indeed, the nearest records are from Yass, ~150 km to the south. Considering the above, the subject site is unlikely to contain an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	Considering the distance to any known populations, the habitat within the subject site is unlikely to be critical for the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.078 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss and fragmentation; habitat degradation through pasture improvement including rock removal, slashing, ploughing and sowing of non-native species; habitat degradation through invasion of habitat by weeds or escaped pasture species; habitat degradation through intensive grazing by stock; lack of knowledge of how habitat management practices influence site occupancy and species persistence; predation by feral or domestic cats and foxes; and changed fire regimes that result in changes to vegetation structure and composition, are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

White-throated Needletail (*Hirundapus caudacutus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.350 ha of potential habitat for this species (PCTs 53, 266 and 277). The subject site is not at the edge of its geographic distribution, there are no priority management areas within the study area, nor are there records from within the 10 km search area. Records near farmland are generally of flying above partly cleared pasture or remnant paddock edge vegetation. Considering the above, that the species' wider state and national records from inland are mostly vagrant and near analogous cleared land to the subject site in its current form and what it will continue to be, the project is unlikely to negatively impact an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	Given the absence of records within the study area and considering that this species is aerial and wide ranging, The habitat within the subject site is unlikely to be critical for the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 1.587 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Vegetation clearing and rotor strike from windfarms are the main threats to this species. The proposal is unlikely to exacerbate the above threats and is therefore unlikely to interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.218 ha of potential habitat for this species (PCT 266). The study area is within a priority management area, however, there are no records from within the 10 km search area. The subject site is not at the edge of the species distribution. Dependent on large hollow-bearing eucalypts for nest sites and feeds exclusively on *Casuarina* and *Allocasuarina,* of which large hollows and feed tree species are absent. The absence of records indicates that no population occurs in the general area.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above. If a population were to occur, the removal of 0.218 ha of associated habitat is unlikely to be significant.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely to be critical to the species given the absence of records, lack of feed trees, and absence of suitably large breeding hollows.
Disrupt the breeding cycle of an important population	The absence of records suggests that no individuals are present (save the potential vagrant). Further, there are no feeding trees or breeding trees present.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.218 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat clearance for development; decline of hollow-bearing trees; excessively frequent fire eliminating hollows and food, and disturbing breeding; feral herbivores; reduced access to surface water; moisture stress due to climate change damaging associated trees; domestic stock grazing; illegal bird smuggling and egg collection; weed invasion; and exclusion of Aboriginal custodians, are the main threats to this species. The proposal is unlikely to significantly exacerbate the above threats and is therefore unlikely to interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Superb Parrot (*Polytelis swainsonii*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Superb Parrot (PCT 266 and 277). Although the subject site is not at the geographic edge of the species distribution, the search area contained twenty-eight records (the most recent of which is from 2022 at 8.6 km from the subject site, and the closest is at 880 m) and the study area is within an NSW priority management area. Therefore, if Superb Parrots were to be present at the subject site, this would constitute an important population. Despite there being twenty-eight records within the 10 km search area, none are from within the subject site, but are as close as within the study area. Although habitat within the quarry site (existing and proposed) is already degraded and has limited suitable required hollow-bearing trees for this species to nest. This species was not detected during the field survey. Furthermore, it is unlikely that the removal of a relatively insignificant amount of associated habitat (0.296 ha) and only two hollow-bearing trees would induce a long-term population decline (if present).
Reduce the area of occupancy of an important population	The proposal will impact up to 0.296 ha of potential habitat for the Superb Parrot, this is unlikely to be significant due to the large amount of remnant habitat which will be retained in the wider search area.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Given the relatively small amount of habitat, and scarcity of hollow-bearing trees, it is unlikely that the habitat is critical to the survival of this species.
Disrupt the breeding cycle of an important population	As a bird that congregates in large breeding colonies, the absence of records in the subject site and intermittent sightings in the wider search area suggests that individuals do not rely on the subject site.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of hollow bearing trees and habitat fragmentation and loss are the main threats for this species. The proposal is unlikely to exacerbate the above threats to a degree that this proposal interferes with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Brown Treecreeper, eastern subspecies (*Climacteris picumnus victoriae*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Brown Treecreeper, eastern subspecies (PCTs 266 and 277). The subject site is not at the edge of its geographic distribution. It is, however, within a priority management area and there is within the search area one record (dating to 2020); approximately 4.6 km to the northeast. Given the age of this record, and the absence of preceding/subsequent records, suggests that this sighting may have been a vagrant. Further, there are only two hollow-bearing trees within the footprint and the scattered paddock trees do not represent preferred habitat for this species. As such, the subject site is unlikely to contain an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely to be critical for the species, see above.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Historical loss of woodland due to agriculture, forestry, mining and residential development; fragmentation of woodland; loss of tree hollows, mature eucalypts and fallen timber from overgrazing and firewood collection; loss of ground litter from compaction and overgrazing; inappropriate forestry management practices; loss of understorey habitat; invasive weed competition with natives; aggressive exclusion by over abundant Noisy Miners; and land management resulting in woodland degradation; are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Painted Honeyeater (*Grantiella picta*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Painted Honeyeater (PCTs 266 and 277). The subject site is not at the edge of its geographic distribution, nor are there priority management areas within the study area. There are no records within the 10 km search area. As such, no important population would occur at the subject site.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. Box-Gum Woodland habitat that is associated with this species is already fragmented and degraded without mistletoe. The habitat within the subject site is unlikely to be critical for the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat clearance, disturbance, and fragmentation; the removal of large trees with heavy mistletoe infestations; overgrazing of grassy woodlands; habitat incursion by exotic weeds; inappropriate fire regimes; and competition with larger, more aggressive honeyeaters are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Diamond Firetail (*Stagonopleura guttata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Diamond Firetail (PCTs 266 and 277). The subject site is not at the edge of its geographic distribution, nor are there records from within the 10 km search area. The study area is, however, within a priority management area for the species. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (*Eucalyptus pauciflora*) Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. It was not detected during the field survey. The habitat is already fragmented and degraded, the Box Gum species are scattered within the subject site and the understorey is either lacking or weedy. Given that the proposal will be removing a relatively insignificant amount of vegetation – 0.296 ha - compared to that which will continue to exist in the wider search area, it is unlikely for the scope of works to place a local population at risk of extinction.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above. If a population were to occur, the removal of 0.296 ha of associated habitat is unlikely to be significant.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely critical habitat given the absence of records.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Clearing and fragmentation of woodlands; poor regeneration of habitat; invasion by exotic weed species; predation of eggs and aggressive exclusion by over abundant Noisy Miners are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Brush-tailed Rock Wallaby (*Petrogale penicillata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Brush-tailed Rock Wallaby (PCTs 266 and 277). The subject site is at the edge of the species geographic distribution, however, there are no priority management areas within the study area, nor are there records from within the 10 km search area. It was not detected during the field survey. The habitat is already fragmented and degraded, the rocky terrain present in the subject site is limited. They live in highly rocky terrain such as escarpments, boulder piles and rocky pinnacles. They generally prefer sites that are north-facing and contain numerous ledges and crevices, this complex habitat is lacking within the subject site. Considering the above, the subject site is unlikely to contain an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced. It is unlikely that an important population exists at the site.
Adversely affect habitat critical to the survival of a species	It is unlikely that the habitat at the subject site is critical to the survival of the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Feral predation; competition for forage and refuge areas with goats; inappropriate fire regimes; competition for food and shelter with other native macropods; invasive weed infestation; road kill; and habitat degradation due to feral pigs, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Grey-headed Flying Fox (*Pteropus poliocephalus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Grey-headed Flying Fox (PCTs 266 and 277). The study area is not within a priority management area nor are there records from within the 10 km search area. It is not on the edge of the species distribution. The nearest mapped flying fox camp is at Cowra, ~50 km to the south. Considering the above, the subject site is unlikely to contain an important population of this species.
Reduce the area of occupancy of an important population	Considering the above, the subject site is unlikely to contain an important population of this species.
Fragment an existing important population into two or more populations	Considering the above, the subject site is unlikely to contain an important population of this species.
Adversely affect habitat critical to the survival of a species	The absence of records and known camps from within the search area indicates that no critical habitat is present.
Disrupt the breeding cycle of an important population	Considering the above, the subject site is unlikely to contain an important population of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of roosting and foraging sites; electrocution on powerlines, entanglement in netting and on barbed-wire; heat stress; conflict with humans; incomplete knowledge of abundance and distribution across the species' range; illegal shooting, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.078 ha of potential habitat for the Large-eared Pied Bat (PCT 277). The study area is not within a priority management area nor are there records from within the 10 km search area. The subject site is not at the edge of the species distribution. Given the above, it is unlikely for any population to be present.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at site, see above.
Adversely affect habitat critical to the survival of a species	Given the above, it is unlikely that the habitat is critical to the survival of the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.078 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Clearing and isolation of forest and woodland habitats near cliffs, caves and old mine workings for agriculture or development; loss of foraging habitat close to cliffs, caves and old mine workings from forestry activities and too-frequent burning, usually associated with grazing; damage to roosting and maternity sites from mining operations, and recreational caving activities; use of pesticides; disturbance to roosting areas by goats; and insufficient understanding of habitat requirements, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Corben's Long-eared Bat (*Nyctophilus corbeni*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.218 ha of potential habitat for Corben's Long-eared Bat (PCT 266). The study area is not within a priority management area nor are there records from within the 10 km search area. It is, however, on the edge of the species distribution, therefore if a population was to be present, it would be considered important. The habitat is already fragmented and degraded with limited suitability for roosting. Given the absence of records, it is unlikely for any population to be present.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above. If a population were to occur, the removal of 0.218 ha of associated habitat is unlikely to be significant.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Given the above, it is unlikely that the habitat is critical to the survival of the species.
Disrupt the breeding cycle of an important population	Given that there are only two hollow-bearing trees within the footprint, it is unlikely that the proposal would impact the breeding cycle of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.218 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of remnant semi-arid woodland and mallee habitat; loss of hollow-bearing trees; application of pesticides in or adjacent to foraging areas; inappropriate fire regimes; disturbance to winter roosting and breeding sites; and loss or modification of habitat, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Golden Sun Moth (*Synemon plana*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Golden Sun Moth (PCTs 266 and 277). The study area is not within a priority management area nor are there records from within the 10 km search area. It is, however, on the edge of the species distribution, therefore if a population was to be present, it would be considered important. Wallaby grass (*R. bipartitum*) is present in the subject site with a balance of bare ground and tussocks in places, as well as *Austrostipa scabra* having been recorded. However, there are no records within 10 km of the subject site and the majority of understorey vegetation is cropped or weedy, adjacent to fragmented woodland, therefore there is a lack of suitable habitat. Given the absence of nearby records, it is unlikely for any population to be present.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above. If a population were to occur, the removal of 0.296 ha of associated habitat is unlikely to be significant.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Given the above, it is unlikely that the habitat is critical to the survival of the species.
Disrupt the breeding cycle of an important population	Given the absence of nearby records, it is unlikely for any population to be present.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss and degradation of habitat by urban, residential, infrastructure and agricultural development; modifications to agricultural practices (e.g. fertiliser application, ploughing and inappropriate grazing); overstocking that results in modification of soil structure through compaction, increased nutrient loads, and promotion of weeds; invasion of habitat by weeds, particularly exotic pasture species (e.g. *Phalaris aquatica, Paspalum dilatatum* and *Avena* spp.); colonisation of wallaby grass grassland habitat by dense Kangaroo Grass tussocks; fragmentation and small size of remnants; and invasion of habitat by St John's wort, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Yass Daisy (*Ammobium craspedioides*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.296 ha of potential habitat for the Yass Daisy (PCTs 266 and 277). The study area is not within a priority management area nor are there records from within the 10 km search area. It is, however, on the edge of the species distribution, therefore if a population was to be present, it would be considered important. It was not detected during the field survey. The habitat is already fragmented and degraded. The species' distribution is restricted to localities in the Yass District and south of Wagga Wagga and north of Bigga. Given the absence of records and restricted distribution, it is unlikely for a population to be present.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at site, see above. If a population were to occur, the removal of 0.296 ha of associated habitat is unlikely to be significant.
Fragment an existing important population into two or more populations	Although the proposal would widen existing fragmentation, it would not significantly exacerbate issues concerning it. Furthermore, no new fragments would be produced.
Adversely affect habitat critical to the survival of a species	Given the above, it is unlikely that the habitat is critical to the survival of the species.
Disrupt the breeding cycle of an important population	Given the absence of records and restricted distribution, it is unlikely for a population to be present.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.296 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Agricultural developments including pasture modification and cropping; intensification of grazing regimes; invasion of weeds including pasture grasses; roadworks (particularly widening or re-routing); and inappropriate mowing or slashing in the cemetery sites where species occurs, are the main threats to this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

EPBC Act-listed Migratory Species

White-throated Needletail (*Hirundapus caudacutus*)	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	As the species is very widely distributed, and as the subject site contains only small areas of potential foraging habitat it is unlikely to constitute important habitat for this species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	It is unlikely that the proposal site constitutes important habitat for this species. While there is potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species, environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	It is unlikely that an ecologically significant proportion of the population occurs within or is dependent on the proposal site. The proposal is unlikely to seriously disrupt the lifecycle for this species.
Conclusion	**Non-significant impact**

Curlew Sandpiper (*Calidris ferruginea*)	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	As the species is very widely distributed, mainly coastal, and the subject site contains only small areas of potential foraging habitat it is unlikely to constitute important habitat for this species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	It is unlikely that the proposal site constitutes important habitat for this species. While there is potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species, environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	It is unlikely that an ecologically significant proportion of the population occurs within or is dependent on the proposal site. The proposal is unlikely to seriously disrupt the lifecycle for this species.
Conclusion	**Non-significant impact**

APPENDIX F – KEY THREATENING PROCESSES

Key Threatening Processes (KTP) predicted as acting on the study area that may be exacerbated by the proposal.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal?
Threat	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		**Unlikely**	**No** No waterways are present within the subject site.
Threat	Anthropogenic Climate Change	KTP	KTP	**Very Likely**	**Yes** Some unavoidable emissions will occur from construction machinery.
Threat	Bushrock removal	KTP		**Likely**	**Potentially** Deposits of rock were detected along the margins of PCT 53 adjacent ponds in the current extraction area. If, during construction, bushrock, is required to be removed, it should be relocated nearby rather than disposed of.
Threat	Clearing of native vegetation	KTP	KTP	**Very Likely**	**Yes** Up to 0.350 ha of native vegetation will be cleared by the current proposal.
Threat	Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	KTP	KTP	**Unlikely**	**Potentially** The spread of grassy weeds that may result from these works could encourage rabbit activity.
Threat	Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	KTP	KTP	**Unlikely**	**No** The proposal does not include any activities that would exacerbate this threat.
Threat	Competition from feral honey bees, *Apis mellifera* L.	KTP		**Likely**	**Yes** The loss of tree hollows would exacerbate this threat.
Threat	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		**Unlikely**	**No** The proposal does not include any activities that would exacerbate this threat
Threat	Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758	KTP		**Unlikely**	**No** The proposed development will not increase occupancy by this species.
Threat	Herbivory and environmental degradation caused by feral deer	KTP		**Unlikely**	**No** The proposed development will not increase occupancy by this species.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal?
Threat	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		**Unlikely**	**No** Fire frequency will not increase due to activities undertaken as part of the proposal.
Threat	Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks, however, this species is not known to occur nearby.
Threat	Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	**Likely**	**Potentially** The loss of tree hollows can exacerbate this threat by encouraging reuse of nest hollows.
Threat	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.)	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Invasion and establishment of exotic vines and scramblers	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Invasion and establishment of the Cane Toad (*Bufo marinus*)	KTP	KTP	**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks, however, this species is not known to occur nearby.
Threat	Invasion of native plant communities by African *Olive Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal?
Threat	Invasion of native plant communities by exotic perennial grasses	KTP		**Very likely**	**Yes** Exotic perennial grasses are already established at the site, increased disturbance could increase their spread.
Threat	Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks, however, this species is not known to occur nearby.
Threat	Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat)	KTP		**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	**Unlikely**	**Potentially** Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Loss of Hollow-bearing Trees	KTP		**Very Likely**	**Yes** Up to two hollow-bearing trees, containing 3 small hollows, would be cleared by the proposal. It is suggested that the proponent attempt to minimise the removal of habitat vegetation to reduce the impacts association with this KTP.
Threat	Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		**Unlikely**	**No** No sites known or suspected to be present.
Threat	Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		**Unlikely**	**No** The proposed works would not increase the likelihood of this threat.
Threat	Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		**Unlikely**	**Potentially** Although there are watercourses present nearby, the scope of works will not exacerbate this KTP.
Threat	Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)	KTP	KTP	**Unlikely**	**No** Ease of access for feral foxes will not be increased by the proposal
Threat	Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	**Unlikely**	**No** Ease of access for feral cats will not be increased by the proposal
Threat	Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758	KTP	KTP	**Unlikely**	**No** Ease of access for feral pigs will not be increased by the proposal

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal?
Threat	Removal of dead wood and dead trees	KTP		**Unlikely**	**Potentially** No substantial deposits of dead wood were encountered during the field deployment. If, however during development timber is uncovered, it is recommended that it be relocated nearby to avoid exacerbating this KTP.

Appendix 4

Road Transport Assessment

prepared by

The Transport Planning Partnership

(Total No. of pages including blank pages = 29)



McNaught's Quarry
Road Transport Assessment

Prepared for:

McNaught Earthworks Pty Limited

19 February 2024

The Transport Planning Partnership

McNaught's Quarry
Road Transport Assessment

Client: McNaught Earthworks Pty Limited

Version: Final

Date: 19 February 2024

TTPP Reference: 23354

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
Final	19/02/2024	Charbel Hanna	Penny Dalton	Penny Dalton	

Table of Contents

1 Introduction 1
2 Existing Environment 2
2.1 Site Location 2
2.2 Road Network 2
2.3 Heavy Vehicle Access 2
2.4 Road Safety History 3
2.5 Traffic Volumes 4
2.6 Traffic Composition 5
2.7 Vehicle Speeds 6
2.8 Traffic Growth 6
3 Project Description and Traffic Generation 7
3.1 Project Description 7
3.2 Traffic Generation 8
3.2.1 Haulage Activity 8
3.2.2 Workforce Travel 9
3.2.3 Deliveries and Visitors 9
3.2.4 Total Traffic Generation 10
3.3 Traffic Distribution 11
4 Impacts of Project 12
4.1 Impact on Traffic Volumes 12
4.2 Road Network Efficiency 12
4.3 Intersection Operation 13
4.4 Intersection Design 14
4.4.1 Turn Treatments 14
4.4.2 Sight Distance 17
4.5 Interaction with Other Intersections 18
4.6 Impacts on Road Safety 19
4.7 Parking 19
4.8 Mitigation Measures 19
5 Conclusions 20

Tables

Table 2.1: Surveyed Traffic Volumes on Canowindra Road 5
Table 2.2: Surveyed Traffic Composition on Canowindra Road November 2023 6
Table 2.3: Surveyed Vehicle Speeds on Canowindra Road (km/h) 6
Table 3.1: Average Material Haulage Trip Generation 9
Table 3.2: Quarry Traffic Generation Summary 10
Table 4.1: Level of Service Criteria for Class II Two-Lane Two-Way Roads 13
Table 4.2: Austroads Warrant for Quarry Access Intersection with Canowindra Road 15

Figures

Figure 2.1: Approved B-double Routes in New South Wales 3
Figure 2.2: Crash Locations Near the Site 4
Figure 2.3: Surveyed Canowindra Road Two-Way Traffic Volumes November 2023 5
Figure 3.1: Location of the Proposed Quarry Access Road 7
Figure 3.2: Existing Access Road to Quarry 8
Figure 4.1: Austroads Warrant for Major Road Treatments 14
Figure 4.2: Basic Auxiliary Left-Turn Treatment (BAL) 16
Figure 4.3: Basic Auxiliary Right-Turn Treatment (BAR) 16
Figure 4.4: Proposed Site Access Facing South Along Canowindra Road 17
Figure 4.5: Proposed Site Access Facing North Along Canowindra Road 18

Appendices

A. TRAFFIC SURVEYS

References

Australian Bureau of Statistics (2024a), *Canowindra 2016 Census All persons QuickStats* *https://www.abs.gov.au/census/find-census-data/quickstats/2016/SSC10796*

Australian Bureau of Statistics (2024b) *Canowindra 2021 Census All persons QuickStats* https://abs.gov.au/census/find-census-data/quickstats/2021/SAL10795

Austroads (2020a), *Guide to Traffic Management Part 3: Transport Study and Analysis Methods.*

Austroads (2020b), *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management.*

Austroads (2023), *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections.*

Transport for New South Wales (2024) https://roads-waterways.transport.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html

1 Introduction

This report has been prepared by The Transport Planning Partnership Pty Ltd (TTPP) on behalf of McNaught Earthworks Pty Ltd to present the findings of the road transport assessment of the proposed McNaught's Quarry (the Quarry) in Canowindra, New South Wales (NSW).

Development consent is being sought for 30 years for an extractive industry at the site. The proposed resource to be extracted is Gospel Oak Shale. The required resource of the proposed quarry will be approximately 2 million tonnes (Mt), with an average annual production rate of 80,000 tonnes per annum (tpa) and a maximum annual production of 150,000 tpa.

This report follows the layout set out below:

- Chapter 2 discusses the existing conditions including a description of the site.
- Chapter 3 provides a brief description of the proposed development.
- Chapter 4 assesses the impacts of the project on the local road network including traffic generation and any associated roadworks to facilitate the development.
- Chapter 5 presents the conclusion of the assessment.

2 Existing Environment

2.1 Site Location

The Site is located at 5082 Canowindra Road, Canowindra (Lot 2, DP516705) approximately 20 kilometres (km) north of Canowindra town centre and 15 km south of Cudal. The Site has frontage to Canowindra Road and lies immediately to the south of Nanami Lane. It is located within the Cabonne Local Government Area.

2.2 Road Network

Canowindra Road (MR310) is a State road connecting several key regions and towns, providing a north-south link between The Escort Way (MR377) at Cudal in the north and Mid Western Highway (HW6) at Cowra in the south. It covers approximately 64 km and forms part of a north-south transportation link through central NSW for long-distance travellers, as well as serving the local needs of residents of Canowindra and other towns. Canowindra Road has one travel lane in each direction and typically has a sign posted speed limit of 100 kilometres per hour (km/h).

Nanami Lane is an unsealed local road which generally runs east-west. It has a width of approximately 7 metres (m) and allows for one travel lane in each direction. Nanami Lane is discontinuous, with separate sections to the east and west of Canowindra Road. The eastern part of Nanami Lane extends to the east from Canowindra Road approximately 14 km south of The Escort Way. It intersects with Canowindra Road at a priority-controlled basic rural T-intersection that does not have any auxiliary turn lanes or widened shoulders. Together with other local roads, it provides part of a link between Canowindra Road and Cargo Road, which is a Regional Road linking Canowindra and Orange.

Battys Lane is an unsealed local road which also runs east-west, extending west from Canowindra Road approximately 750 m south of the Nanami Lane intersection. It has a width of approximately 7 m and allows for one travel lane in each direction.

2.3 Heavy Vehicle Access

As shown in Figure 2.1, Canowindra Road is approved for use by 25/26 m General Mass Limit B-doubles, with no travel conditions.

Figure 2.1: Approved B-double Routes in New South Wales



Source: Transport for New South Wales (2024)

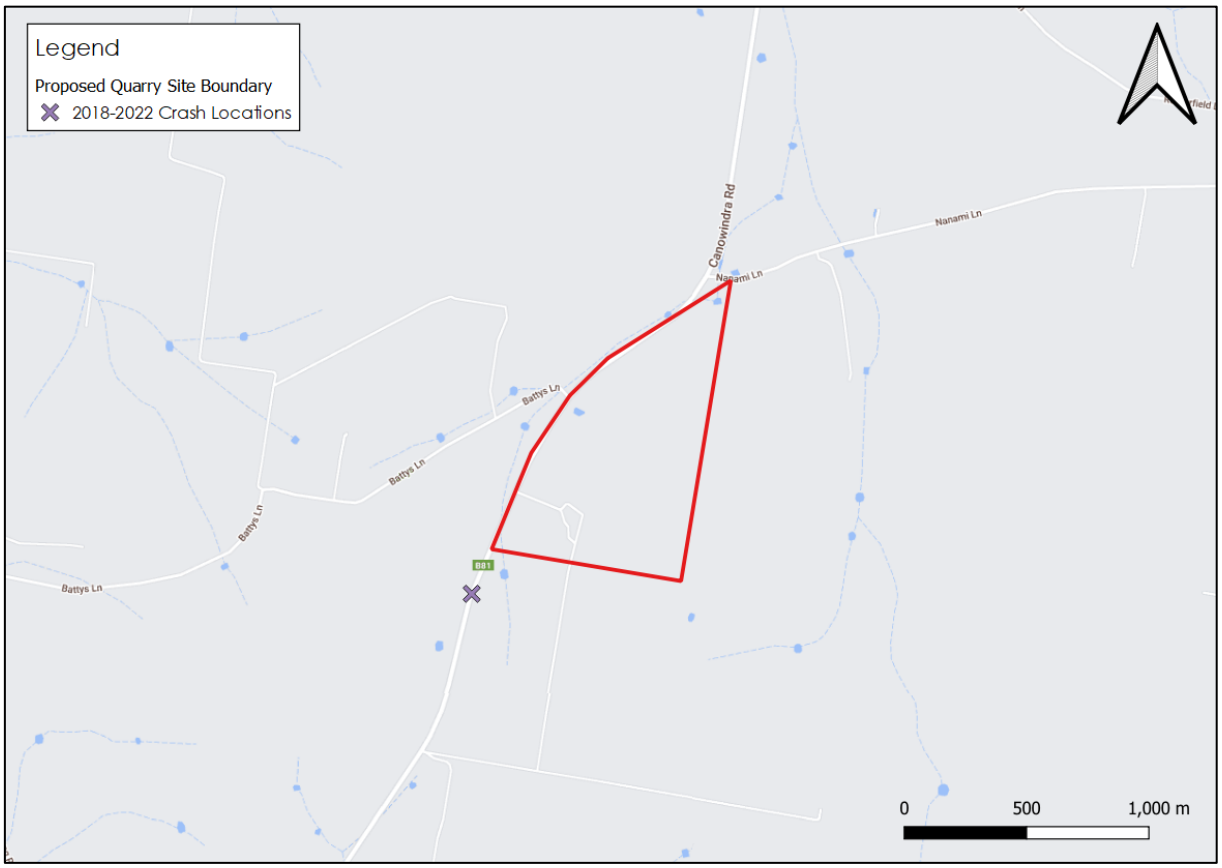
2.4 Road Safety History

Road crash data for the roads in the region of the Site were obtained from the Transport for NSW Centre for Road Safety for the five-year period from 1 January 2018 to 31 December 2022. Data collected over this period include crashes which conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash locations within the vicinity of the site are shown in Figure 2.2.

Figure 2.2: Crash Locations Near the Site



Over the period reviewed, one crash was reported within the vicinity of the site, and occurred in March 2020. The crash involved a single light truck utility, travelling northbound, and left the carriageway to the left on a right hand bend, striking a drain/culvert and a tree/bush. The crash occurred during daylight hours and in dry conditions on a Saturday afternoon. Neither speeding nor fatigue were nominated as contributing factors to the crash (Crash ID 1231947).

2.5 Traffic Volumes

To quantify existing traffic conditions in the vicinity of the Site, Automatic Tube Counts (ATC) were undertaken for the one week period between Thursday 9 November 2023 and Wednesday 15 November 2023 (inclusive) on Canowindra Road, approximately 700 m south of Battys Lane.

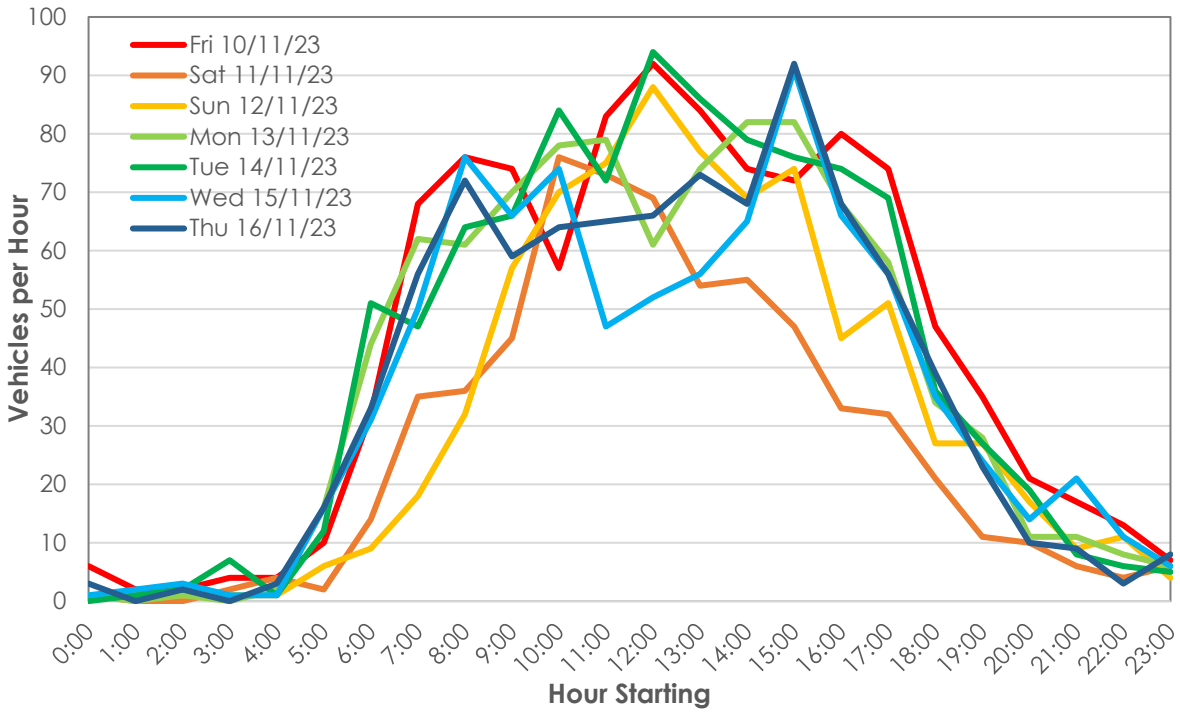
A summary of the traffic volumes recorded on Canowindra Road is presented in Table 2.1. Data have been presented for all weekdays and for a Saturday as these would represent the days the quarry would be in operation.

Table 2.1: Surveyed Traffic Volumes on Canowindra Road

Direction	Average Weekday	Peak Weekday	Saturday
Daily Traffic (vehicles per day)			
Northbound	473	523	293
Southbound	469	511	343
Two-way	942	1,034	636
Peak Hour Traffic (vehicles per hour)			
Northbound	46	-	36
Southbound	48	-	40
Two-way	94	-	76

The traffic volumes recorded across each day of the surveyed week are shown in Figure 2.3.

Figure 2.3: Surveyed Canowindra Road Two-Way Traffic Volumes November 2023



2.6 Traffic Composition

The ATC collected details of the composition of the traffic based on the Austroads-94 Vehicle Classification System. Under that system, light vehicles include motorcycles, cars, vans, four-wheel drives, and utilities (including those towing a trailer or caravan), heavy vehicles include heavy rigid trucks such as single unit trucks and buses, and articulated vehicles such as semi-trailers, rigid trucks with trailers, B-doubles and road trains where permitted. The surveyed composition of traffic using the ATC data is summarised in Table 2.2, which classifies the heavy vehicles as either rigid or articulated. These results separately consider the weekday and weekend day conditions.

Table 2.2: Surveyed Traffic Composition on Canowindra Road November 2023

Day	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles	Percent Heavy Vehicles
Average Weekday	667	136	139	942	29.2
Saturday	522	59	55	636	17.9

Table 2.2 indicates that on weekdays, approximately 29 percent of vehicles on Canowindra Road are heavy vehicles. On Saturdays, this reduces to approximately 18 percent.

2.7 Vehicle Speeds

A summary of the vehicle speeds recorded on Canowindra Road is presented in Table 2.3. Data have been presented for average weekdays and for a Saturday as these would represent the days the quarry would be in operation.

Table 2.3: Surveyed Vehicle Speeds on Canowindra Road (km/h)

Direction	Average Weekday		Saturday	
	Average Speed	85th Percentile Speed	Average Speed	85th Percentile Speed
Northbound	99.8	107.7	101.2	108.9
Southbound	98.3	107.3	99.9	108.9

The results in Table 2.3 indicate that the 85th percentile speeds of vehicles along Canowindra Road exceed the posted speed limit of 100 km/h in both directions.

2.8 Traffic Growth

No specific approved or proposed major developments have been identified within the vicinity of the site that may impact background traffic conditions in the region. As such, it is assumed that traffic growth would be a result of population growth in the nearby town centre of Canowindra. Australian Bureau of Statistics data (2024) indicates that the population of Canowindra grew from 2,258 in 2016 to 2,437 in 2021, which is an average of approximately at 1.5 percent per year. As such, it has been assumed that traffic growth along Canowindra Road would also increase at a rate of 1.5 percent per year.

Given that the existing traffic volumes along Canowindra Road are low, with a peak of less than 100 vehicles per hour two-way), it is not expected that the population increase in Canowindra would have any significant impact on travel volumes or travel times along Canowindra Road.

3 Project Description and Traffic Generation

3.1 Project Description

McNaught Earthworks are seeking development consent for 30 years to extract Gospel Oak Shale from 5082 Canowindra Road, Canowindra. Quarry operations are proposed to commence in mid-2024.

The Quarry would extract and transport an average of 80,000 tpa and a maximum of 150,000 tpa of shale. Between one and three people would work at the site each day. The operating hours of the quarry are proposed to be:

- 7:00 am to 6:00 pm Monday to Friday.
- 8:00 am to 1:00 pm on Saturdays.
- No operations on Sundays or Public Holidays.

Vehicular access to the quarry would be via an existing access from Canowindra Road, as shown in Figure 3.1 and Figure 3.2.

Figure 3.1: Location of the Proposed Quarry Access Road

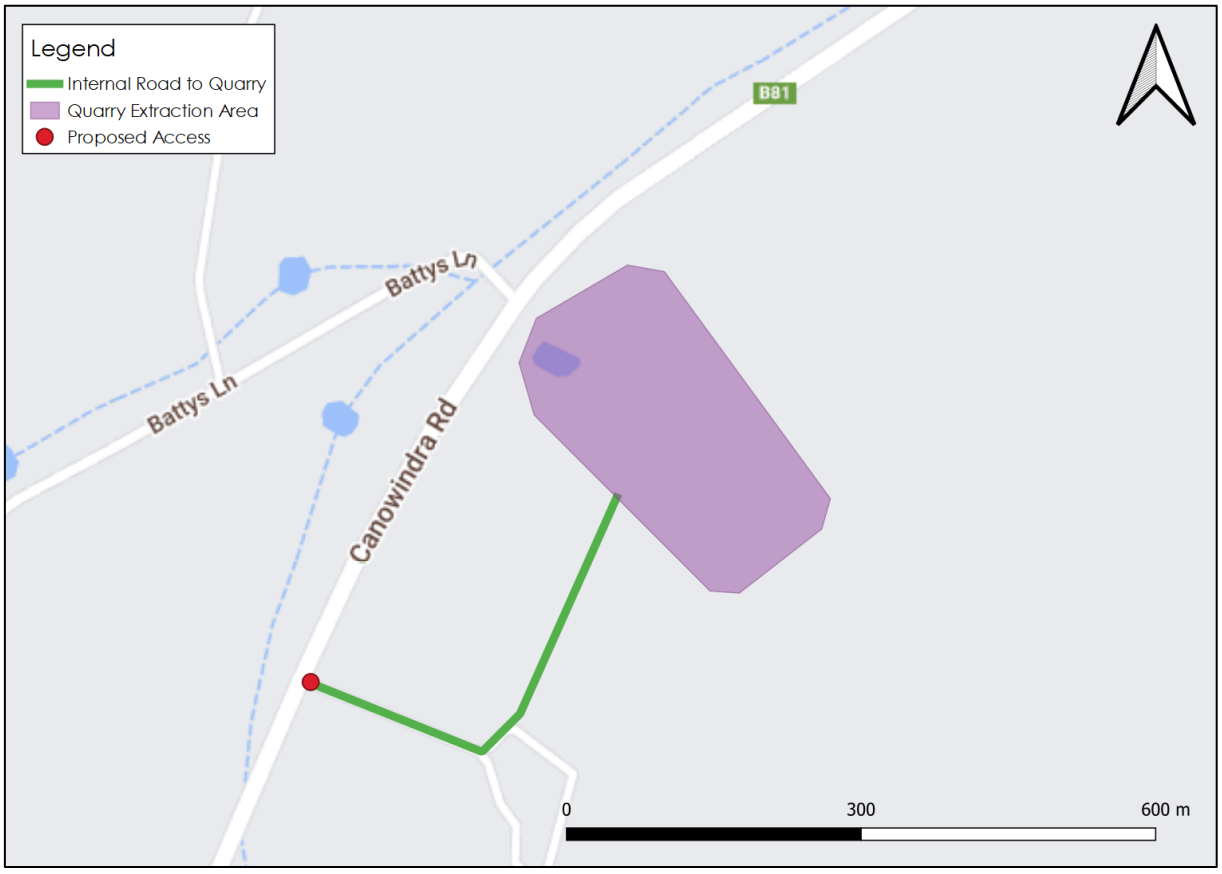


Figure 3.2: Existing Access Road to Quarry



Photograph taken from Canowindra Road facing east along Quarry Access Road

3.2 Traffic Generation

3.2.1 Haulage Activity

The Project anticipates an average production rate of 80,000 tpa and maximum annual production rate of 150,000 tpa of material, to be processed on site and transported by road. Material would be transported using truck and dog combinations, with an average payload of 33 t. To estimate the potential traffic generation of quarry product transportation, Table 3.1 presents the average daily trips generated by the haulage of material at the proposed average and maximum annual production rate. This assumes continuous operation throughout 50 operating weeks per year, 11 hours per weekday and five hours per Saturday, i.e., total 3,000 operating hours per year.

Table 3.1: Average Material Haulage Trip Generation

	Average Production 80,000 tpa	Maximum Production 150,000 tpa
Loads per year (33 t per load)	2,424	4,545
Average loads per operating hour	0.8	1.5
Average Vehicle Trips per Operating Hour	**1.6**	**3.0**
Average loads per Weekday	8.9	16.7
Average Vehicle Trips per Weekday	**17.8**	**33.3**
Average loads per Saturday	4.0	7.6
Average Vehicle Trips per Saturday	**8.1**	**15.2**

Table 3.1 demonstrates that at maximum production, the transport of material from the Quarry would generate fewer than 34 heavy vehicle trips per weekday, and fewer than 16 heavy vehicle trips per Saturday.

Practically, as Quarry would operate on a campaign basis, the number of trips generated by the movement of material would vary from the average. The transportation of product from the Quarry during any campaign is proposed to be limited to a maximum of 88 truck movements on any one day, made up of 44 inbound empty trips and 44 outbound laden trips.

Over the proposed weekday operating hours, the maximum of 88 heavy vehicle trips would be equivalent to an average of eight heavy vehicle trips per hour (four inbound and four outbound). While it is unlikely that the maximum of 88 heavy vehicle trips would be generated during the reduced haulage hours on a Saturday, this would be equivalent to an average of approximately 18 heavy vehicle trips per hour (nine inbound and nine outbound).

3.2.2 Workforce Travel

The workforce of up to three personnel per day would typically drive to and from the Quarry each day. Assuming that each worker travels independently, this would result in a maximum inbound generation of three light vehicle movements at the start of the day, and a maximum outbound generation of three light vehicle movements at the end of the day. The workforce would typically arrive prior the start of haulage activities each day, and leave after the cessation of haulage activities each day, and so would not travel at the same time as the trucks transporting quarry products.

3.2.3 Deliveries and Visitors

At the start and end of each campaign period, it is anticipated that there would be three laden low loader movements to transport the mobile processing plant to and from the Quarry. This would generate six heavy vehicle trips, which are likely to occur on one day. Conservatively, if all low loaders arrived and departed within the same hour, this would result in a maximum generation of six truck trips in one hour.

These trips would not coincide with the transport of material from the Quarry and would generate fewer trips than the transport of quarry materials (Section 3.2.1) and so has not been considered further in this assessment.

During campaigns, it is expected that a maximum of one visitor would attend the Quarry on any one day. With the arrival and departure of such visitors, this would generate two vehicle trips per day. The trips may occur at any time of day, however as a robust assessment, it is assumed that a visitor may arrive and depart during the same hour, generating two vehicle trips per hour.

3.2.4 Total Traffic Generation

Table 3.2 summarises the overall traffic generation of the quarry used for the purpose of this assessment. With respect to peak hourly trip generation, this applies the robust assumption that the daily maximum number of trips generated by the transport of quarry products may occur during the operational hours on a Saturday (resulting in a higher hourly trip generation). It also robustly assumes that the workforce travels while material is being transported from the Quarry and visitors are attending, while practically, this would not occur.

Table 3.2: Quarry Traffic Generation Summary

Type	Light Vehicles	Heavy Vehicles	Total
Daily Trip Generation During Campaign (vehicles per day)			
Maximum Haulage	0	88	88
Workforce	6	0	6
Deliveries and Visitors	2	0	2
Total per Day	**8**	**88**	**96**
Average Weekday Peak Hourly Trip Generation During Campaign (vehicles per hour)			
Maximum Haulage	0	8	8
Workforce	3	0	3
Deliveries and Visitors	2	0	2
Total per Hour	**5**	**8**	**13**
Saturday Peak Hourly Trip Generation During Campaign (vehicles per hour)			
Maximum Haulage	0	18	18
Workforce	3	0	3
Deliveries and Visitors	2	0	2
Total per Hour	**5**	**18**	**23**

Table 3.2 indicates that, noting the robust underlying assumptions describe above, the Project can be expected to generate a peak of 23 vehicle trips during one hour on a Saturday (made up of 13 trips in the peak direction and 10 trips in the contra-peak direction), or 13 vehicle trips during one hour on a weekday (made up of eight trips in the peak direction and five trips in the contra-peak direction).

3.3 Traffic Distribution

It is anticipated that half the workforce would reside in or near Canowindra to the south and half would reside in or near Cargo. Access from Canowindra is via Canowindra Road south of the Quarry, and access to/from Cargo is available via Nanami Lane and Canowindra Road north of the Quarry. On this basis, the workforce-generated trips would be evenly split between north and south along Canowindra Road (i.e., 50 % to/from the north and 50 % to/from the south). As the number of trips generated by workers attending the site each day would be low, it is reasonable to assume that on any one day, all workforce-generated trips may be to/from the north or to/from the south.

Throughout the life of the Project, approximately half of the quarry products are expected to be transported to the north and half to the south. As the Quarry would operate on a campaign basis, and deliveries on any one day would be distributed according to demand, it is possible that on any one day, all product may be transported to the north or all product may be transported to the south.

Therefore, on any one day all of the vehicle trips generated by the Quarry may be to/from the north only, or to/from the south only. Over the life of the Project, the trips would however be evenly split over both directions.

4 Impacts of Project

4.1 Impact on Traffic Volumes

Existing peak hour traffic volumes along Canowindra Road are low, recording a maximum of 94 vehicles per hour on a weekday and 76 vehicles per hour on a Saturday (refer to Table 2.1). As described in Section 3, the Project may generate up to 23 vehicle trips per hour on a Saturday and 13 vehicle trips on a weekday.

During a campaign, should the peak Project traffic generation coincide with the background peak hourly traffic on Canowindra Road, and all Project-generated vehicles approach and depart the Site to/from the same direction, future traffic volumes on Canowindra Road would be 107 vehicles per hour during a weekday peak hour, and 99 vehicles per hour during a Saturday peak hour.

4.2 Road Network Efficiency

Austroads (2020a) provides guidelines for the capacity and performance of two lane, two-way rural roads, which in turn, refers to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016). The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades. Level of Service (LOS) is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers.

LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. LOS B to D describes progressively worse traffic conditions. LOS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LOS E is taken as the capacity of a lane or roadway. In rural situations, LOS C is generally considered to be acceptable. At LOS C, most vehicles are travelling in platoons, and travel speeds are curtailed. At LOS D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low.

The LOS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road, and three classes of road are defined in the HCM. The roads in the region of the Project are considered to be typically Class II roads, on which drivers do not necessarily expect to travel at high speeds. The Level of Service for Class II roads is defined in terms of Percent Time Spent Following (PTSF), which is a measure of the level of opportunities to overtake, and is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. The LOS criteria for Class II two lane roads are as shown in Table 4.1. As a guide, Table 4.1 also presents

the maximum two-way traffic volume for varying Levels of Service, for a theoretical two-lane two-way road with the characteristics noted below the table, calculated using the HCM method.

Table 4.1: Level of Service Criteria for Class II Two-Lane Two-Way Roads

Level of Service	Percent Time Spent Following	Maximum Two-Way Volume for Given LoS (vehicles per hour)[A]
A	≤ 40	320
B	> 40 – 55	575
C	> 55 – 70	1,050
D	> 70 – 85	1,780
E	≥ 85	-
F	Demand exceeds capacity	-

[A] *For travel lanes 2.5m wide, shoulders 0.5m wide, speed limit 100km/h, 20% no-passing, 20% heavy vehicles, 50/50 directional traffic split, peak hour factor 0.88, level topography.*

Considering that the forecast peak hourly traffic volumes on Canowindra Road of 107 vehicles per hour during a weekday peak hour and 99 vehicles per hour during a Saturday peak hour are significantly below the criteria required for the road to be classed as Level of Service 'A' (320 vehicles per hour) as shown in Table 4.1, the PTSF on these roads is therefore inherently very low, with drivers experiencing negligible restriction to their freedom to choose their travel speed or to overtake. It can be concluded that Level of Service 'A' would be experienced on these roads even with the additional traffic because of the proposed quarry.

As such, the proposal would not create any discernible impact on traffic volumes along both Canowindra Road and Nanami Lane.

4.3 Intersection Operation

At unsignalised intersections with minor roads, where there are relatively low volumes of through and turning vehicles, capacity considerations are usually not significant, and detailed analysis of capacity is not warranted. As a guide, at volumes below the following combinations of maximum hourly volumes at a cross intersection with a two-lane two-way road, capacity analysis is not warranted:

- major road 400 vehicles per hour, minor road 250 vehicles per hour;
- major road 500 vehicles per hour, minor road 200 vehicles per hour; and
- major road 650 vehicles per hour, minor road 100 vehicles per hour.

Considering that the forecast peak hourly traffic volumes on Canowindra Road during a campaign would be up to 107 vehicles per hour on a weekday (99 vehicles on Saturday), and the Site Access would carry up to 13 vehicles per hour on a weekday (23 vehicles per hour on Saturday), it is evident that the peak hourly volumes are well below the threshold volumes for analysis. As such, there is no capacity concerns regarding the operation of the intersection which would be used to access the site.

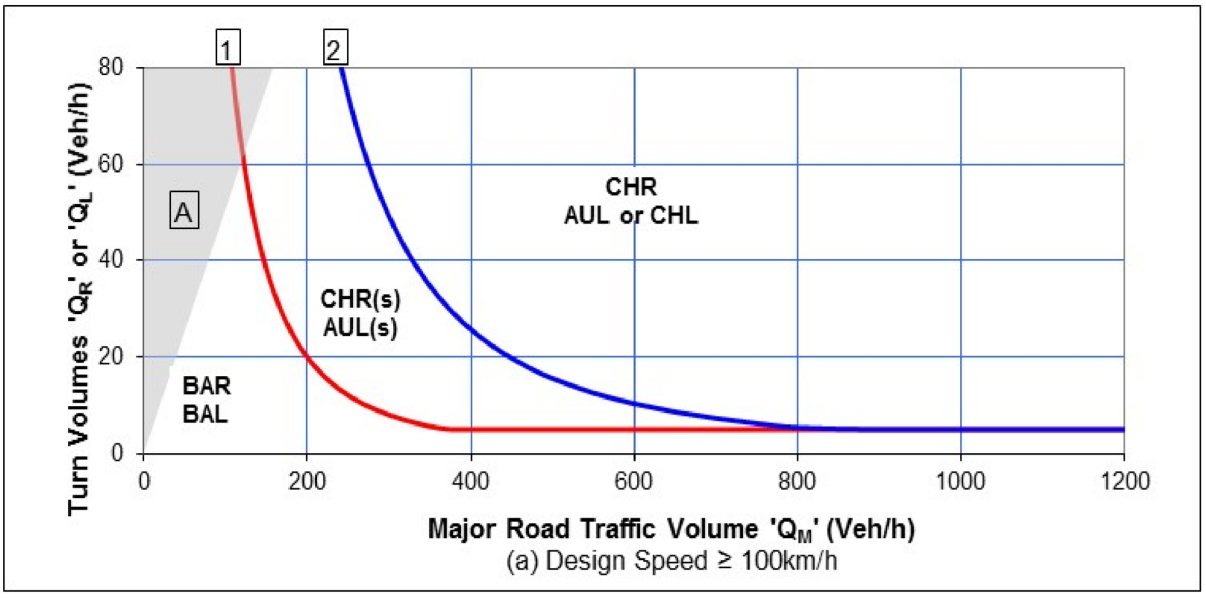
4.4 Intersection Design

4.4.1 Turn Treatments

Due to the use of the Quarry Access by heavy vehicles, it is recommended that the intersection of the Quarry Access Road and Canowindra Road be designed to be consistent with an intersection rather than a more basic rural property access.

Austroads (2020b) sets out warrants that provide guidance on preferred minimum treatments in the major road at intersections. The warrant for high-speed rural road environments relevant to the intersection of Canowindra Road and the proposed Site Access Road is presented in Figure 4.1. The warrant focuses on safety performance, and is based on peak hour flows.

Figure 4.1: Austroads Warrant for Major Road Treatments



BAL = Basic Left-Turn, BAR = Basic Right-Turn, AUL = Auxiliary Left-Turn, CHR = Channelised Right-Turn, CHL = Channelised Left-Turn, (s) = short, Q_M = major road vehicles per hour, Q_L = left turn vehicles per hour, Q_R = right turn vehicles per hour

Table 4.2 summarises the forecast peak hourly traffic volumes at the intersection of the Quarry Access Road and Canowindra Road, and their application to the Austroads (2020b) warrant for treatments in the major road. As the Quarry-generated traffic may all travel in one direction during any one hour, Table 4.2 assumes the peak hourly Quarry-generated traffic may be all approaching from the north or all approaching from the south, although this would not occur concurrently.

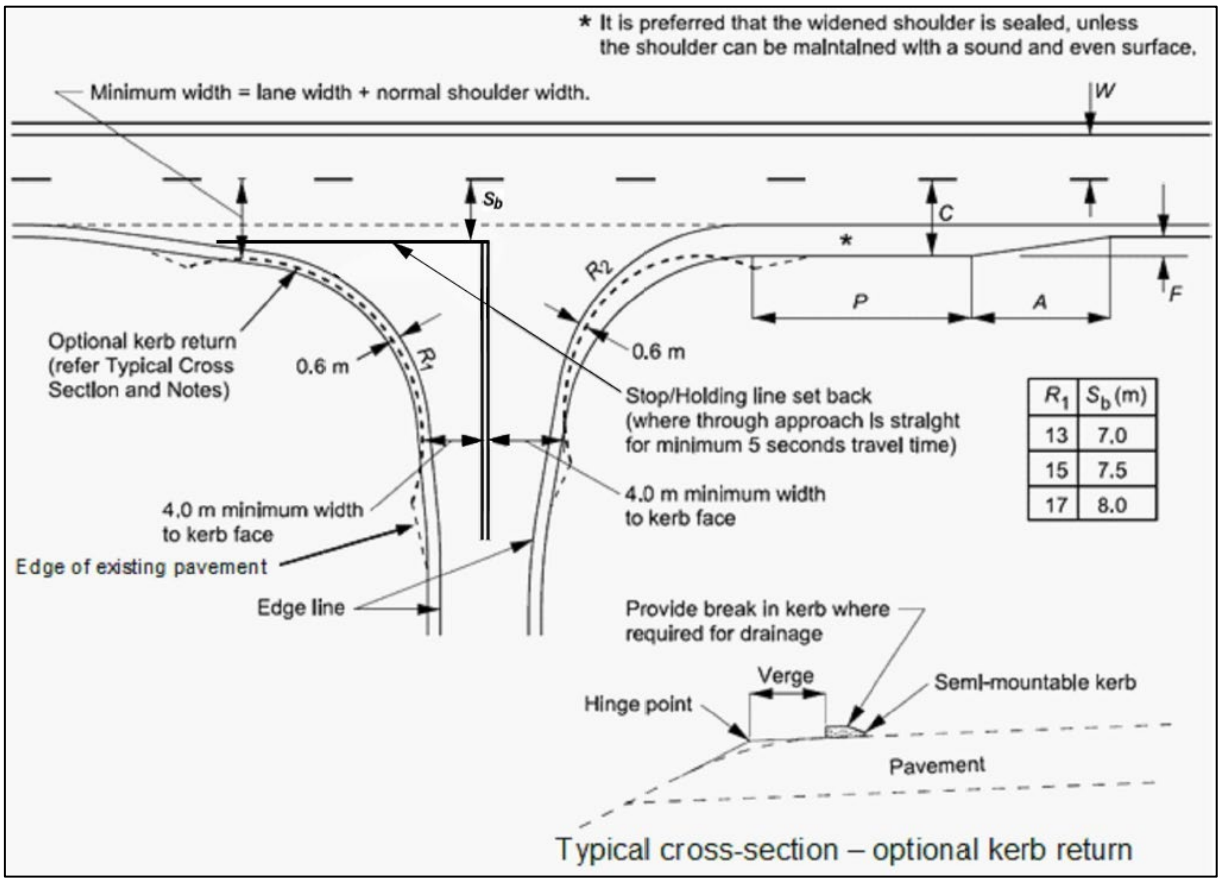
Table 4.2: Austroads Warrant for Quarry Access Intersection with Canowindra Road

Peak Hourly Traffic Volume (vehicles per hour)	Left Turn Treatment All Quarry Traffic to/from North		Right Turn Treatment All Quarry Traffic to/from South	
	Q_M	Q_L	Q_M	Q_R
Average Weekday Peak Hour at Maximum Daily Haulage				
Background Traffic	48	-	94	-
Quarry Traffic	-	8	-	8
Total Traffic	**48**	**8**	**94**	**8**
Saturday Peak Hour at Maximum Daily Haulage				
Background Traffic	40	-	96	-
Quarry Traffic	-	13	-	13
Total Traffic	**40**	**13**	**96**	**13**

Comparison between these peak volumes and the Austroads (2020b) warrants (Figure 4.1) indicates that the intersection of the Quarry Access Road and Canowindra Road would be appropriately treated with a BAL and BAR treatment in Canowindra Road. The standard layouts of these treatments are illustrated in Figure 4.2 and Figure 4.3. The BAL treatment is a widened shoulder on the left-hand side of the major road when turning left into the site (as shown in Figure 4.2), which allows the vehicle slowing to turn left to move off the carriageway to allow for through vehicles to pass. The BAR treatment is a widened shoulder on the left-hand side of the main road when turning right into the site (as shown in Figure 4.3), which allows space for a through vehicle to pass around a vehicle that has slowed to turn right into the minor road.

The proposed site access road would be widened to facilitate two-way truck movements into and out of the quarry.

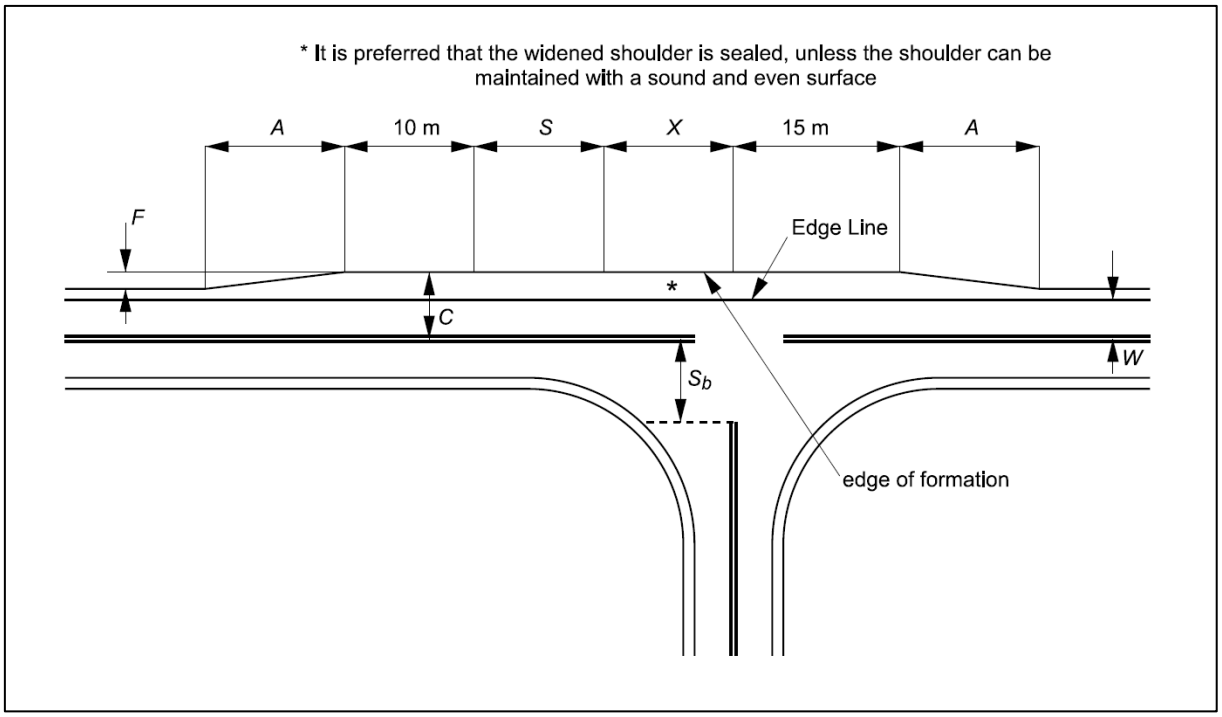
Figure 4.2: Basic Auxiliary Left-Turn Treatment (BAL)



R_1	S_b (m)
13	7.0
15	7.5
17	8.0

Source: Figure 8.2 Austroads (2023)

Figure 4.3: Basic Auxiliary Right-Turn Treatment (BAR)



Source: Figure 7.1 Austroads (2023)

4.4.2 Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided at an intersection, providing sufficient distance for a driver on the major road to observe a vehicle on the minor road moving into a collision situation and to decelerate to a stop before reaching the collision point. Based on the posted speed limit of 100 km/h on Canowindra Road, Austroads (2023) indicates that the SISD required for level grades is 248 m, noting the average speed on Canowindra Road was surveyed as 98 to 102 km/h (refer to Table 2.3), which is consistent with the posted speed limit. The SISD requirement based on the surveyed 85th percentile speed on Canowindra Road of approximately 108 to 109 km/h (refer to Table 2.3) is approximately 275 to 279 m.

Figure 4.4 and Figure 4.5 illustrate the sightlines to the north and south along Canowindra Road from the proposed Quarry Access.

Figure 4.4: Proposed Site Access Facing South Along Canowindra Road



Figure 4.5: Proposed Site Access Facing North Along Canowindra Road



TTPP observed that the sight distance available between a driver at the location of the proposed Quarry Access Road and a southbound driver approaching on Canowindra Road is approximately 280 m. The sight distance available between a driver at the location of the proposed Quarry Access Road and a northbound driver approaching on Canowindra Road is in excess of 500 m from the location.

The available sight distances at the proposed Site Access intersection are consistent with the requirements for SISD based on the average and 85th percentile speeds on Canowindra Road.

4.5 Interaction with Other Intersections

The Site Access would be located approximately 430 m south of the intersection of Canowindra Road and Battys Lane, and approximately 1.2 km south of the intersection of Canowindra Road and Nanami Lane. There is no other intersections or property accesses close to the Site Access.

The Site Access is therefore considered to be adequately separated from other property accesses and intersections.

4.6 Impacts on Road Safety

The review of the road crash history of the roads expected to be used for haulage associated with the Quarry did not identify any causation factors associated with the existing road network that may be exacerbated by increased traffic demands.

It is recommended that a Drivers' Code of Conduct be developed and implemented for drivers of all heavy vehicles who regularly access the Quarry. Compliance with the Code of Conduct should form part of the employment or contract conditions of those drivers, with penalties for non-compliance, and include such matters as:

- observing the approved transport hours;
- adhering to posted speed limits;
- implementing safe driving practices in poor weather or poor visibility conditions, including suspension of transport operations if required;
- minimising the use of exhaust brakes near residential areas; and
- securing tailgates, chains and loose cables to minimise noise.

4.7 Parking

Parking would be provided on-site to meet the Quarry's operational demands, creating no impact to on-street areas.

4.8 Mitigation Measures

This assessment has found that subject to the recommended provision of BAL and BAR treatments in Canowindra Road at its intersection with the Quarry Access Road, widening of the Quarry Access Road to permit two-way heavy vehicle movements, and implementation of a Drivers' Code of Conduct, the Project would not require any specific road upgrades or management measures to accommodate its impacts on the road network.

5 Conclusions

This study has examined the likely road transport implications of the proposed McNaught's Quarry located at 5082 Canowindra Road, Canowindra. It is concluded that the following measures are recommended:

- BAL and BAR treatments be provided in Canowindra Road at its intersection with the Quarry Access Road;
- the Quarry Access Road be widened to permit two-way movement of heavy vehicles; and
- a Drivers' Code of Conduct be developed and implemented for drivers of heavy vehicles who regularly access the Quarry, outlining behavioural expectations for those drivers. Compliance with the Code of Conduct should form part of the employment or contract conditions of those drivers, with penalties for non-compliance.

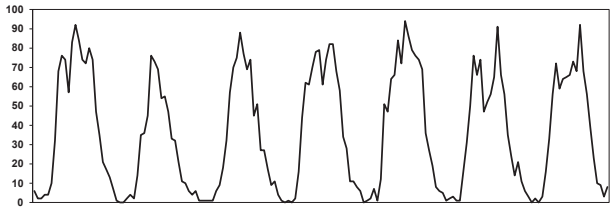
Appendix A

Traffic Surveys

Hourly Volume By Day (Speed and Classification)

Canowindra Road
700m south of Battys Lane
Canowindra
Northbound and Southbound - Two Way Traffic

Site Number:	AC01
Client:	TTPP
Geocounts Job #:	1695037422047
Count Type:	Volume/Class/Speed
Coordinates:	-33.4072 148.6844



100
Posted Speed Limit

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	7 day Average	Weekday Average
Time	10/11/23	11/11/23	12/11/23	13/11/23	14/11/23	15/11/23	16/11/23		
0:00	6	1	1	1	0	1	3	2	2
1:00	2	0	1	0	1	2	0	1	1
2:00	2	0	1	1	2	3	2	2	2
3:00	4	2	1	0	7	1	0	2	2
4:00	4	4	1	2	1	1	3	2	2
5:00	10	2	6	16	12	16	16	11	14
6:00	32	14	9	44	51	31	33	31	38
7:00	68	35	18	62	47	50	56	48	57
8:00	76	36	32	61	64	76	72	60	70
9:00	74	45	57	70	66	66	59	62	67
10:00	57	76	70	78	84	74	64	72	71
11:00	83	73	75	79	72	47	65	71	69
12:00	92	69	88	61	94	52	66	75	73
13:00	84	54	77	74	86	56	73	72	75
14:00	74	55	69	82	79	65	68	70	74
15:00	72	47	74	82	76	91	92	76	83
16:00	80	33	45	68	74	66	68	62	71
17:00	74	32	51	58	69	56	56	57	63
18:00	47	21	27	34	36	35	39	34	38
19:00	35	11	27	28	27	24	23	25	27
20:00	21	10	17	11	19	14	10	15	15
21:00	17	6	9	11	8	21	9	12	13
22:00	13	4	11	8	6	11	3	8	8
23:00	7	6	4	6	5	6	8	6	6
7am-7pm	881	576	683	809	847	734	778	758	810
24hr Total	1034	636	771	937	986	865	888	874	942
Light	783	522	610	614	658	552	595	619	667
H Rigid	133	59	88	143	161	153	145	126	136
H Artic	118	55	73	180	167	160	148	129	139

SITE DETAILS
Two Way Traffic

Speed Distribution		
> 40 km/hr		100.0%
> 50 km/hr		99.6%
> 60 km/hr		99.5%
> 70 km/hr		99.1%
> 80 km/hr		96.5%
> 90 km/hr		87.8%
> 100 km/hr		53.2%

Peak Survey Results		
AM	10:00	84
PM	12:00	94
24hr Volume		1034
Light		783
Heavy Rigid		161
Heavy Articulated		180
7am to 7pm Volume		881

Avg Traffic Composition	
Light	70.9%
Heavy Rigid	14.4%
Heavy Articulated	14.7%

Avg Speed Data (kph)	
85th Percentile	107.8
Mean	99.4
Minimum	37.0
Maximum	153.0
Std. Deviation	10.0

The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@ttpp.net.au

www.ttpp.net.au

Appendix 5

Canowindra Road Quarry Access Intersection Design

prepared by

Duncan Priestley Civil Engineering Pty Limited

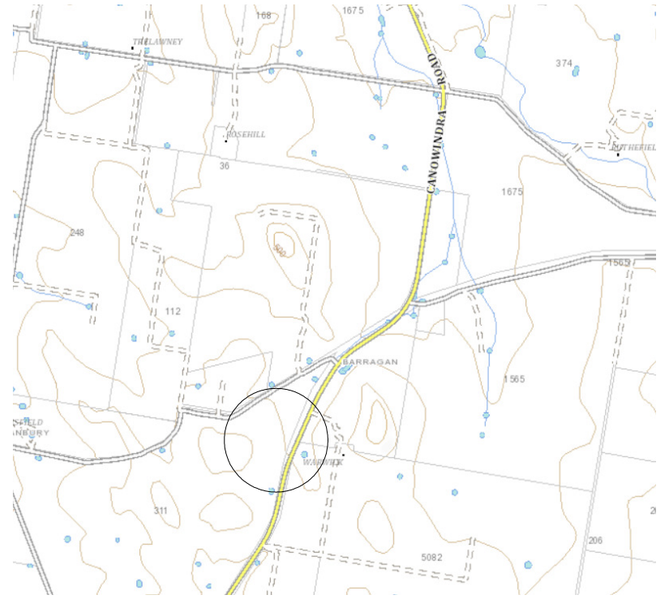
(Total No. of pages including blank pages = 12)

INDEX

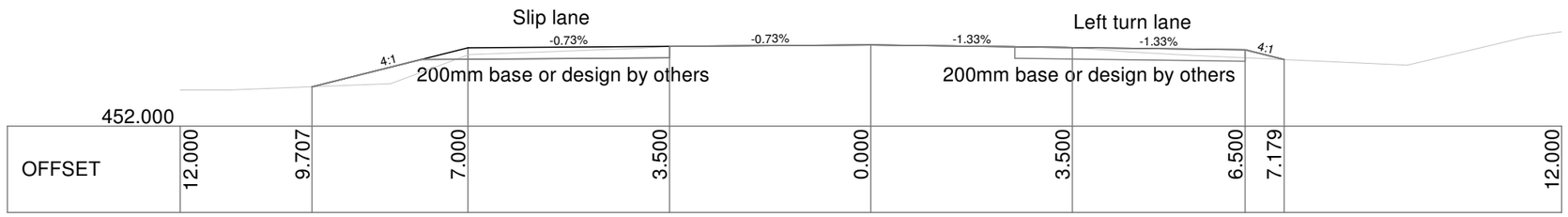
Sheet No.

1	Cover
2	Plan and longsections
3 - 8	Cross sections Canowindra Rd
9 - 10	Cross sections Quarry Access Rd
11	Line marking and signs

Point	Easting	Northing	Elevation	Code
1	657658.529	6303402.103	434.850	PM170330
3	656744.884	6302510.236	454.880	ST01



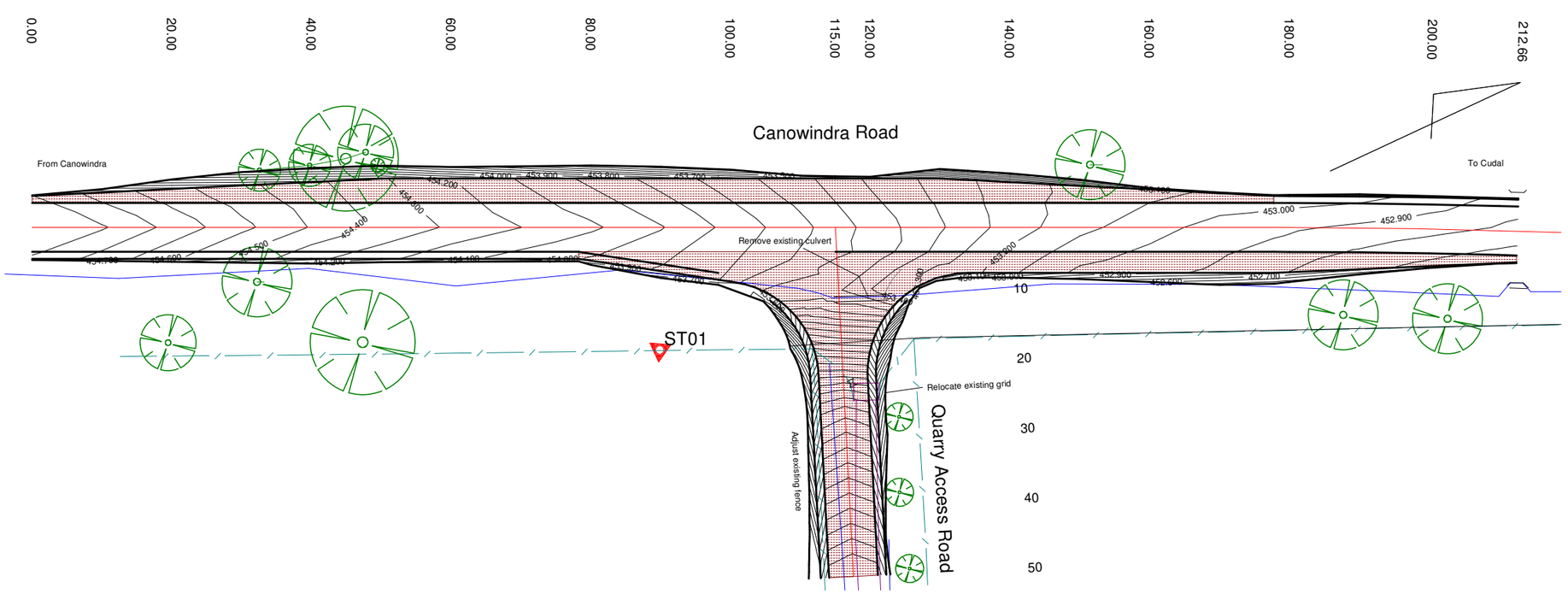
CANOWINDRA ROAD QUARRY ACCESS INTERSECTION



130

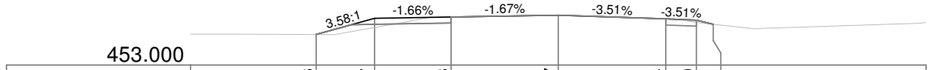
TYPICAL CROSS SECTION

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN		DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			**McNAUGHT EARTHMOVING**	PLAN NUMBER	**Sheet Number: 1**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**CANOWINDRA RD QUARRY ACCESS INTERSECTION**		
				5083 CANOWINDRA RD		



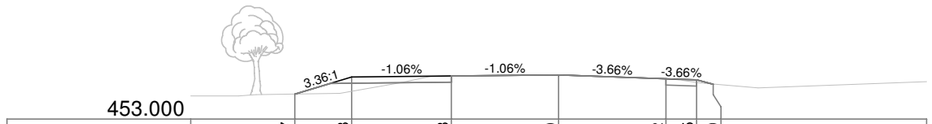
Datum R.L. 450.000

| | | |



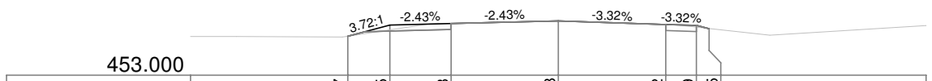
DESIGN		453.996	454.527	454.568	454.627	454.504	454.469	454.331		
NATURAL	454.010	453.996	454.222	454.569	454.627	454.504	454.396	454.331		454.388
OFFSET	12.000	7.897	6.000	3.500	0.000	3.500	4.500	5.051		12.000

30



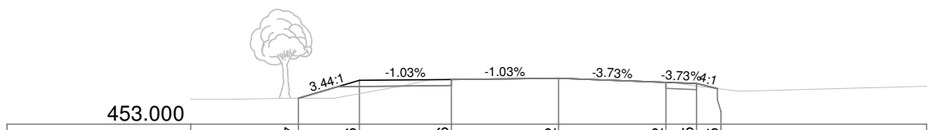
DESIGN		453.817	454.368	454.403	454.440	454.312	454.275	454.139		
NATURAL	453.754	453.817	453.907	454.403	454.440	454.312	454.195	454.139		454.223
OFFSET	12.000	8.605	6.750	3.500	0.000	3.500	4.500	5.044		12.000

45



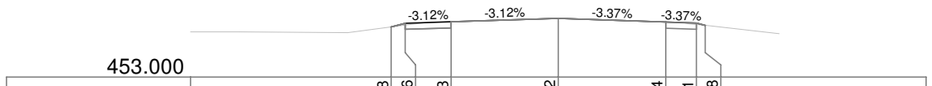
DESIGN		454.267	454.635	454.683	454.768	454.652	454.619	454.515		
NATURAL	454.261	454.267	454.475	454.683	454.768	454.652	454.561	454.515		454.617
OFFSET	12.000	6.869	5.500	3.500	0.000	3.500	4.500	4.916		12.000

20



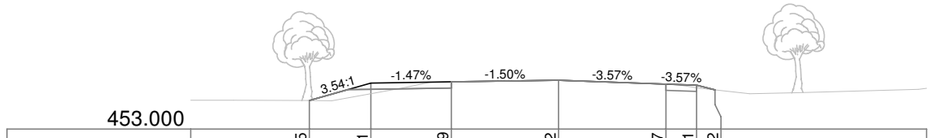
DESIGN		453.847	454.426	454.456	454.492	454.362	454.325	454.155		
NATURAL	453.813	453.847	453.992	454.456	454.492	454.362	454.237	454.155		454.238
OFFSET	12.000	8.486	6.500	3.500	0.000	3.500	4.500	5.179		12.000

40



DESIGN		454.638	454.756	454.803	454.912	454.794	454.761	454.688		
NATURAL	454.474	454.638	454.696	454.803	454.912	454.794	454.717	454.688		
OFFSET	12.000	5.458	5.000	3.500	0.000	3.500	4.500	4.789		12.000

10

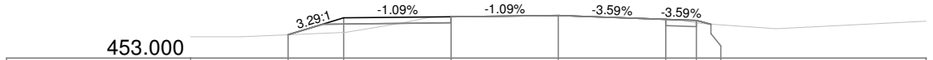


DESIGN		453.935	454.501	454.539	454.592	454.467	454.431	454.282		
NATURAL	453.945	453.935	454.154	454.539	454.590	454.465	454.353	454.282		454.330
OFFSET	12.000	8.133	6.130	3.500	0.000	3.500	4.500	5.099		12.000

32

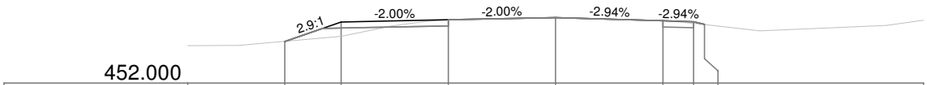
Scale Horizontal 1:200 Vertical 1:200

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN		DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			**McNAUGHT EARTHMOVING**	PLAN NUMBER	**Sheet Number: 3**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**CANOWINDRA RD QUARRY ACCESS INTERSECTION**		
				5083 CANOWINDRA RD		



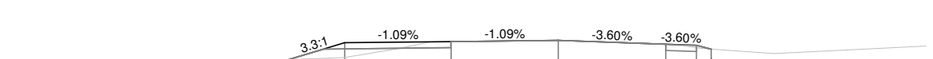
DESIGN		453.759	454.311	454.349	454.387	454.262	454.226	454.106		
NATURAL	453.696	453.759	453.833	454.349	454.387	454.262	454.152	454.106		454.207
OFFSET	12.000	8.819	7.000	3.500	0.000	3.500	4.500	4.980		12.000

50



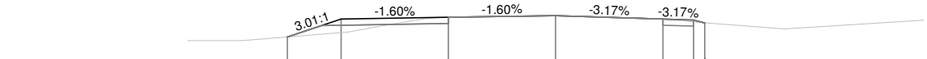
DESIGN		453.359	453.994	454.064	454.134	454.031	454.002	453.913		
NATURAL	453.224	453.359	453.525	454.064	454.134	454.032	453.949	453.913		454.053
OFFSET	12.000	8.839	7.000	3.500	0.000	3.500	4.500	4.858		12.000

78



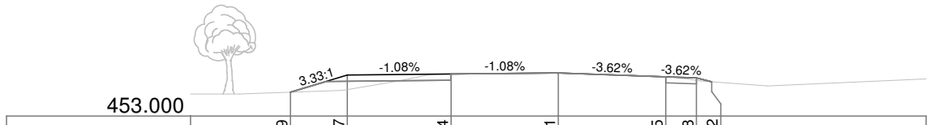
DESIGN		453.764	454.318	454.356	454.394	454.268	454.232	454.110		
NATURAL	453.703	453.764	453.836	454.356	454.394	454.268	454.157	454.110		454.209
OFFSET	12.000	8.798	6.970	3.500	0.000	3.500	4.500	4.986		12.000

49



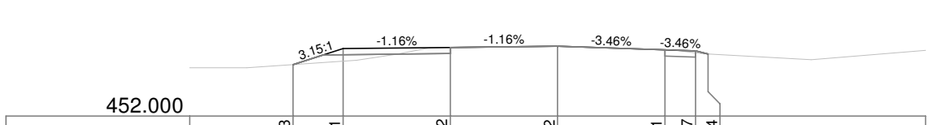
DESIGN		453.508	454.089	454.145	454.201	454.090	454.058	453.966		
NATURAL	453.389	453.508	453.649	454.145	454.201	454.090	454.000	453.966		454.061
OFFSET	12.000	8.748	7.000	3.500	0.000	3.500	4.500	4.868		12.000

70



DESIGN		453.779	454.337	454.374	454.411	454.285	454.248	454.122		
NATURAL	453.723	453.779	453.862	454.374	454.412	454.285	454.172	454.122		454.216
OFFSET	12.000	8.741	6.885	3.500	0.000	3.500	4.500	5.005		12.000

47

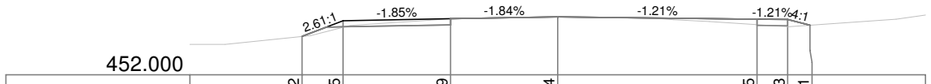


DESIGN		453.683	454.201	454.242	454.282	454.161	454.127	454.024		
NATURAL	453.579	453.683	453.796	454.242	454.282	454.161	454.064	454.024		454.147
OFFSET	12.000	8.635	7.000	3.500	0.000	3.500	4.500	4.909		12.000

60

Scale Horizontal 1:200 Vertical 1:200

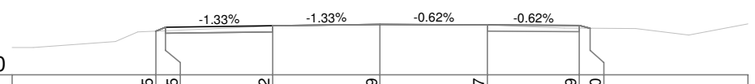
ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN		DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			**McNAUGHT EARTHMOVING**	PLAN NUMBER	**Sheet Number: 4**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**CANOWINDRA RD QUARRY ACCESS INTERSECTION**		
				5083 CANOWINDRA RD		



452.000

DESIGN		453.252	453.765	453.829	453.894	453.815	453.803	453.621	
NATURAL	452.997	453.252	453.550	453.829	453.894	453.639	453.575	453.621	453.948
OFFSET	12.000	8.340	7.000	3.500	0.000	6.500	7.500	8.228	12.000

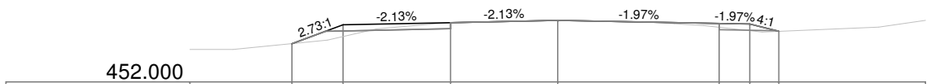
98



452.000

DESIGN		453.425	453.555	453.602	453.649	453.627	453.609	453.520	
NATURAL	452.895	453.425	453.438	453.602	453.649	453.625	453.523	453.520	453.659
OFFSET	12.000	7.310	7.000	3.500	0.000	3.500	6.500	6.854	12.000

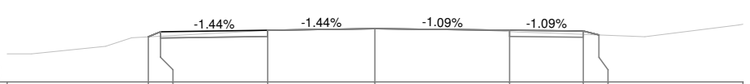
115



452.000

DESIGN		453.246	453.859	453.933	454.008	453.904	453.884	453.646	
NATURAL	453.055	453.246	453.480	453.933	454.008	453.780	453.669	453.646	454.003
OFFSET	12.000	8.672	7.000	3.500	0.000	5.264	6.264	7.217	12.000

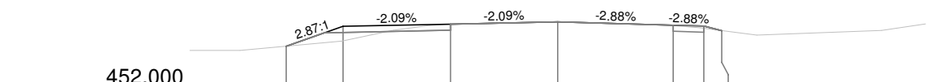
90



452.000

DESIGN		453.470	453.630	453.680	453.731	453.683	453.657	453.530	
NATURAL	452.914	453.470	453.491	453.680	453.731	453.637	453.549	453.530	453.877
OFFSET	12.000	7.392	7.000	3.500	0.000	4.395	6.798	7.307	12.000

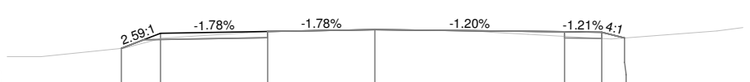
110



452.000

DESIGN		453.328	453.974	454.047	454.120	454.012	453.983	453.836	
NATURAL	453.188	453.328	453.503	454.047	454.120	453.997	453.912	453.836	454.051
OFFSET	12.000	8.854	7.000	3.500	0.000	3.764	4.764	5.351	12.000

80



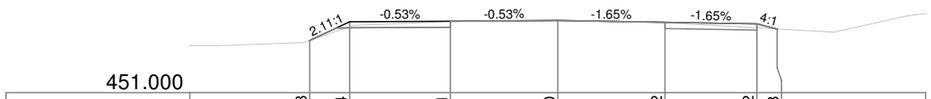
452.000

DESIGN		453.253	453.745	453.807	453.869	453.795	453.780	453.594	
NATURAL	452.984	453.253	453.570	453.807	453.869	453.649	453.580	453.594	453.937
OFFSET	12.000	8.272	7.000	3.500	0.000	6.185	7.395	8.140	12.000

100

Scale Horizontal 1:200 Vertical 1:200

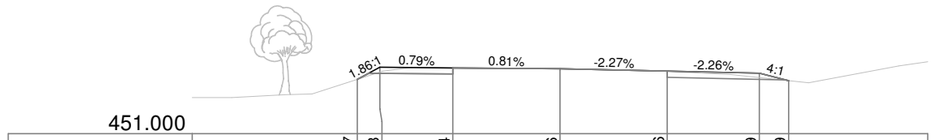
ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN		DRAWING	
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	CANOWINDRA RD ISECT - MP	Total Sheets: 11
16/04/2024	HEIGHT DATUM			**McNAUGHT EARTHMOVING**	PLAN NUMBER	
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**CANOWINDRA RD QUARRY ACCESS INTERSECTION**		**Sheet Number: 5**
				5083 CANOWINDRA RD		



451.000

DESIGN		452.698	453.314	453.331	453.350	453.292	453.242	453.078	
NATURAL	452.534	452.698	453.152	453.331	453.350	453.292	453.114	453.078	453.586
OFFSET	12.000	8.090	6.791	3.500	0.000	3.500	6.500	7.158	12.000

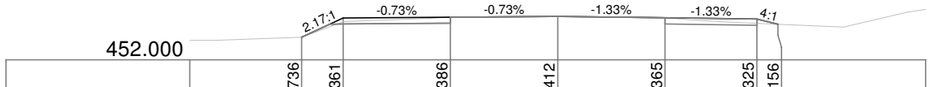
133



451.000

DESIGN		452.767	453.163	453.144	453.116	453.036	452.969	452.729	
NATURAL	452.173	452.767	453.002	453.144	453.116	453.036	452.831	452.729	453.343
OFFSET	12.000	6.612	5.875	3.500	0.000	3.500	6.500	7.459	12.000

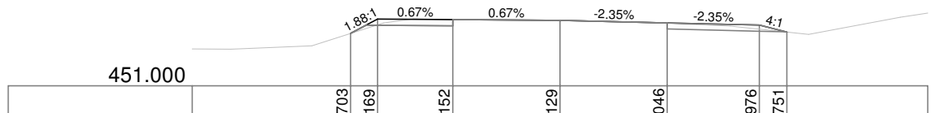
151



452.000

DESIGN		452.736	453.361	453.386	453.412	453.365	453.325	453.156	
NATURAL	452.628	452.736	453.237	453.386	453.412	453.365	453.186	453.156	453.640
OFFSET	12.000	8.352	7.000	3.500	0.000	3.500	6.500	7.179	12.000

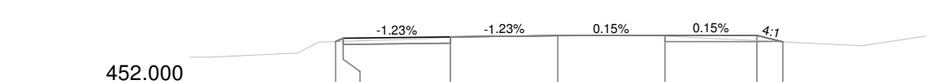
130



451.000

DESIGN		452.703	453.169	453.152	453.129	453.046	452.976	452.751	
NATURAL	452.194	452.703	452.981	453.152	453.129	453.046	452.845	452.751	453.365
OFFSET	12.000	6.830	5.953	3.500	0.000	3.500	6.500	7.401	12.000

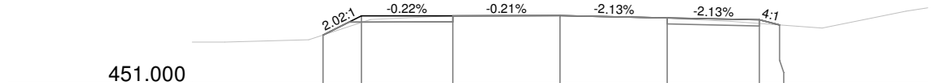
150



452.000

DESIGN		453.375	453.481	453.524	453.567	453.572	453.577	453.367	
NATURAL	452.865	453.375	453.383	453.524	453.567	453.555	453.408	453.367	453.552
OFFSET	12.000	7.245	7.000	3.500	0.000	3.500	6.500	7.341	12.000

120



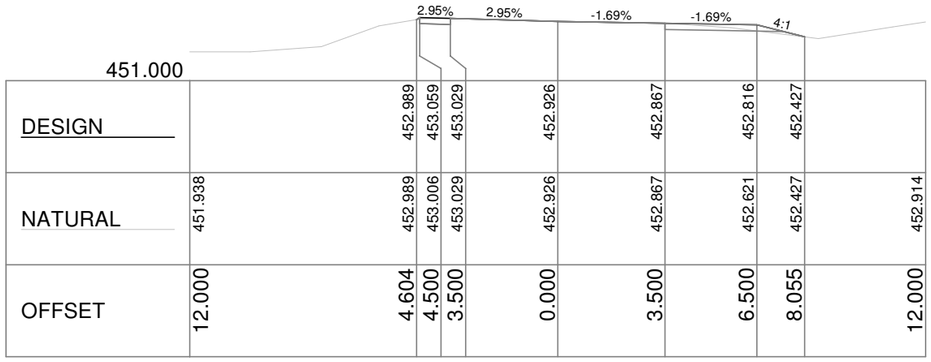
451.000

DESIGN		452.621	453.242	453.248	453.256	453.181	453.117	452.952	
NATURAL	452.392	452.621	453.030	453.248	453.256	453.181	453.001	452.952	453.504
OFFSET	12.000	7.733	6.477	3.500	0.000	3.500	6.500	7.160	12.000

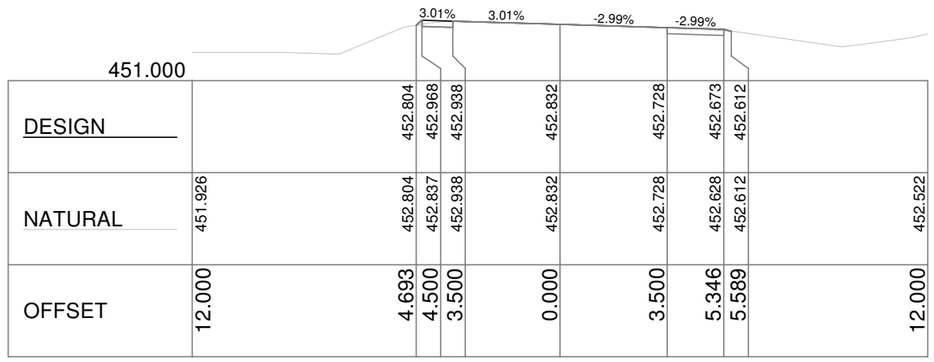
140

Scale Horizontal 1:200 Vertical 1:200

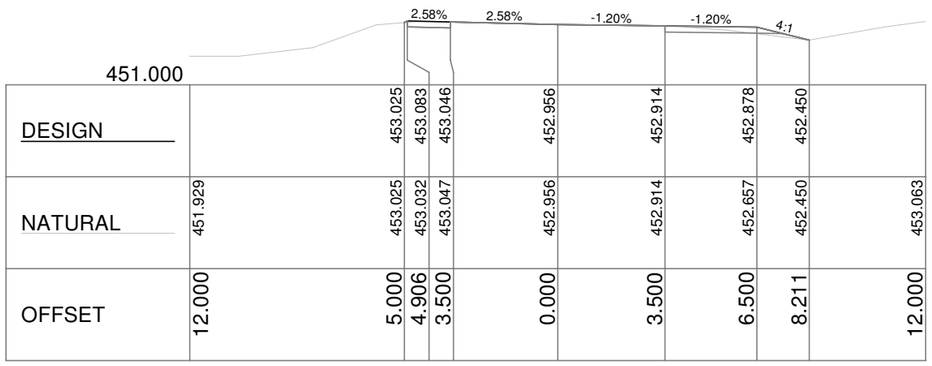
ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN		DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			**McNAUGHT EARTHMOVING**	PLAN NUMBER	**Sheet Number: 6**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**CANOWINDRA RD QUARRY ACCESS INTERSECTION**		
				5083 CANOWINDRA RD		



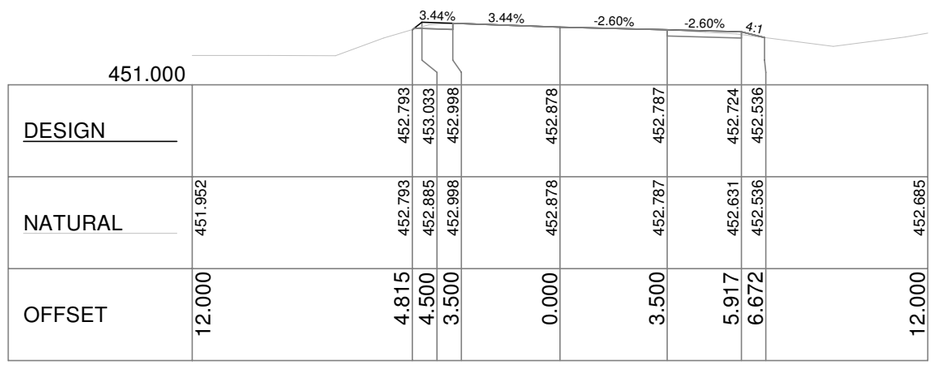
177



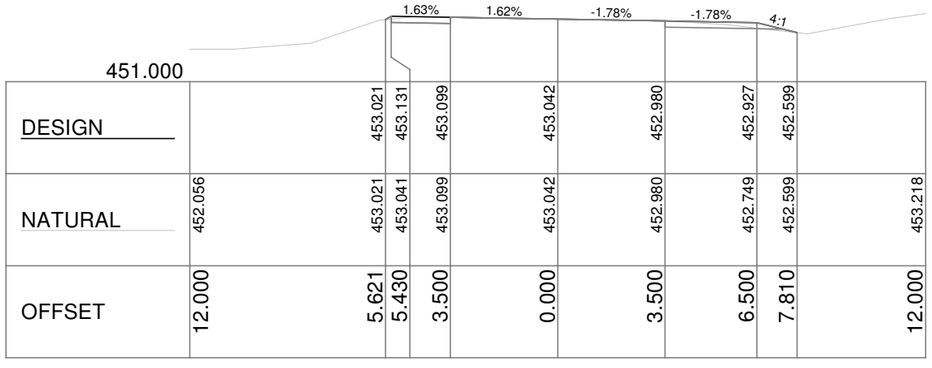
200



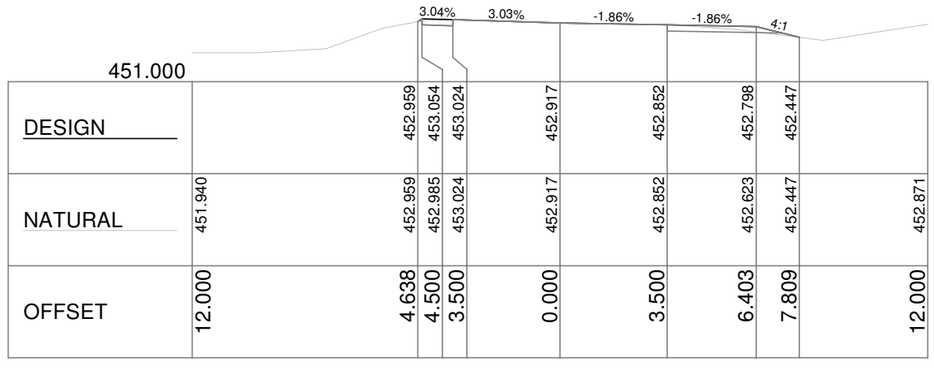
170



190



160



180

Scale Horizontal 1:200 Vertical 1:200

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	DUNCAN PRIESTLEY CIVIL ENGINEERING	DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	McNAUGHT EARTHMOVING	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			CANOWINDRA RD QUARRY ACCESS INTERSECTION	PLAN NUMBER	**Sheet Number: 7**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	5083 CANOWINDRA RD		

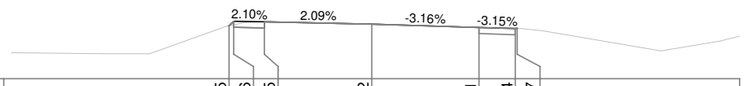
Culvert - End of work



450.000

DESIGN		452.703	452.852	452.833	452.768	452.656	452.624	452.645	
NATURAL		452.703	452.735	452.833	452.768	452.656	452.645	452.645	452.360
OFFSET	12.000	4.649	4.500	3.500	0.000	3.500	4.500	4.584	12.000

212



451.000

DESIGN		452.725	452.876	452.855	452.782	452.671	452.634	452.647	
NATURAL		452.725	452.756	452.855	452.782	452.671	452.649	452.647	452.390
OFFSET	12.000	4.656	4.500	3.500	0.000	3.500	4.689	4.741	12.000

210

SLIP LANE

Volumes Report
Apr 16, 2024 07:56PM

Job: CANOWINDRA RD ISECT.mjo

ALIGNMENT: ALIGN1
DESIGN SURFACE: DESIGN
NATURAL SURFACE: NATURAL

LEFT LIMIT STRING: LBAT2
RIGHT LIMIT STRING: LLND

Stripping Volume 0.000
Base Volume 119.464

Total Cut 63.421
Total Fill 92.961

Net Volume 29.540 Fill

RIGHT Flare and LH TURN LANE

Volumes Report

Apr 16, 2024 08:24PM

Job: CANOWINDRA RD ISECT.mjo

ALIGNMENT: ALIGN1
DESIGN SURFACE: DESIGN
NATURAL SURFACE: NATURAL

LEFT LIMIT STRING:R3500
RIGHT LIMIT STRING:RBAT1

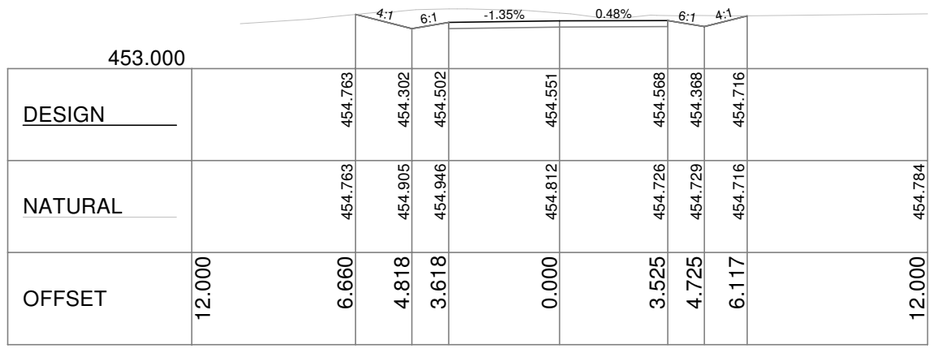
Stripping Volume 0.000
Base Volume 77.482

Total Cut 48.058
Total Fill 4.793

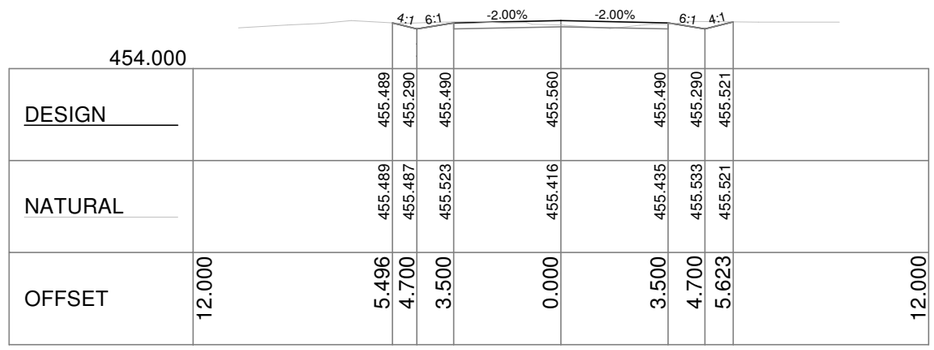
Net Volume 43.265 Cut

Scale Horizontal 1:200 Vertical 1:200

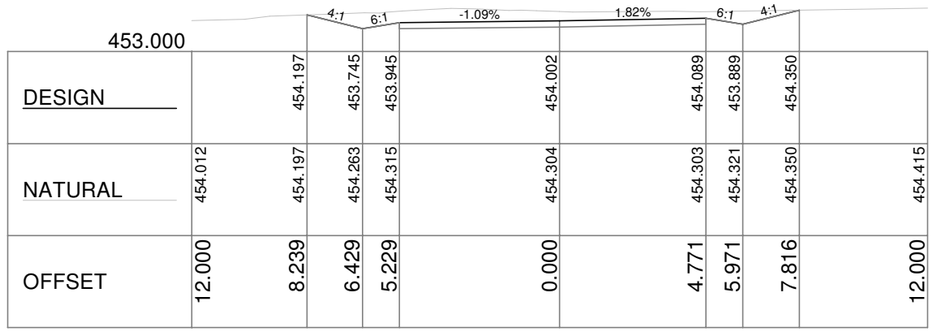
ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	DUNCAN PRIESTLEY CIVIL ENGINEERING	DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	McNAUGHT EARTHMOVING	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			CANOWINDRA RD QUARRY ACCESS INTERSECTION	PLAN NUMBER	**Sheet Number: 8**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	5083 CANOWINDRA RD		



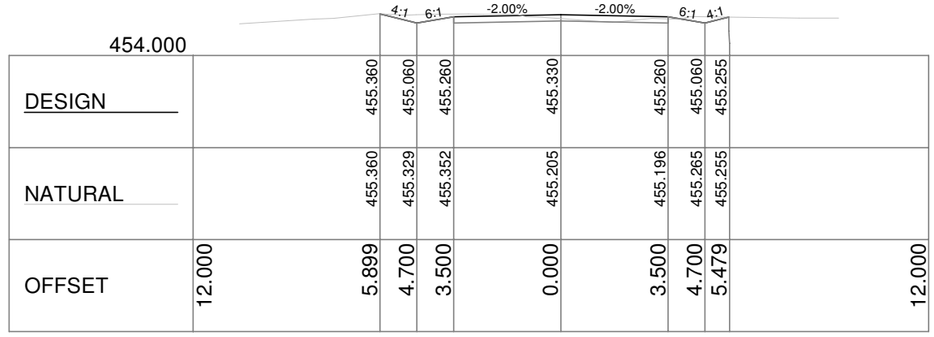
20



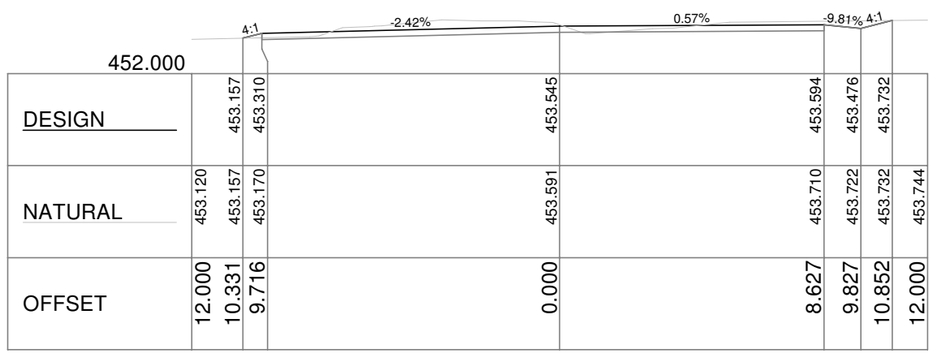
35



15



30

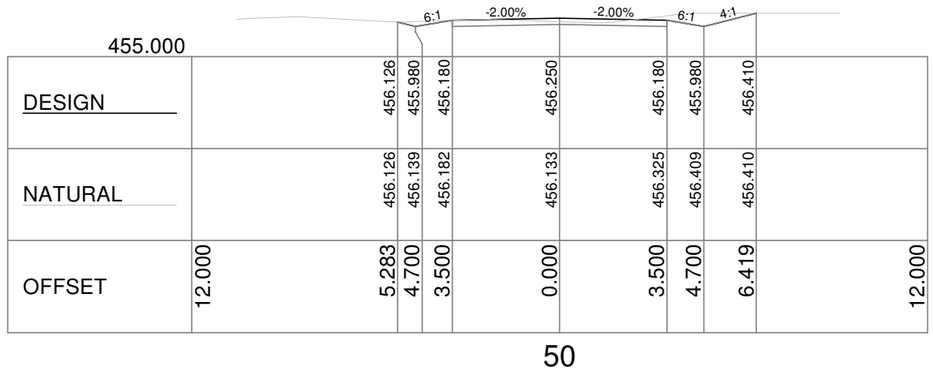


10

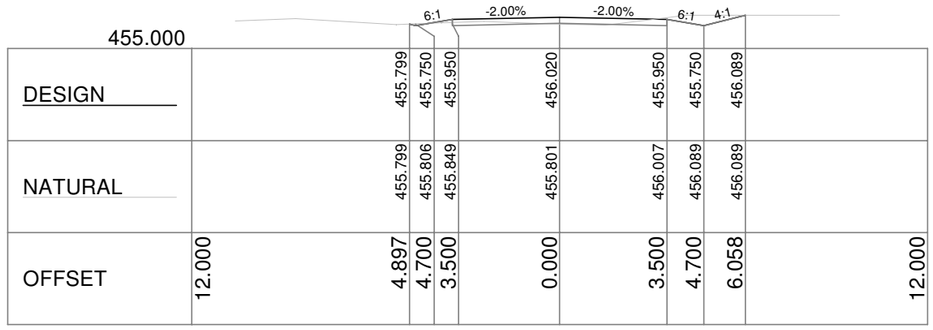


25

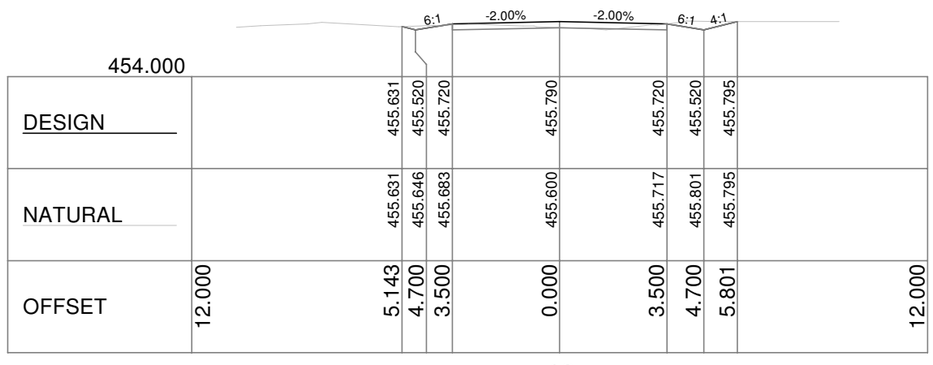
ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	**McNAUGHT EARTHMOVING**	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			**CANOWINDRA RD QUARRY ACCESS INTERSECTION**	PLAN NUMBER	**Sheet Number: 9**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**5083 CANOWINDRA RD**		



50



45



40

Volumes Report
Apr 16, 2024 10:30PM

Job: ISECT.mjo

ALIGNMENT: ALIGN2
DESIGN SURFACE: DESIGN
NATURAL SURFACE: NATURAL

Stripping Volume 0.000
Base Volume 16.690

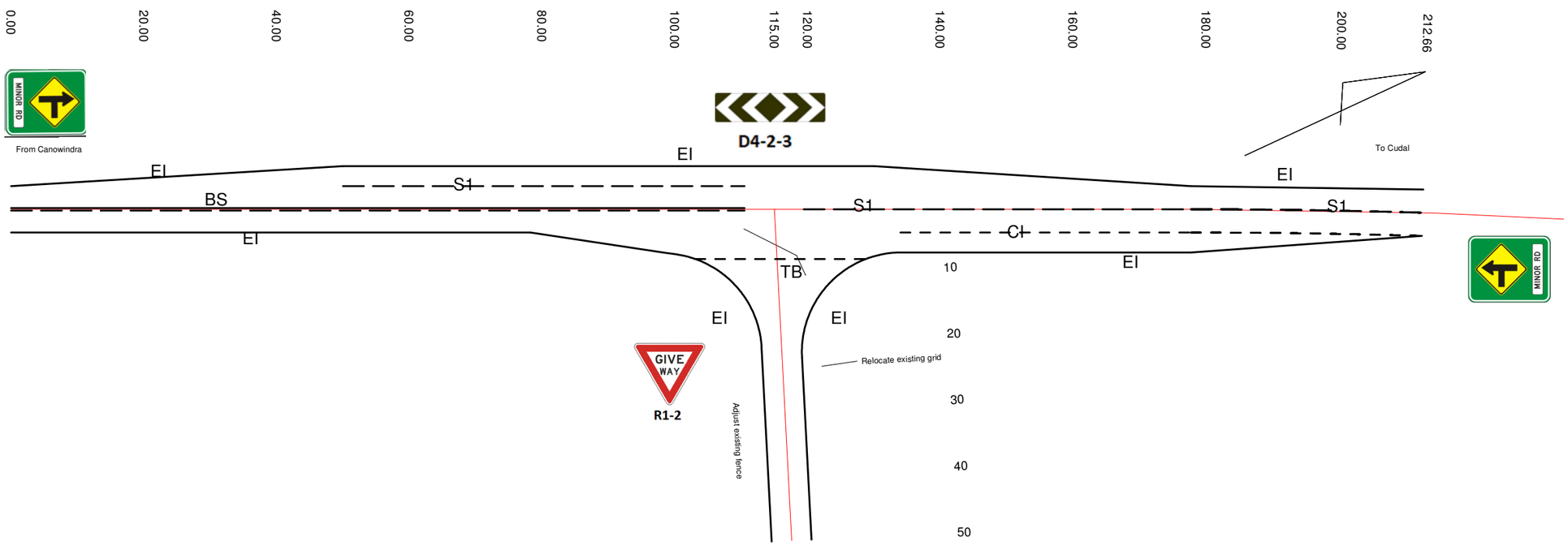
Total Cut 256.290
Total Fill 0.369

Net Volume 255.920 Cut

Note: This excess cut could be used on LHT Lane

Scale Horizontal 1:200 Vertical 1:200

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	DUNCAN PRIESTLEY CIVIL ENGINEERING	DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	McNAUGHT EARTHMOVING	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			CANOWINDRA RD QUARRY ACCESS INTERSECTION	PLAN NUMBER	**Sheet Number: 10**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	5083 CANOWINDRA RD		



Scale Horizontal 1:200 Vertical 1:200

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	DUNCAN PRIESTLEY CIVIL ENGINEERING	DRAWING	Total Sheets: 11
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	DUNCAN PRIESTLEY CIVIL ENGINEERING	McNAUGHT EARTHMOVING	CANOWINDRA RD ISECT - MP	
16/04/2024	HEIGHT DATUM			CANOWINDRA RD QUARRY ACCESS INTERSECTION	PLAN NUMBER	**Sheet Number: 11**
SCALE: $SCALE	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	5083 CANOWINDRA RD		

Appendix 6

Aboriginal Due Diligence Assessment Report

prepared by

OzArk Environment & Heritage

(Total No. of pages including blank pages = 33)



View south across the southeastern boundary of the study area.

ABORIGINAL DUE DILIGENCE ASSESSMENT REPORT

MCNAUGHT'S QUARRY

NEAR CANOWINDRA, NSW

MAY 2024

Report prepared by

OzArk Environment & Heritage

for McNaught Earthworks Pty Ltd

OzArk
Environment & Heritage

145 Wingewarra St
(PO Box 2069)
Dubbo NSW 2830

Phone: (02) 6882 0118
Fax: (02) 6882 0630
enquiry@ozarkehm.com.au
www.ozarkehm.com.au

This page has intentionally been left blank.

DOCUMENT CONTROLS

Proponent	McNaught Earthworks Pty Ltd
Client	RW Corkery & Co
Document Description	Aboriginal Due Diligence Assessment Report: McNaught's Quarry, near Canowindra, NSW.
File Location	OzArk Job No.
R.W. Corkery\McNaught's Quarry Canowindra Oct 2023\Heritage\Report	4160

Document Status: V3.1 FINAL	Date: 29/05/2024
Draft V1: OzArk internal edits	V1.0 TR author 5/12/2023 V1.1 SR review 12/12/2023
Draft V2: OzArk and client edits	V2.0 OzArk to Client for review 20/12/2023
Final V3: Final document	V3.0 OzArk finalises 21/12/2023 V3.1 OzArk updates report 29/05/2024
Prepared for	Prepared by
Grace Scullet-Dean Graduate Environmental Consultant RW Corkery & Co grace@rwcorkery.com 0429 635 975	Tenae Robertson Archaeologist OzArk Environment & Heritage 145 Wingewarra Street (PO Box 2069) Dubbo NSW 2830 P: 02 6882 0118 tenae@ozarkehm.com.au

COPYRIGHT

© OzArk Environment & Heritage 2024 and © McNaught Earthworks Pty Ltd 2024

All intellectual property and copyright reserved.

Apart from any fair dealing for private study, research, criticism, or review, as permitted under the Copyright Act, 1968, no part of this report may be reproduced, transmitted, stored in a retrieval system, or adapted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without written permission.

Enquiries should be addressed to OzArk Environment & Heritage.

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.

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by RW Corkery & Co (the client), on behalf of McNaught Earthworks Pty Ltd (the proponent) to complete an Aboriginal due diligence heritage assessment for the McNaught's Quarry (the proposal). The proposal is near Canowindra in the Cabonne Shire Local Government Area.

The study area comprises 9.3 hectares (ha) of undulating slopes located east of Canowindra Road, approximately 16.5 kilometres (km) north of Canowindra. The study area is the impact footprint of the proposal, which includes the quarry extraction area, an access road, and areas for associated facilities and stockpiling.

The visual inspection of the study area was undertaken by OzArk Archaeologist, Tenae Robertson, on 25 October 2023. The visual inspection confirmed that the study area has been subject to high levels of disturbances. No Aboriginal objects or landforms with subsurface potential were identified.

The undertaking of the due diligence process resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

> *Aboriginal Heritage Impact Permit application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au). If human remains are found, stop work, secure the site, and notify NSW Police and Heritage NSW.*

To ensure the greatest possible protection to the area's Aboriginal cultural heritage values, the following recommendations are made:

1) The proposed work may proceed without further archaeological investigation.
2) 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 that may be in adjacent landforms. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
3) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. If during works, however, Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed.
4) Inductions for work crews should include a cultural heritage awareness procedure to ensure they recognise Aboriginal artefacts (see **Appendix 3**) and are aware of the

legislative protection of Aboriginal objects under the *National Parks and Wildlife Act 1974* and the contents of the *Unanticipated Finds Protocol.*

5) The information presented here meets the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. It should be retained as shelf documentation for five years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

CONTENTS

EXECUTIVE SUMMARY III
1 INTRODUCTION 7
1.1 Brief description of the proposal 7
1.2 Study area 8
1.3 Assessment approach 8
2 ABORIGINAL DUE DILIGENCE ASSESSMENT 9
2.1 Introduction 9
2.2 Defences under the NPW Regulation 2019 9
2.2.1 Low impact activities 9
2.2.2 Disturbed lands 9
2.3 Application of the Due Diligence Code of Practice to the proposal 11
2.3.1 Step 1 11
2.3.2 Step 2a 13
2.3.3 Step 2b 15
2.3.4 Step 2c 18
2.3.5 Step 3 19
2.3.6 Step 4 19
2.4 Conclusion 20
3 MANAGEMENT RECOMMENDATIONS 22
REFERENCES 23
PLATES 25
APPENDIX 1: AHIMS SEARCH RESULTS 26
APPENDIX 2: ABORIGINAL HERITAGE: UNANTICIPATED FINDS PROTOCOL 29
APPENDIX 3: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION 30

FIGURES

Figure 1-1. Map showing the location of the study area for the proposal. 7
Figure 1-2: Aerial showing the study area. 8
Figure 2-1: Aerial of the study area showing portions defined as ‘disturbed land’. 10
Figure 2-2: Layout of the proposal. 12
Figure 2-3: Previously recorded sites in relation to the study area. 14
Figure 2-4: Survey coverage within the study area. 20

TABLES

Table 2-1: Determination of whether Due Diligence Code of Practice applies. 10
Table 2-1: Site types and frequencies of AHIMS sites near the study area. 13
Table 2-3: Due Diligence Code of Practice application. 21

PLATES

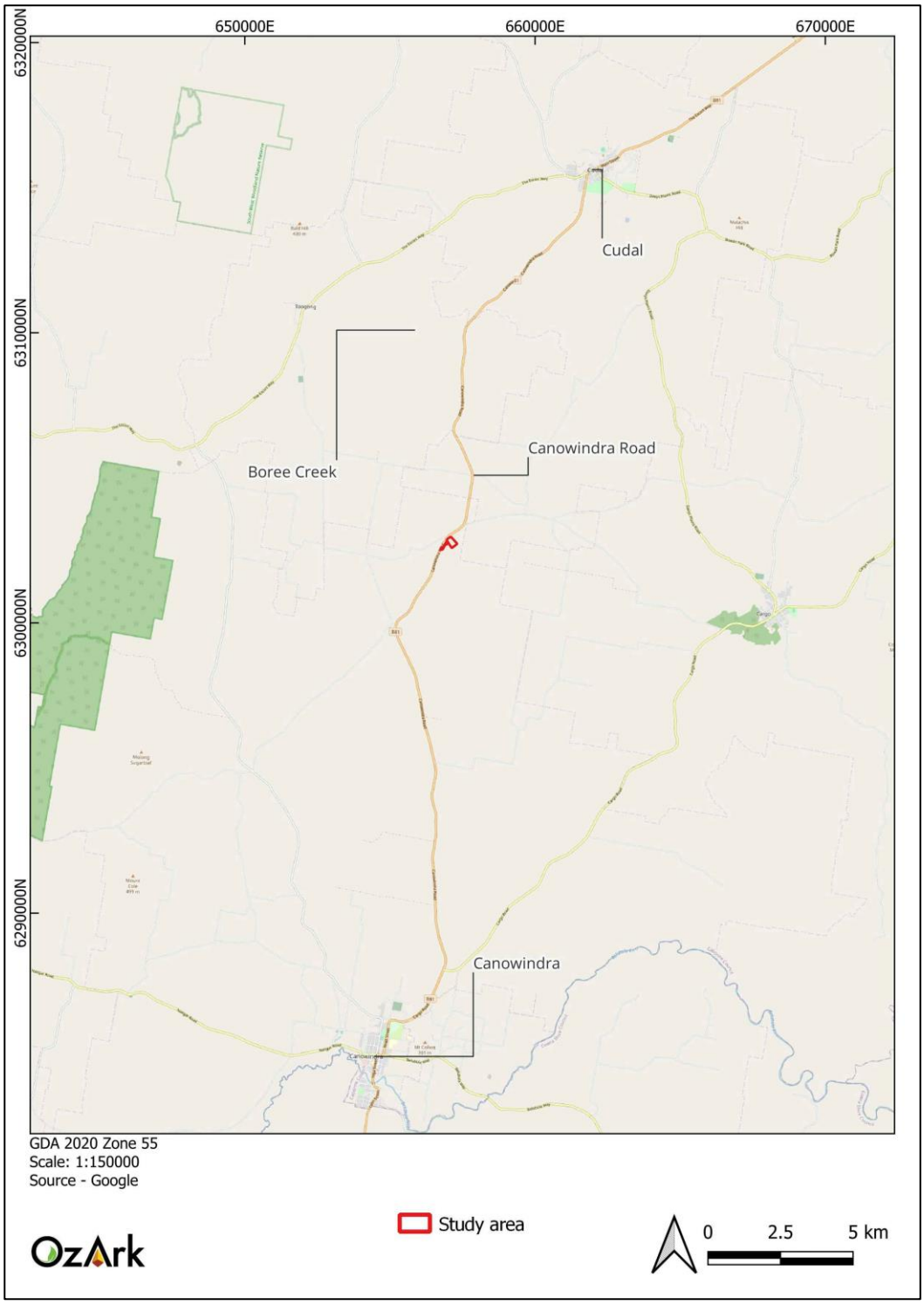
Plate 1: View northwest across the proposed extraction area. 25
Plate 2: View west from the proposed extraction area towards the proposed location of the access track, stockpile, and facilities area. 25

1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

OzArk Environment & Heritage (OzArk) has been engaged by RW Corkery & Co (the client), on behalf of McNaught Earthworks Pty Ltd (the proponent) to complete an Aboriginal due diligence heritage assessment for the McNaught's Quarry (the proposal). The proposal is near Canowindra in the Cabonne Shire Local Government Area (LGA) (**Figure 1-1**).

Figure 1-1. Map showing the location of the study area for the proposal.



1.2 STUDY AREA

The study area comprises 9.3 hectares (ha) of undulating slopes located east of Canowindra Road, 16.5 kilometres (km) north of Canowindra.

The study area is the impact footprint of the proposal, which includes the quarry extraction area, an access road, and areas for associated facilities and stockpiling. The study area is shown on **Figure 1-2**.

Figure 1-2: Aerial showing the study area.



1.3 ASSESSMENT APPROACH

The desktop and visual inspection component for the study area follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (due diligence; DECCW 2010).

2 ABORIGINAL DUE DILIGENCE ASSESSMENT

2.1 INTRODUCTION

Section 57 of the National Parks and Wildlife Regulation 2019 (NPW Regulation) made under the *National Parks and Wildlife Act 1974* (NPW Act) advocates a due diligence process to determining likely impacts on Aboriginal objects. Carrying out due diligence provides a defence to the offence of harming Aboriginal objects and is an important step in satisfying Aboriginal heritage obligations in NSW.

2.2 DEFENCES UNDER THE NPW REGULATION 2019

2.2.1 Low impact activities

The first step before application of the due diligence process itself is to determine whether the proposed activity is a "low impact activity" for which there is a defence in the NPW Regulation. The exemptions are listed in Section 58 of the NPW Regulation (DECCW 2010: 6).

The proposal will involve the excavation and grading of earth and is not considered to be a "low impact activity". Therefore, the Due Diligence process must be applied.

2.2.2 Disturbed lands

Relevant to this process is the assessed levels of previous land-use disturbance.

The NPW Regulation Section 58 (DECCW 2010: 18) define disturbed land as follows:

> *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable.*
>
> *Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.*

Most of the study area meets the Due Diligence criteria of 'disturbed land' and no further assessment is required for these areas. Disturbances across the study area include an excavated borrow pit, ploughing, vegetation clearing, and road construction (**Figure 2-1**). However, areas of remnant mature vegetation are located within the study area which are not considered to be disturbed, and the Due Diligence process must be applied.

Figure 2-1: Aerial of the study area showing portions defined as 'disturbed land'.



In summary, it is determined that the proposal must be assessed under the Due Diligence Code of Practice. The reasoning for this determination is set out in **Table 2-1**.

Table 2-1: Determination of whether Due Diligence Code of Practice applies.

Item	Reasoning	Answer
Is the activity to be assessed under Division 4.7 (state significant development) or Division 5.2 (state significant infrastructure) of the EP&A Act?	The proposal will be assessed under Part 4 of the EP&A Act.	No
Is the activity exempt from the NPW Act or NPW Regulation?	The proposal is not exempt under this Act or Regulation.	No
Do either or both apply: Is the activity in an Aboriginal place? Have previous investigations that meet the requirements of this Code identified Aboriginal objects?	The activity will not occur in an Aboriginal place. No previous investigations have been undertaken for this proposal.	No
Is the activity a low impact one for which there is a defence in the NPW Regulation?	The proposal is not a low impact activity for which there is a defence in the NPW Regulation.	No
Is the activity occurring entirely within areas that are assessed as 'disturbed lands'?	The proposal is not entirely within areas of high modification.	No
Due Diligence Code of Practice assessment is required		

2.3 APPLICATION OF THE DUE DILIGENCE CODE OF PRACTICE TO THE PROPOSAL

To follow the generic due diligence process, a series of steps in a question/answer flowchart format (DECCW 2010: 10) are applied to the proposed impacts and the study area, and the responses documented.

2.3.1 Step 1

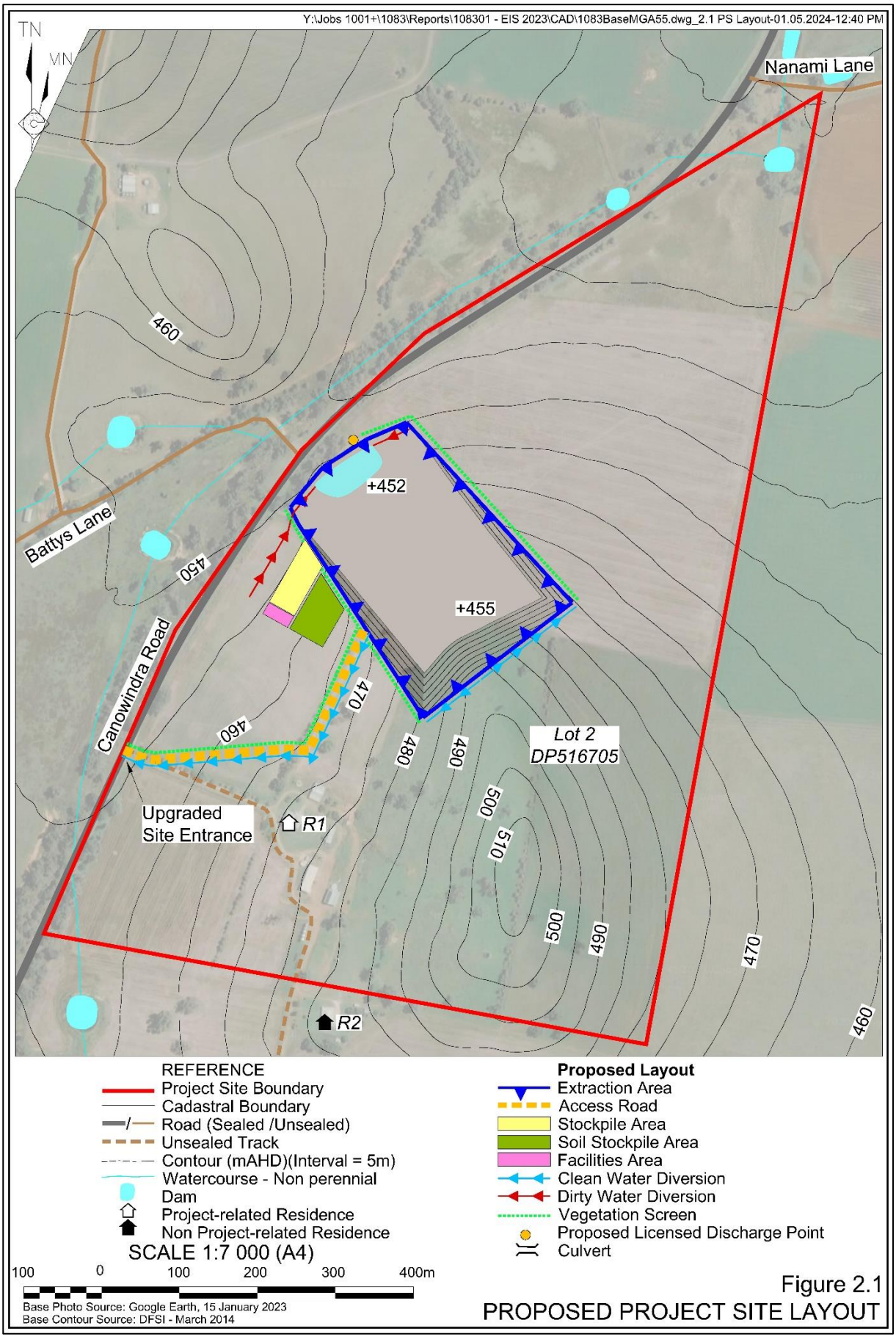
Will the activity disturb the ground surface or any culturally modified trees?

Yes, the proposal will impact the ground surface and may impact culturally modified trees.

The extraction of material will be performed via a bulldozer to rip and push the material which is to then be loaded into road trucks for transportation off site. Additionally, an access track, facilities area and stockpile area will be established, and a deceleration zone is to be constructed along the corridor of Canowindra Road (**Figure 2-2**).

Mature trees are located within the study area and may be impacted by the works. Therefore, culturally modified trees may be impacted if present.

Figure 2-2: Layout of the proposal.



2.3.2 Step 2a

Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?

No, there are no previously recorded sites within the study area.

A search of the Aboriginal Heritage Information Management System (AHIMS) was completed on 20 October 2023 within a 40 x 40 km search area centred on the study area (GDA Zone 55 Eastings: 637347 – 677128, Northings: 6282840 – 6322562) (**Appendix 1**: AHIMS Search Results).

The search returned 52 records for Aboriginal sites within the search area. No previously recorded sites are located within or near the study area. **Figure 2-3** shows all previously recorded sites in relation to the study area and **Table 2-2** lists the types of sites returned in the search area.

Culturally modified trees are the most frequently recorded site type within the search area, comprising 55.5% of all sites (n=29). Open artefact sites such as artefact scatters (n=9, 17%) and isolated finds (n=7, 13.5%) remain common site types in the area. Burials are present though appear at a lesser frequency than other sites recorded.

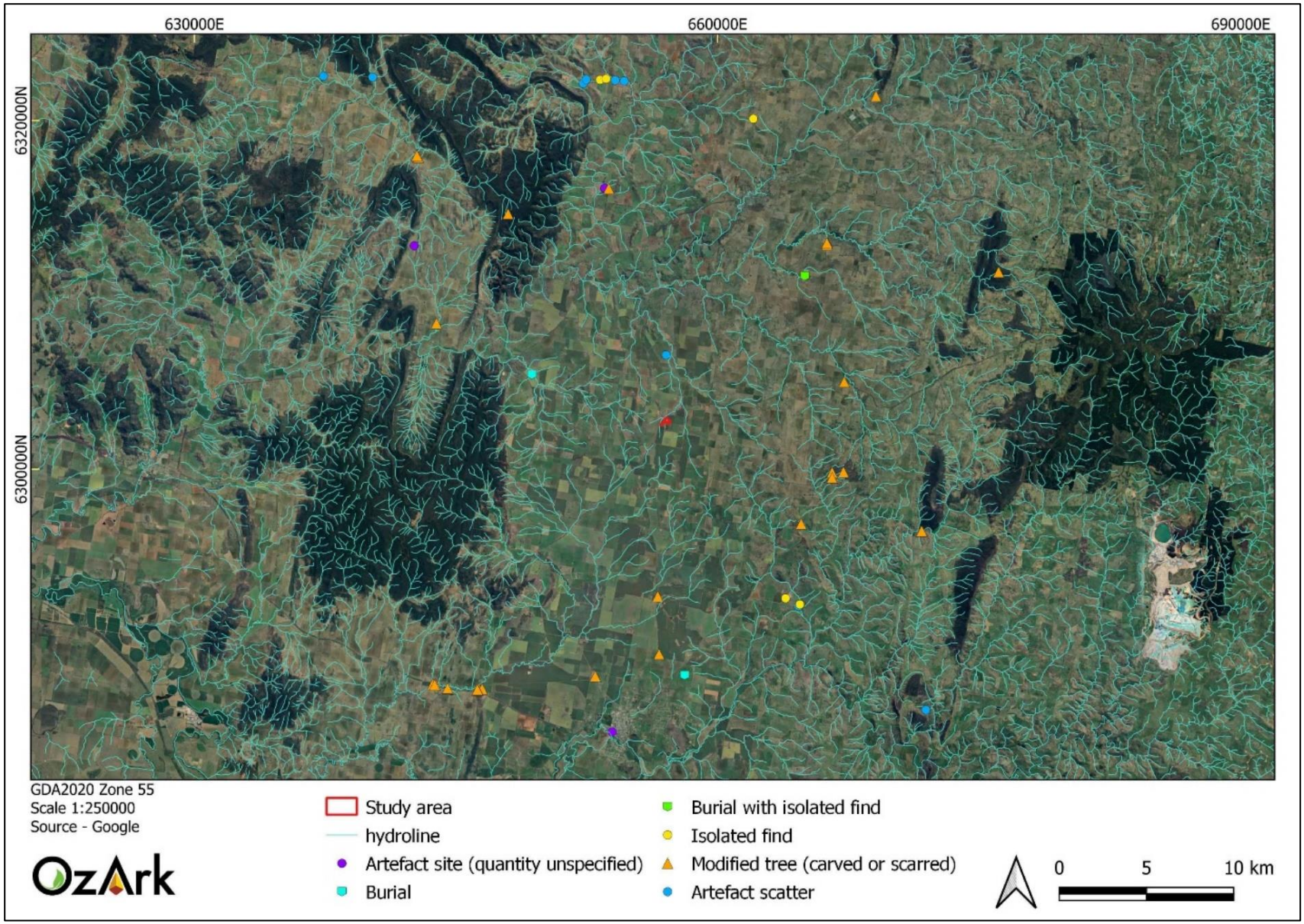
The AHIMS data indicates that modified trees are the most likely site type to be present in the study area, with artefact sites also likely to be recorded. While previously recorded modified trees tend to be located near reliable or semi-reliable watercourses, some have been located up to 1 km from the nearest ephemeral water source. Therefore, while unlikely, it is possible for modified trees to be recorded distant to a reliable source of water where mature vegetation remains.

Additionally, as isolated finds have been recorded in highly disturbed contexts at distance from waterways, they therefore could be recorded within the study area.

Table 2-2: Site types and frequencies of AHIMS sites near the study area.

Site Type	Number	% Frequency
Modified tree	29	55.5
Artefact scatter	9	17
Isolated find	7	13.5
Artefact site (quantity unspecified)	4	8
Burial	2	4
Burial with isolated find	1	2
Total	**52**	**100**

Figure 2-3: Previously recorded sites in relation to the study area.



2.3.3 Step 2b

Are there any other sources of information of which a person is already aware?

No, there are no other sources of information that would indicate the presence of Aboriginal objects in the study area.

Ethnohistoric context

According to Tindale's (1974) and Horton's (1994) maps of tribal boundaries, the study area falls within the boundaries of the Wiradjuri 'tribal' or ethno-linguistic group.

Oral tradition records the presence of over 20 clans within the broader Bathurst–Mudgee region, organised according to matrilineal descent (Navin Officer 2005: 48). Clans were made up of several independent groups, of up to 20 members, in friendly contact with each other, moving separately for much of the year over a shared territory (Pearson 1981; Haglund 1985).

Early accounts of contact between European and Aboriginal people in the Macquarie River area were provided by Oxley (1820) and Sturt (1834), and later by Garnsey (1942) who was born in Dubbo in 1874 (Whitehead 2003). Early references to Aboriginal people in the Orange and Wellington regions are provided by John Oxley, who passed by Limestone Creek, south of Mt Canobolas, on 12 April 1817, describing the area as "*a beautiful picturesque country of low hills and fine valleys well-watered"* (Whitehead 2003: 351). Further southwest, at the Lachlan River, Oxley met Aboriginal people carrying stone hatchets and possum skin cloaks. Oxley then returned to Bathurst along the Bell and Macquarie Rivers north of Orange in late August, passing near Wellington on 25 August 1817. Oxley noted the abundant natural resources in areas adjacent to the Macquarie River—including emus, ducks, swans, fish and freshwater muscles—and that the country had an abundance of running water, with a spring on every hill (Rawson 1997: 8).

Garnsey's interest in local Aboriginal culture led him to record information gleaned from his father and from Wiradjuri Aboriginal elders in the Dubbo area. His work remains a useful account of everyday life and religious/ceremonial practices. Garnsey's (1942: 6) description of camp life suggests that many activities were performed communally, for the benefit of the mob. Campsites comprised a series of bark or bush shelters arranged in a semi-circle opening to the east, arranged around a central fire, with men occupying shelters to the north, women in the centre, and children to the south. Camps moved frequently over short distances due to alterations in social relations and weather, and in response to hygiene concerns, among other factors. Longer distance movements tended to be linked to participation in large-scale gatherings (e.g. ceremony or warfare) or alterations in resource availability. Garnsey (1942: 6–23) also provides detailed descriptions of ceremonial practices related to alterations in social status and passages from infancy to adulthood. These descriptions of are a composite of various verbal accounts, the

accuracy of which is difficult to ascertain. Garnsey (1942: 14) suggests that the 'mob' structure began to break down during the 1890s, by which time only older men appeared to retain the tribal markings and knowledge associated with ceremonial practice. Oral histories provided by traditional custodians are likely to elaborate upon and refute aspects of these early accounts.

In the early colonial period, relationships between Europeans and Aboriginal people were relatively amicable while there were few colonists. Pearson analysed observations written by nineteenth century observers from the upper Macquarie region:

> *the upper Macquarie was inhabited by large localised groups of Aborigines, who in normal conditions of daily life were divided into small groups of up to twenty individuals. These small groups could coalesce relatively quickly into groups of from 80 to 150 people to take advantage of a guaranteed or desirable resource (such as seasonal food resources or the goods offered by the Wellington mission), for ceremonial or social obligations, or for special events (such as a pre-arranged gathering to see an explorer or first settler in an area). There seem to have been no over-riding seasonal factors affecting Aboriginal movements in the well-watered upper Macquarie* (Pearson 1984: 64).

Plants were used for food, as well as in the manufacture of practical items, decorative items and medicines, with some species providing more than one resource. Grass stalks could be used for weaving or producing baskets. Large trees were useful in providing bark and fibres used for the manufacture of tools, containers and possibly the construction of watercraft. The resin obtained from Grass Trees, for example, were an adhesive that could be used in hafting processes. Bark fibres were twisted into twine which could then be woven into traps, containers or baskets and a variety of wooden tools. Stone was also used for tools (RPS 2014).

Regional archaeological context

Pearson (1981) analysed the patterns of Aboriginal and early colonial settlement within the Upper Macquarie Region, including some excavation. Three shelters were excavated, yielding occupation dates to around 7,000 BP. Pearson argued that archaeological sites could be divided into two main categories: occupation sites and non-occupation sites (which included grinding grooves, scarred or carved trees, ceremonial and burial sites etc.). Pearson's analysis of site location yielded a site prediction model with occupation sites occurring in areas with:

- Access to water – site size decreased with distance from water
- Good drainage and views over watercourses or river flats
- Level ground
- Adequate fuel
- Appropriate localised weather patterns for summer or winter occupation.

As such, occupation sites were most frequently found on low ridge tops, creek banks, gently undulating hills and river flats and usually in open woodland vegetation (Pearson 1981: 101). The location of non-occupation sites, meanwhile, depended on several factors relating to site function. For instance:

- Grinding grooves only occur where there is appropriate outcropping sandstone, but as close to occupation sites as possible,
- Scarred trees are variably located with no obvious patterning, other than proximity to watercourses where camps are more frequently located,
- Burial grounds are generally in soft soils, as close to occupation sites as geological conditions permit,
- Ceremonial sites, such as bora rings and stone arrangements, are located away from occupation sites.

Local archaeological context

OzArk 2009

In 2009 the RTA commissioned OzArk to undertake ecological and heritage assessments of a c. 19 km section of Canowindra Road adjacent to the current study area. Two culturally modified trees (CC-ST1 and CC-ST2) were identified, both of which were assessed as Aboriginal in origin. The trees were situated approximately 10 km and 13 km south of the current study area. The lack of stone artefacts recorded during this survey was concluded to likely be related to a lack intersecting permanent and semi-permanent water courses.

Pardoe 2009

Several surveys were conducted for an Aboriginal Cultural Heritage Assessment for the Cadia East Project (Pardoe, 2009). The assessment was located 25 km south-west of Orange, and approximately 30 km east of the current study area within an undulating landscape. One quartz flake and two scarred trees were recorded during the surveys, and three areas of heightened archaeological potential were identified. It was noted that the Cadia Valley and its surrounds generally have a low likelihood to possess significant Aboriginal sites due to the very low density of previously recorded sites and objects in the region, as well as disturbances associated with land use.

OzArk 2010

An assessment of an approximately 11 km section of Canowindra Road was carried out by OzArk (2010) 7.5 km north of the current study area. One isolated siltstone flake was recorded during the inspection on an unsealed track within an undulating hill landform. The artefact was located 130 m from a permanent watercourse, Bourimbla Creek.

Pardoe 2010

In 2010, Dr Colin Pardoe undertook an Aboriginal heritage assessment which identified one open site approximately 3.5 km from the current study area. The site consisted of a broken hammer stone, cores, flakes, and debitage. All artefacts identified consisted of volcanic, silcrete, or siliceous raw materials. The site was recorded approximately 250 m from a tributary to Boree Creek.

Conclusion

The archaeological characteristics of the region suggest that Aboriginal sites tend to be associated with reliable waterways, but may also be located along ephemeral waterways that offer water during periods of increased rainfall.

Scarred trees and open artefact sites such as artefact scatters and isolated finds are expected to be the most likely site type present at the study area. However, due to the distance of the study area from a reliable source of water, the likelihood of recording Aboriginal sites is significantly decreased.

2.3.4 Step 2c

Are there any landscape features that are likely to indicate presence of Aboriginal objects?

Yes, portions of the study area contain landforms with identified archaeological sensitivity.

The Due Diligence Code outlines a series of landscape features which are known to be archaeologically sensitive, and which are likely to contain Aboriginal objects. Included in this list is any land within 200 m of a body of water or a watercourse (DECCW 2010).

The western section of the study area is located within 200 m of a non-perennial drainage line. This drainage line is would not have the capacity to sustain a population outside of periods of increased rainfall, inhibiting long-term habitation. The drainage is an ephemeral tributary to Boree Creek, which is situated 7.8 km north of the study area.

The study area is located within the Canobolas Slopes as characterised by Mitchell (2002). This landform unit features rounded hills, peaks and ranges on sandstone, tuffaceous and limestone units. The study area itself consist of slopes associated with a hill crest located southeast of the study area. The western area of the Canobolas Slopes holds brown gradational sandy loams and harsh yellow texture contrast soils (Mitchell 2002). These soils are highly erodible, particularly when combined with vegetation clearance and moderate slopes. vegetation within this area typically includes white, grey, and yellow box, stringybark, and ironbark species. These species (excluding ironbark) are suitable for the extraction of bark for cultural purposes.

2.3.5 Step 3

Can harm to Aboriginal objects or disturbance of archaeologically sensitive landscape features be avoided?

No. Landforms with identified archaeological sensitivity may be impacted by the proposal.

The proposal will require the excavation and grading of earth within 200 m of an ephemeral drainage line, therefore harm to landforms with archaeological sensitivity cannot be avoided.

2.3.6 Step 4

Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?

No, there are no Aboriginal objects within the study area.

The visual inspection of the study area was undertaken by OzArk Archaeologist, Tenae Robertson, on 25 October 2023. The proposed extraction area, deceleration zone, and the southern portion of the proposed access route were inspected on foot. Where the remaining area of the access route and associated facilities were not inspected on foot, similar landforms were inspected to confirm archaeological potential of the landform (**Figure 2-4**).

The inspection confirmed that the proposed extraction area was located within highly disturbed contexts subject to ploughing and crop cultivation, as well as extensive previous earthworks which have modified the nature of the landform. The extraction area is located on a gentle to medium gradient slope within a generally undulating landscape. The visibility in this area was somewhat low, at approximately 30% between the dense wheat crops. This area is assessed as having low archaeological potential.

The proposed access track traverses through a paddock which has been subject to ploughing, on a gently sloping landform and meets with an existing track in the east. The location of the proposed deceleration zone was confirmed to be highly disturbed through works associated with the construction of Canowindra Road. The visibility within the proposed deceleration zone was very low, at approximately 15%. The archaeological potential for this area is assessed as being low.

All remnant mature vegetation within the study area was inspected and no trees displayed evidence of cultural modification. Further, no other Aboriginal site types were identified within the study area. The lack of identified sites is to be expected given the distance of the study area from a reliable water source, high levels of disturbance and lack of landforms suitable for occupation.

Figure 2-4: Survey coverage within the study area.



A 'no' answer for Step 4, results in the following outcome (DECCW 2010):

> *AHIP* (Aboriginal Heritage Impact Permit) *application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify Heritage NSW (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au). If human remains are found, stop work, secure the site and notify NSW Police and Heritage NSW.*

2.4 CONCLUSION

The due diligence process has resulted in the outcome that an AHIP is not required. The reasoning behind this determination is set out in **Table 2-3**.

Table 2-3: Due Diligence Code of Practice application.

Step	Reasoning	Answer
Step 1 Will the activity disturb the ground surface or any culturally modified trees?	The proposed works will disturb the ground surface through excavation and grading. The proposal may impact mature, native vegetation however visual inspection did not confirm the presence of culturally modified trees within the study area.	Yes
If the answer to Step 1 is 'yes', proceed to Step 2		
Step 2a Are there any relevant records of Aboriginal heritage on AHIMS to indicate presence of Aboriginal objects?	AHIMS indicated that there are no Aboriginal sites within the study area.	No
Step 2b Are there other sources of information to indicate presence of Aboriginal objects?	There are no other sources of information to indicate that Aboriginal objects are likely in the study area.	No
Step 2c Will the activity impact landforms with archaeological sensitivity as defined by the Due Diligence Code?	Landforms with identified archaeological sensitivity are present.	Yes
If the answer to any stage of Step 2 is 'yes', proceed to Step 3		
Step 3 Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?	The proposal will impact landforms with archaeological sensitivity as identified in the Due Diligence Code: landforms within 200 m of 'waters'.	No
If the answer to Step 3 is 'no', a visual inspection is required. Proceed to Step 4.		
Step 4 Does the visual inspection confirm that there are Aboriginal objects or that they are likely?	The visual inspection recorded no Aboriginal objects in the study area. Landforms with identified archaeological sensitivity that were identified at a desk-top level were found during the inspection to have low archaeological potential.	No
Conclusion		
AHIP not necessary. Proceed with caution.		

3 MANAGEMENT RECOMMENDATIONS

The undertaking of the due diligence process resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

> *AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW (02) 9873 8500 (heritagemailbox @environment.nsw.gov.au). If human remains are found, stop work, secure the site, and notify NSW Police and Heritage NSW.*

To ensure the greatest possible protection to the area's Aboriginal cultural heritage values, the following recommendations are made:

1) The proposed work may proceed without further archaeological investigation.
2) 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 that may be in adjacent landforms. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
3) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. If during works, however, Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed.
4) Inductions for work crews should include a cultural heritage awareness procedure to ensure they recognise Aboriginal artefacts (see **Appendix 3**) and are aware of the legislative protection of Aboriginal objects under the NPW Act and the contents of the *Unanticipated Finds Protocol.*
5) The information presented here meets the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. It should be retained as shelf documentation for five years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

REFERENCES

DECCW 2010 — DECCW. 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. Department of Environment, Climate Change and Water, Sydney.

Garnsey 1942 — Garnsey, E. J. 1942. *A Treatise on the Aborigines of Dubbo and District: Their camplife, habits and customs*. Dubbo Museum and Historical Society.

Haglund 1985 — Haglund L. 1985. *Assessment of the Prehistoric Heritage in the Mudgee Shire.*

Horton 1994 — Horton, D. 1994. *The AIATSIS Map of Indigenous Australia*. Australian Institute of Aboriginal and Torres Strait Islander Studies.

Mitchell 2002 — Mitchell, Dr. Peter. 2002. *Description for NSW (Mitchell) Landscapes Version 2.* Department of Environment and Climate Change NSW.

Navin Officer 2005 — Navin Officer Heritage Consultants.2005. *Wilpinjong Coal Project.* Report to Wilpinjong Coal Pty Limited.

Oxley 1820 — Oxley, J. 1820. *Journals of two expeditions into the interior of New South Wales.* London.

OzArk 2009 — OzArk Environment & Heritage. 2009. *Aboriginal Heritage Assessment: MR310 (Cudal to Canowindra Rd) Widening Project.* Report for NSW Roads & Traffic Authority.

OzArk 2010 — OzArk Environment & Heritage. 2010. *Indigenous Heritage Assessment: MR310 (Cudal to Frisby Lane) Widening Project*. Report for NSW Roads & Traffic Authority.

Pardoe 2009 — Colin Pardoe Bio-Anthropology & Archaeology. 2009. *Cadia East Project Aboriginal Cultural Heritage Assessment*. Report for Cadia Holdings Pty Limited.

Pardoe 2010 — Pardoe, C. 2010. *Wellington – Young Pipeline Cultural Heritage Assessment.* CNC Project Management.

Pearson 1981 — Pearson M. 1981. *Seen through Different Eyes: Changing Land Use and Settlement Patterns in the Upper Macquarie River Region of NSW from Prehistoric Times to 1860.* [PhD thesis] Submitted to the Department of Prehistory and Anthropology, The Australian National University.

Sturt 1833 — Sturt, C. 1833. *Journals of expeditions into the interior of southern Australian during the years 1828, 1829, 1830 and 1831.* Two Volumes: London.

Tindale 1974 Tindale N. 1974. *Aboriginal Tribes of Australia*. ANU Press, Canberra.

Whitehead 2003 Whitehead, J. 2003. *Tracking an Mapping the Explorers: Oxley, Evans and Cunningham: The Lachlan River 1817.*

PLATES



Plate 1: View northwest across the proposed extraction area.



Plate 2: View west from the proposed extraction area towards the proposed location of the access track, stockpile, and facilities area.

APPENDIX 1: AHIMS SEARCH RESULTS

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Mcnaught Quarry 4160
Client Service ID : 831155

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
44-1-0114	Parkes-Maildra Open Site 18 (PM-OS18)	GDA	55	652306	6322131	Open site	Partially Destroyed	Artefact : -		102488
	Contact: Orange LALC	Recorders: Doctor.Jodie Benton						Permits:		
44-4-0363	Back Mogong Road Scarred Tree	GDA	55	652989	6288133	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact: Cowra LALC	Recorders: Doctor.Colin Pardoe						Permits:		
44-1-0092	Parked Manildra-Open Site 14 (PM-OS14)	GDA	55	640227	6322486	Open site	Partially Destroyed	Artefact : -		102488
	Contact:	Recorders: OzArk Environmental and Heritage Management - Dubbo						Permits:		
44-1-0053	Reedy Creek Road 2	AGD	55	642731	6317708	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Rosemary Stapleton						Permits:		
44-1-0023	Davy's Plain 1;	AGD	55	664900	6310900	Open site	Valid	Artefact : -, Burial : -	Burial/s,Isolated Find	
	Contact:	Recorders: Bill Allen						Permits:		
44-1-0147	SWWNR Mandagery	GDA	55	647993	6314648	Closed site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact:	Recorders: Mr.Steven Woodhall,Mr.Steven Woodhall,DPIE - Armidale,DPIE - Armidale						Permits:		
44-1-0030	C-ST-1 Near Cargo-Canowindra Rd.	AGD	55	666460	6299630	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	4748
	Contact:	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits:		
44-4-0069	Old Mill (1);	AGD	55	653850	6284750	Open site	Valid	Artefact : -	Open Camp Site	102779
	Contact:	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits:		
44-1-0002	Murga;Mandagery Mountains;	AGD	55	642493	6312631	Open site	Valid	Artefact : -	Open Camp Site	
	Contact:	Recorders: ASRSYS						Permits:		
44-4-0333	Nyrang Creek Road opposite silo	AGD	55	644409	6287254	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Rosemary Stapleton						Permits:		
44-1-0145	Cargo-IF1	GDA	55	663904	6292600	Open site	Valid	Artefact : -		
	Contact:	Recorders: Ms.Morgan Wilcox						Permits:		
44-1-0107	PM-IF6 (Molong)	GDA	55	653265	6322336	Open site	Partially Destroyed	Artefact : 1		102488
	Contact:	Recorders: Doctor.Jodie Benton,OzArk Environmental and Heritage Management - Dubbo,Mr.T						Permits:		
44-1-0041	Canomodine Creek	AGD	55	671561	6296262	Open site	Valid	Modified Tree (Carved or Scarred) : 1		

Report generated by AHIMS Web Service on 20/10/2023 for Tenae Robertson for the following area at Datum :GDA, Zone : 55, Eastings : 637347.0 - 677128.0, Northings : 6282840.0 - 6322562.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 5

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Mcnaught Quarry 4160
Client Service ID : 831155

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact:	Recorders: Miss.Rebeeca Ogden-Brunell						Permits:		
44-1-0103	Bourimbla 1	GDA	55	657052	6306555	Open site	Valid	Artefact : 3		
	Contact: Orange LALC	Recorders: Doctor.Colin Pardoe						Permits:		
43-3-0100	Parkes-Manildra Open Site 35 (PM-OS35)	GDA	55	637402	6322547	Open site	Valid	Artefact : -		102488
	Contact: Orange LALC	Recorders: Doctor.Jodie Benton						Permits:		
44-4-0290	Nyrang Creek 2	AGD	55	643707	6287471	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Miss.Rebeeca Ogden-Brunell						Permits:		
44-4-0285	Canowindra-Nyrang Creek Road 1	AGD	55	646094	6287121	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Miss.Rebeeca Ogden-Brunell						Permits:		
44-1-0034	C-IF-3;"Canomodine";	AGD	55	664610	6292060	Open site	Valid	Artefact : -	Isolated Find	
	Contact:	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits:		
44-4-0288	Canowindra Nyrang Creek Road	AGD	55	646183	6287252	Open site	Valid	Modified Tree (Carved or Scarred) : 2		
	Contact:	Recorders: Miss.Rebeeca Ogden-Brunell						Permits:		
44-1-0098	Molong TSR 3	GDA	55	653526	6316107	Open site	Valid	Artefact : -		
	Contact:	Recorders: Miss.Cortney Biles						Permits:		
44-4-0362	Cudal/Canowindra Mod Tree 1	GDA	55	656653	6289397	Open site	Valid	Modified Tree (Carved or Scarred) : 1		101794
	Contact:	Recorders: Doctor.Jodie Benton						Permits:		
44-1-0044	Wide Lane	AGD	55	666177	6312690	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Miss.Rebeeca Ogden-Brunell						Permits:		
44-1-0031	C-ST-2 Near Cargo-Canowindra Rd.	AGD	55	666460	6299330	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	4748
	Contact:	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits:		
44-4-0332	Canowindra-Nyrang Creek Road 2	AGD	55	646392	6287215	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact:	Recorders: Rosemary Stapleton						Permits:		
44-1-0015	Canowindra;Burdett;	AGD	55	649249	6305240	Open site	Valid	Burial : -	Burial/s	
	Contact:	Recorders: ASRSYS						Permits:		

Report generated by AHIMS Web Service on 20/10/2023 for Tenae Robertson for the following area at Datum :GDA, Zone : 55, Eastings : 637347.0 - 677128.0, Northings : 6282840.0 - 6322562.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 2 of 5

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Mcnaught Quarry 4160
Client Service ID : 831155

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
44-1-0100	Cudul/Canowindra Mod Tree 2	GDA	55	656576	6292713	Open site	Valid	Modified Tree (Carved or Scarred) : 1		101794
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
44-1-0052	Reedy Creek Road	AGD	55	642647	6317805	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Rosemary Stapleton					**Permits**		
44-4-0334	Nyrang Creek 3	AGD	55	643548	6287480	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Rosemary Stapleton					**Permits**		
44-1-0036	C-IF-1 Canomodine	AGD	55	664610	6292060	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
44-1-0045	Wide Lane 2	AGD	55	666173	6312791	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-1-0032	C-ST-3 Near Cargo-Canowindra Rd.	AGD	55	667110	6299660	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	4748
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
44-1-0006	Boree;	AGD	55	668974	6321218	Open site	Valid	Modified Tree (Carved or Scarred) : -	Carved Tree	65
	Contact	**Recorders**	ASRSYS					**Permits**		
44-1-0042	Canomodine Creeck 2	AGD	55	671597	6296265	Open site	Valid	Modified Tree (Carved or Scarred) : 2		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-5-0009	Newbridge;	AGD	55	671840	6286010	Open site	Valid	Artefact : -	Open Camp Site	2009
	Contact	**Recorders**	R Williams,Prue Gaffey					**Permits**		
44-1-0149	Barton scar tree#2	GDA	55	676124	6311311	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	Mr.Steven Woodhall,DPIE - Armidale					**Permits**		
44-1-0106	PM-IF5 (Molong)	GDA	55	653618	6322390	Open site	Partially Destroyed	Artefact : 1		102488
	Contact	**Recorders**	Doctor.Jodie Benton,OzArk Environmental and Heritage Management - Dubbo,Mr.T					**Permits**		
44-1-0117	Parkes-Manildra Open Site 25 (PM-OS25)	GDA	55	654134	6322307	Open site	Partially Destroyed	Artefact : -		102488
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		

Report generated by AHIMS Web Service on 20/10/2023 for Tenae Robertson for the following area at Datum :GDA, Zone : 55, Eastings : 637347.0 - 677128.0, Northings : 6282840.0 - 6322562.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

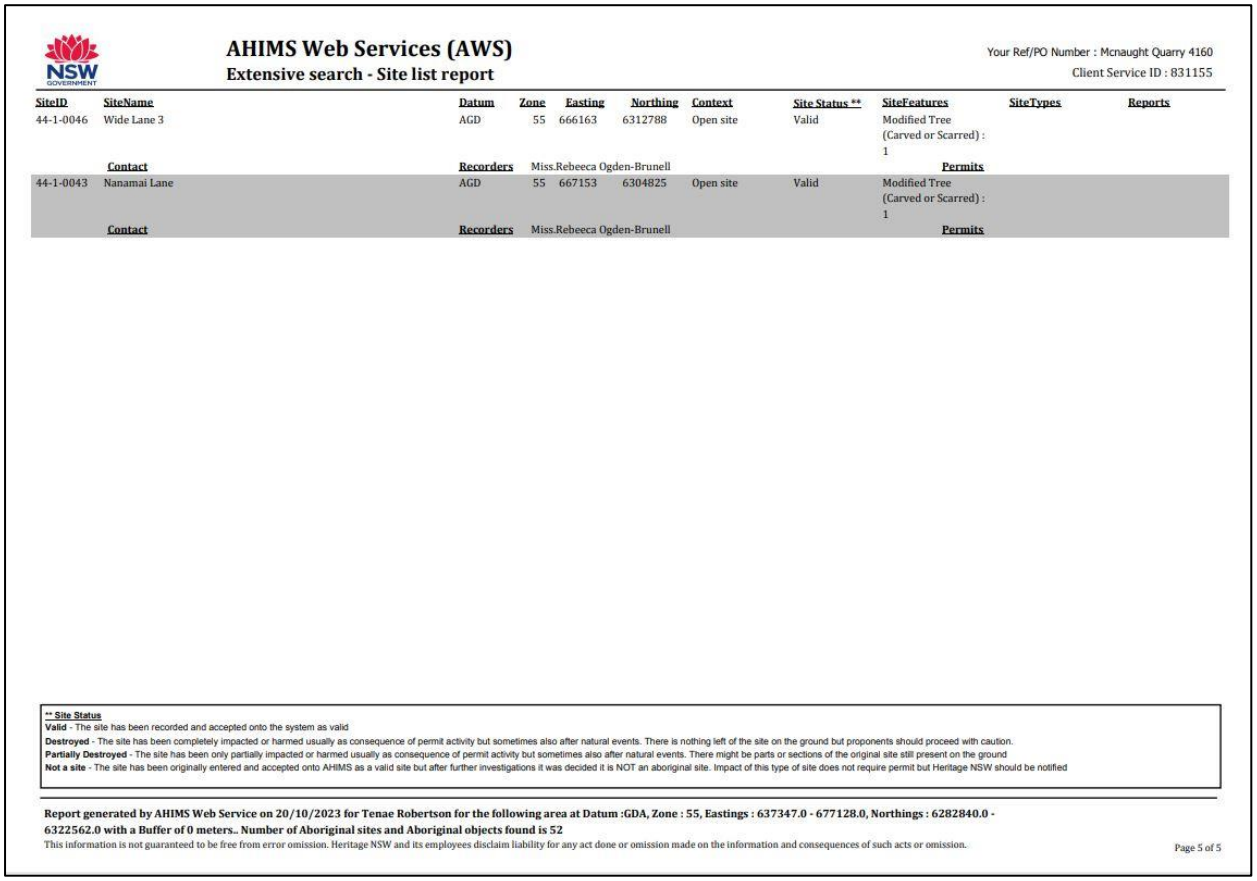
AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Mcnaught Quarry 4160
Client Service ID : 831155

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
44-1-0037	C-OS-1 Canomodine	AGD	55	664540	6291960	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
44-1-0148	Cargo Rd 800	GDA	55	664800	6296867	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	Mr.Mark Saddler					**Permits**		
44-4-0287	Canowindra-Nyrang Creek Road	AGD	55	646151	6287151	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-1-0084	Parked Manildra-Open Site 4 (PM-OS4)	GDA	55	652474	6322352	Open site	Partially Destroyed	Artefact : -		102488
	Contact	**Recorders**	OzArk Environmental and Heritage Management - Dubbo					**Permits**		
44-1-0097	Molong TSR 2	GDA	55	653544	6316125	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Miss.Cortney Biles					**Permits**		
44-1-0096	Molong TSR 1	GDA	55	653767	6316098	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	Birpai Local Aboriginal Land Council,Miss.Cortney Biles					**Permits**		
44-1-0116	Parkes-Manildra Open Site 24 (PM-OS24)	GDA	55	654649	6322267	Open site	Partially Destroyed	Artefact : -		102488
	Contact Orange LALC	**Recorders**	Doctor.Jodie Benton					**Permits**		
51-1-0058	Preston's Paddock Burial	AGD	55	658000	6288000	Open site	Valid	Burial : -	Burial/s	102779
	Contact	**Recorders**	Ms.Adrienne Howe-Piening					**Permits**		
44-1-0102	Scenic Road CMT 1	GDA	55	662057	6320101	Open site	Valid	Artefact : 1		
	Contact Orange LALC	**Recorders**	Doctor.Colin Pardoe					**Permits**		
44-4-0286	Canoindra-Nyrang Creek Road 2	AGD	55	646113	6287179	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-1-0054	Reedy Creek Road 5	AGD	55	643770	6308186	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Rosemary Stapleton					**Permits**		
44-4-0289	Nyrang Creek	AGD	55	643661	6287441	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-1-0035	C-IF-2;"Canomodine";	AGD	55	664610	6292060	Open site	Valid	Artefact : -	Isolated Find	
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		

Report generated by AHIMS Web Service on 20/10/2023 for Tenae Robertson for the following area at Datum :GDA, Zone : 55, Eastings : 637347.0 - 677128.0, Northings : 6282840.0 - 6322562.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Mcnaught Quarry 4160
Client Service ID : 831155

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
44-1-0046	Wide Lane 3	AGD	55	666163	6312788	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		
44-1-0043	Nanamai Lane	AGD	55	667153	6304825	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Miss.Rebeeca Ogden-Brunell					**Permits**		

** Site Status
Valid - The site has been recorded and accepted onto the system as valid
Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 20/10/2023 for Tenae Robertson for the following area at Datum :GDA, Zone : 55, Eastings : 637347.0 - 677128.0, Northings : 6282840.0 - 6322562.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 52

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 5 of 5

APPENDIX 2: 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 as soon as practical on (02) 9873 8500 (heritagemailbox @environment.nsw.gov.au), 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.
2. If Aboriginal burials are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and Heritage NSW 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 and after gaining written approval from Heritage NSW (normally an Aboriginal Heritage Impact Permit).

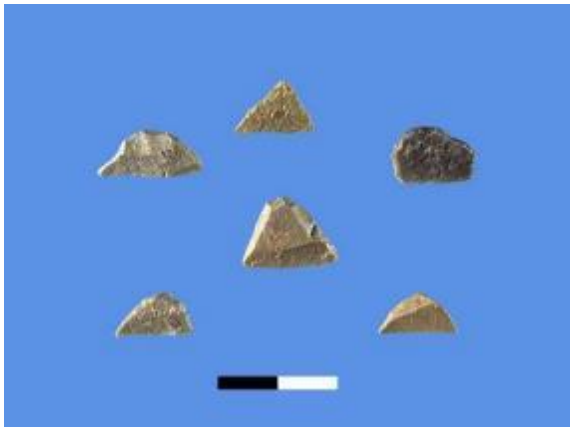
APPENDIX 3: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION



A retouched silcrete flake



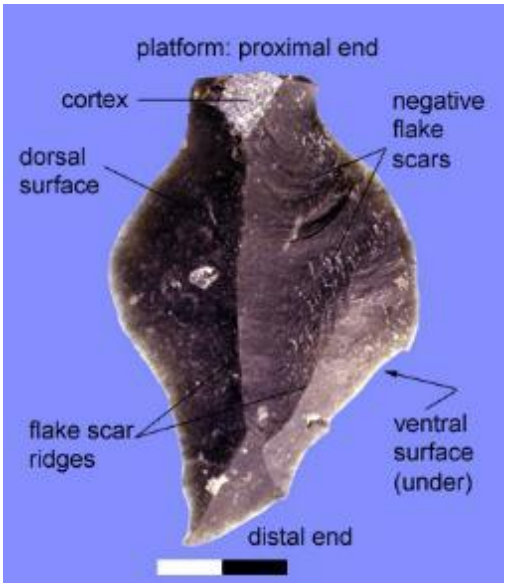
A quartz flake



Microliths (scale = 1 cm)



Volcanic flakes



Flake characteristics (scale = 1 cm)



A mudstone/tuff core from which flakes have been removed