



ABN: 70 973 626 960

Environmental Impact Statement

for the

Swan Ponds Quarry

Prepared by:



R.W. CORKERY & CO. PTY. LIMITED

April 2018

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ABN: 70 973 626 960

Environmental Impact Statement

for the

Swan Ponds Quarry

Prepared for:

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t/a Swan Ponds
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Ref No. 952/02

April 2018



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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: The Yarragrove Family Trust
applicant address: 8-14 Irving Place
BATHURST NSW 2795

c) Application Number:

EAR 1053

d) Address/land details:

Mid Western Highway, Evans Plains

Properties to be developed

Land Description:

Lot Number	Deposited Plan
241	1185616

e) Project Outline:

The Applicant is seeking development consent for the following.

- Extraction of weathered granite from the proposed Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, for a period of 18 years.
- Screening, washing and stockpiling of the extracted material.
- Campaign based crushing of material with a small mobile cone crusher.
- Transportation of the extracted material from the Project

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 18 September 2017.

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:

- this EIS has been prepared in accordance with the requirements of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*;
- the document contains all available information that is relevant to the environmental assessment of the proposed development; and
- that the information contained in the document is neither false nor misleading.

Signature:

M Bland

Name:

Mitchell Bland

Date:

5/4/2018.



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CONTENTS

	Page		Page
EXECUTIVE SUMMARY	ES-1	2.8	AMENITIES, SERVICES AND FACILITIES 2-13
SECTION 1: INTRODUCTION	1-1	2.8.1	Site Office..... 2-13
1.1 SCOPE	1-3	2.8.2	Potable Water..... 2-14
1.2 PROJECT SITE AND LAND ZONING	1-5	2.8.3	Power 2-14
1.3 THE APPLICANT	1-5	2.8.4	Communications..... 2-14
1.4 BACKGROUND TO THE PROPOSAL.....	1-7	2.9	HOURS OF OPERATION AND PROJECT LIFE 2-14
1.4.1 Introduction	1-7	2.9.1	Hours of Operation 2-14
1.4.2 Existing Approvals and Licences.....	1-7	2.9.2	Life of the Proposal 2-14
1.4.3 Approvals Required	1-8	2.10	EMPLOYMENT AND ECONOMIC CONTRIBUTION 2-15
1.4.4 Geological Setting and Resource.....	1-8	2.10.1	Employment 2-15
1.4.5 Existing Quarry Activities	1-10	2.10.2	Economic Contribution 2-15
1.5 FORMAT OF THE STATEMENT	1-12	2.11	BIODIVERSITY OFFSET STRATEGY 2-15
1.6 MANAGEMENT OF INVESTIGATIONS ..	1-13	2.12	SITE DECOMMISSIONING AND REHABILITATION 2-15
SECTION 2: DESCRIPTION OF THE PROPOSAL.....	2-1	2.12.1	Introduction 2-15
2.1 INTRODUCTION.....	2-3	2.12.2	Rehabilitation and Final Land Use Objectives 2-18
2.1.1 Objectives of the Proposal	2-3	2.12.3	Rehabilitation Procedures 2-18
2.1.2 Overview of the Proposal.....	2-3	2.13	ALTERNATIVES CONSIDERED..... 2-20
2.2 SITE ESTABLISHMENT	2-6	SECTION 3: CONSULTATION, ISSUE IDENTIFICATION AND PRIORITISATION	3-1
2.2.1 Survey and Mark Out	2-6	3.1	INTRODUCTION 3-3
2.2.2 Clearing of Vegetation	2-6	3.2	CONSULTATION 3-3
2.2.3 Stripping and Stockpiling of Growth Medium.....	2-6	3.2.1	Government Agencies..... 3-3
2.3 EXTRACTION OPERATIONS	2-7	3.2.2	Community Consultation 3-4
2.3.1 Layout of the Extraction Area.....	2-7	3.3	PLANNING CONTEXT 3-4
2.3.2 Extraction Method	2-7	3.3.1	Introduction 3-4
2.3.3 Extraction Rate	2-7	3.3.2	Commonwealth Legislation 3-4
2.3.4 Extraction Equipment.....	2-7	3.3.3	NSW Legislation..... 3-4
2.4 PROCESSING AND STOCKPILING OPERATIONS	2-8	3.3.4	State Environmental Planning Policies..... 3-7
2.5 TRANSPORTATION	2-9	3.3.5	Local Planning Issues 3-10
2.5.1 Introduction	2-9	3.4	PRIORITISATION OF ENVIRONMENTAL ISSUES 3-11
2.5.2 Anticipated Traffic Levels.....	2-9	SECTION 4: ASSESSMENT AND MANAGEMENT OF KEY ENVIRONMENTAL ISSUES.....	4-1
2.5.3 Site Entrance	2-9	4.1	ENVIRONMENTAL SETTING 4-3
2.5.4 Site Access Road.....	2-9	4.1.1	Introduction 4-3
2.5.5 Transportation Routes	2-11	4.1.2	TOPOGRAPHY AND DRAINAGE 4-3
2.5.6 Heavy Vehicle Classes	2-11	4.1.3	METEOROLOGY 4-7
2.6 WATER MANAGEMENT	2-12	4.1.4	Land Ownership and Land Use 4-9
2.7 WASTE MANAGEMENT.....	2-12		
2.7.1 Production Waste.....	2-12		
2.7.2 Non-Production Waste	2-13		



		Page			Page
4.2	ABORIGINAL HERITAGE.....	4-9	4.8.3	Management and Mitigation Measures	4-41
4.2.1	Introduction	4-9	4.8.4	Impact Assessment.....	4-41
4.2.2	Consultation.....	4-13	4.9	HISTORIC HERITAGE.....	4-42
4.2.3	AHIMS Registered Sites	4-13	4.9.1	Introduction	4-42
4.2.4	Predictive Model	4-14	4.9.2	Existing Environment	4-42
4.2.5	Survey Methodology	4-14	4.9.3	Impact Assessment.....	4-43
4.2.6	Management and Mitigation Measures	4-14	4.10	GROUNDWATER	4-43
4.2.7	Survey Results.....	4-15	4.10.1	Introduction	4-43
4.2.8	Assessment of Impact.....	4-16	4.10.2	Existing Environment	4-43
4.3	SURFACE WATER.....	4-18	4.10.3	Management and Mitigation Measures	4-44
4.3.1	Introduction	4-18	4.10.4	Assessment of Impacts	4-45
4.3.2	Existing Surface Water Environment.....	4-19	4.11	LAND RESOURCES	4-45
4.3.3	Site Water Balance	4-19	4.11.1	Introduction	4-45
4.3.4	Management and Mitigation Measures	4-20	4.11.2	Existing Environment	4-45
4.3.5	Impact Assessment.....	4-21	4.12	HAZARDS	4-47
4.4	NOISE.....	4-21	4.12.1	Introduction	4-47
4.4.1	Introduction	4-21	4.12.2	Management and Mitigation Measures	4-47
4.4.2	Existing Noise Environment	4-22	4.12.3	Assessment of Impact.....	4-47
4.4.3	Noise Assessment Criteria.....	4-22	4.13	SOCIAL AND ECONOMIC	4-48
4.4.4	Noise Assessment Methodology	4-23	4.13.1	Introduction	4-48
4.4.5	Management and Mitigation measures	4-23	4.13.2	Community Profile.....	4-48
4.4.6	Assessment of Impacts.....	4-26	4.13.3	Adverse and Beneficial Socio-economic Impacts	4-53
4.5	TRANSPORTATION AND TRAFFIC	4-26	4.13.4	Management and Mitigation Measures	4-53
4.5.1	Introduction	4-26	4.13.5	Impact Assessment.....	4-53
4.5.2	Existing Traffic Environment	4-29	4.14	CUMULATIVE IMPACTS	4-54
4.5.3	Management and Mitigation Measures	4-30	SECTION 5: EVALUATION AND JUSTIFICATION OF THE PROPOSAL.....		
4.5.4	Assessment of Impacts.....	4-30	5-1		
4.6	VISUAL AMENITY	4-31	5.1	ECOLOGICAL SUSTAINABLE DEVELOPMENT	5-3
4.6.1	Introduction	4-31	5.1.1	Introduction	5-3
4.6.2	Existing Visual Environment	4-31	5.1.2	The Precautionary Principle	5-3
4.6.3	Management and Mitigation Measures	4-31	5.1.3	Social Equity	5-4
4.6.4	Assessment of Impacts.....	4-32	5.1.4	Conservation of Biological Diversity and Ecological Integrity	5-4
4.7	BIODIVERSITY.....	4-33	5.1.5	Improved Valuation and Pricing of Environmental Resources	5-5
4.7.1	Introduction	4-33	5.1.6	Conclusion	5-5
4.7.2	Existing Environment	4-33	5.2	JUSTIFICATION OF THE PROPOSAL	5-5
4.7.3	Management and Mitigation Measures	4-36	5.2.1	Introduction	5-5
4.7.4	Impact Assessment.....	4-37	5.2.2	Biophysical Considerations	5-6
4.8	AIR QUALITY.....	4-40			
4.8.1	Introduction	4-40			
4.8.2	Existing Environment	4-40			

CONTENTS

	Page		Page
5.2.3	Socio-Economic Considerations 5-8	FIGURES	
5.2.4	Planning Considerations 5-8	Figure 1.1	Locality Plan..... 1-4
5.2.5	Section 4.15(1) Considerations.... 5-9	Figure 1.2	Project Site Land Zoning 1-6
5.2.6	Consequences of Not Proceeding with the Proposal 5-10	Figure 1.3	Local Geology 1-9
5.3	CONCLUSION 5-10	Figure 1.4	Existing Project Site Layout..... 1-11
SECTION 6: REFERENCES	6-1	Figure 2.1	Proposed Project Site Layout..... 2-4
SECTION 7: GLOSSARY OF TECHNICAL TERMS, ACRONYMS, SYMBOLS AND UNITS.....	7-1	Figure 2.2	Proposed Extraction Area Layout 2-5
APPENDICES		Figure 2.3	Site Access Road and Entrance.... 2-10
Appendix 1	Development Application Form	Figure 2.4	Proposed Transport Routes 2-11
Appendix 2	Secretary's Environmental Assessment Requirements and Matters Identified for Consideration	Figure 2.5	Proposed Final Landform 2-16
Appendix 3	Coverage of Secretary's Environmental Assessment Requirements	Figure 2.6	Proposed Final Landform – Isometric View 2-17
Appendix 4	Heritage Assessment	Figure 4.1	Regional Topography and Drainage..... 4-4
Appendix 5	Noise Impact Assessment	Figure 4.2	Local Topography and Drainage..... 4-5
Appendix 6	Traffic Impact Assessment	Figure 4.3	Project Site Topography and Drainage..... 4-6
		Figure 4.4	Wind Roses for Bathurst Airport.... 4-10
		Figure 4.5	Land Ownership and Residences 4-11
		Figure 4.6	Surrounding Land Uses and Groundwater Bores 4-12
		Figure 4.7	Aboriginal Heritage Sites..... 4-17
		Figure 4.8	Conceptual Water Balance..... 4-20
		Figure 4.9	Noise Modelling Scenario 1 – Existing Operations 4-24
		Figure 4.10	Noise Modelling Scenario 2 – Proposed Operations 4-25
		Figure 4.11	Noise Modelling Results – Scenario 1 – Existing Operations..... 4-27
		Figure 4.12	Noise Modelling Results – Scenario 2 – Proposed Operations..... 4-28
		Figure 4.13	Mapped Vegetation Communities 4-34

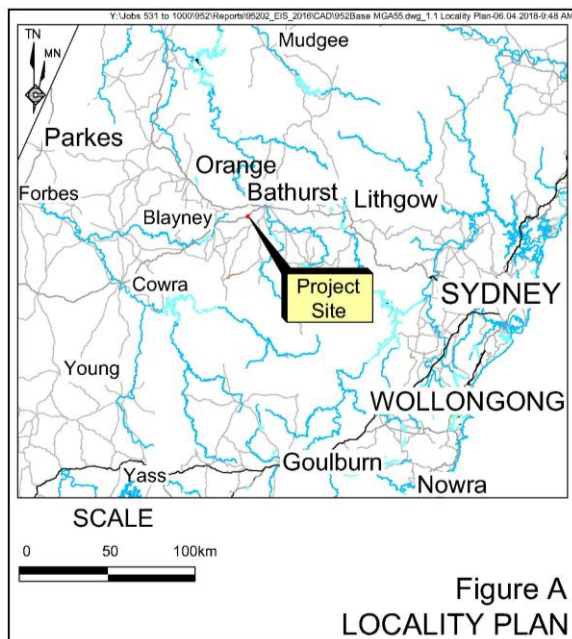
CONTENTS

	Page		Page
TABLES		PLATES	
Table 1.1	Water Access Licences 1-8	Plate 4.1	View of the Existing Extraction Area from the Mid Western Highway 4-32
Table 2.1	Indicative Equipment List..... 2-8		
Table 2.2	Non-Production Waste Management..... 2-13		
Table 2.3	Proposed Hours of Operation 2-14		
Table 3.1	Application of the Mining SEPP 3-8		
Table 3.2	Specific Matters of the Bathurst Regional Development Control Plan 2014 3-12		
Table 4.1	Meteorological Data..... 4-8		
Table 4.2	Listed Species within 10km of the Project Site 4-35		
Table 4.3	Registered Bores within 1km of the Extraction Area 4-44		
Table 4.4	2011 and 2016 Census Population Statistics 4-49		
Table 4.5	2016 Census Age Statistics 4-49		
Table 4.6	2016 Census Employment Statistics 4-50		
Table 4.7	2016 Census Industry of Employment Statistics 4-51		
Table 4.8	2016 Census Income Statistics..... 4-51		
Table 4.9	2016 Census Cost of Housing and Household Size Statistics 4-52		
Table 4.10	2016 Census Post School Level of Education..... 4-52		

Executive Summary

INTRODUCTION

This *Environmental Impact Statement* (EIS) has been prepared by R.W. Corkery & Co. Pty Limited (RWC) on behalf of The Yarragrove Family Trust (the Applicant) to support a development application to Bathurst Regional Council (Council) for the continued operation and extension of the Swan Ponds Quarry (the Proposal). The Project Site is located approximately 13km by road southwest of Bathurst in the Central West of NSW (**Figure A**).



The Proposal would comprise:

- extraction of weathered granite from a proposed Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, for a period of 18 years;

- screening, washing and stockpiling of the extracted material;
- campaign based crushing of material with a small mobile cone crusher;
- transportation of the extracted material from the Project Site;
- the progressive rehabilitation of a modified landform.

The Proposal is classified as:

- Designated Development under Clause 19 of Schedule 3(1) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg) as it would exceed the 2ha disturbance criteria; and the Project Site has been the subject of an extractive industry in the last five years.
- Regional Development under Part 4 of the *State Environmental Planning Policy (SEPP) (State and Regional Development) 2011* because it is an extractive industry that is classified as a Designated Development. As a result, the determining authority for the Proposal will be the Joint Regional Planning Panel (JRPP).

In addition, the Proposal is classified as Integrated Development under Section 4.46 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), an Environment Protection Licence will be required under the *Protection of the Environment Operations Act 1997* (POEO Act) and an Aboriginal Heritage Impact Permit will be required under Section 90 of the *National Parkes and Wildlife Act 1974*.

THE APPLICANT

The Applicant, The Yarragrove Family Trust, was formed for the purpose of managing the Quarry and agricultural operations within the Project Site. The Trustees of the Trust are Mr and Mrs Allbut, who were founding directors of TruFlo Pumping Systems Pty Ltd, a Bathurst-based company that currently employs more than 60 people.

The Applicant is seeking to ensure the continued secure supply of concrete aggregates to concrete batching plants within the Bathurst Regional Local Government Area and surrounding areas. The Applicant has a history of investing in infrastructure to ensure the sustainable operation of its activities and has promptly and comprehensively implemented actions to address issues as they have arisen.

Mr Allbut has had long experience in managing businesses in a competent and sustainable manner as evidenced by the current successful operation of TruFlo and has undergone training in the horticultural and landscaping sectors.

OBJECTIVES OF THE PROPOSAL

- To provide an ongoing source of coarse and fine sand for concrete aggregates, material for road construction and maintenance, and select fill.
- To minimise the impact on the local environment, community and other stakeholders.
- To provide for a final landform amenable to future use for nature conservation and agricultural activities.
- To ensure the ongoing operation of the Quarry in a safe, reliable and cost-effective manner, contributing to the local economy of the Bathurst Regional LGA.

DESCRIPTION OF THE PROPOSAL

Overview

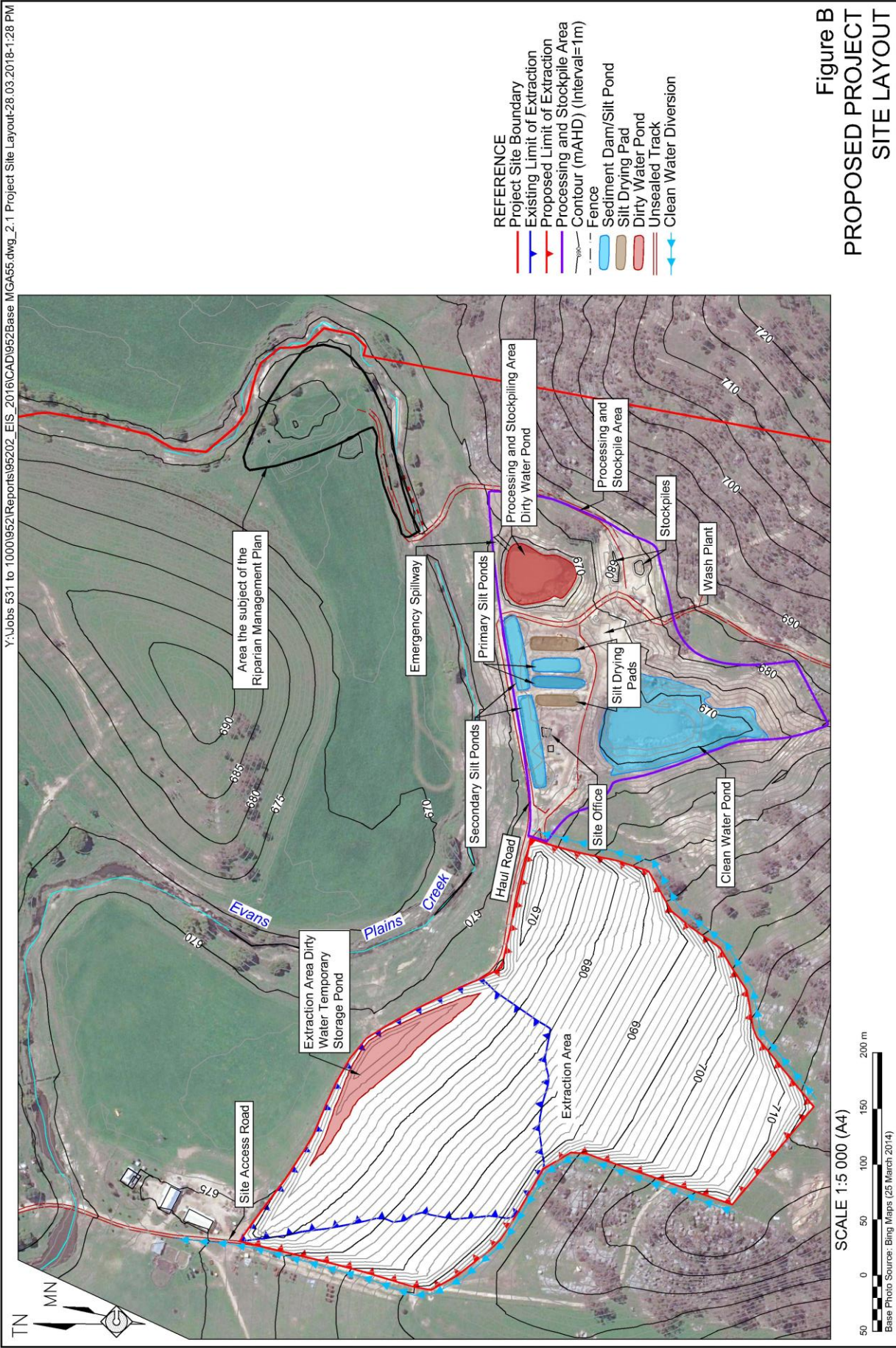
The Proposal would comprise the following (Figure B).

- Extraction of weathered granite from an enlarged Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, using a bulldozer, excavator, scraper or similar for a period of approximately 18 years.
- Processing of extracted weathered granite, including screening and washing.
- Campaign based crushing of weathered granite using a small mobile cone crusher.
- Loading and transportation of extracted and stockpiled material from the Project Site via the Mid Western Highway.
- Progressive rehabilitation of the Project Site to achieve a final land use of nature conservation and/or agriculture.

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 mark out of all areas of approved disturbance.
- Removal of vegetation within the proposed Extraction Area.
- Stripping and stockpiling or transfer of topsoil.



Extraction Operations

The proposed Extraction Area would have an approximate area of 10.3ha, with maximum wall slopes of 1:4, and a sloping floor approximately 4m lower than the existing landform.

Extraction operations would use a bulldozer or excavator on a campaign basis to rip and push the weathered granite into stockpiles.

Extraction of weathered granite would not exceed 50 000tpa, with the annual average extraction level expected to be approximately 35 000tpa.

Processing and Stockpiling Operations

The extracted material would either loaded into road-registered trucks or processed using a mobile crushing, washing and screening plant. Coarse, washed material would be stockpiled and allowed to dewater, while fine material would be passed to the Primary and Secondary Silt Ponds to settle out. Oversize material would be broken up with a small mobile cone crusher on a campaign basis and processed as above.

Transportation Operations

The Applicant contends that the current intersection of the site access road with the Mid Western Highway complies with the requirements for a BAL/BAR intersection. This would be confirmed by a suitably qualified traffic engineer upon approval.

Quarry products would be transported from the Project Site using semi-trailer trucks or smaller. Very occasionally, B-double road registered trucks may be used. The maximum rate of transportation would be 20 laden vehicles per day. All product would be transported via the Mid Western Highway either to the east towards Bathurst or to the west towards Blayney.

Hours of Operation

The Applicant would undertake all on-site activities between 7:00am and 5:00pm, Monday to Friday, and between 8:00am and 12:00pm on Saturday.

Life of the Proposal

The intended life of the Proposal would be approximately 18 years.

Employment and Economic Contribution

The Applicant anticipates that the Proposal would continue to contribute approximately \$392,500 to the local and regional economy.

In addition, the Proposal would contribute to local, regional and State economies by providing competitively priced coarse and fine sand products for use as concrete aggregates and select fill.

Rehabilitation and Final Landform

At the completion of extraction and processing activities, all infrastructure would be removed from the Project Site, while the Site Access Road would be maintained as access for the final land use.

The proposed final landform would comprise a gently sloping Extraction Area with sloping faces of no more than 1:4 (V:H), covered in native grasses, shrubs and trees. Two water storages would be retained to the east of the Extraction Area.

Final land use would be suitable for agricultural or nature conservation.

PLANNING CONTEXT

Planning Instruments

The Project Site is situated on land zoned Zone RU1 – Primary Production under the *Bathurst Regional Local Environment*

Plan 2014 (Bathurst LEP). Extractive industries are 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 (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries);*
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;*
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection;* and
- *State Environmental Planning Policy No. 55 – Remediation of Land.*

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

- Bathurst Regional LEP.
- *Bathurst Regional Development Control Plan 2014.*

Approvals Required

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

- An Environment Protection Licence under Clause 19 of Schedule 1 of the *Protection of the Environment Operations Act 1997*.
- Should modifications to the intersection of the Site Access Road and the Mid Western Highway be required, a Section 138 Permit under the *Roads Act 1993* will be required.

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.

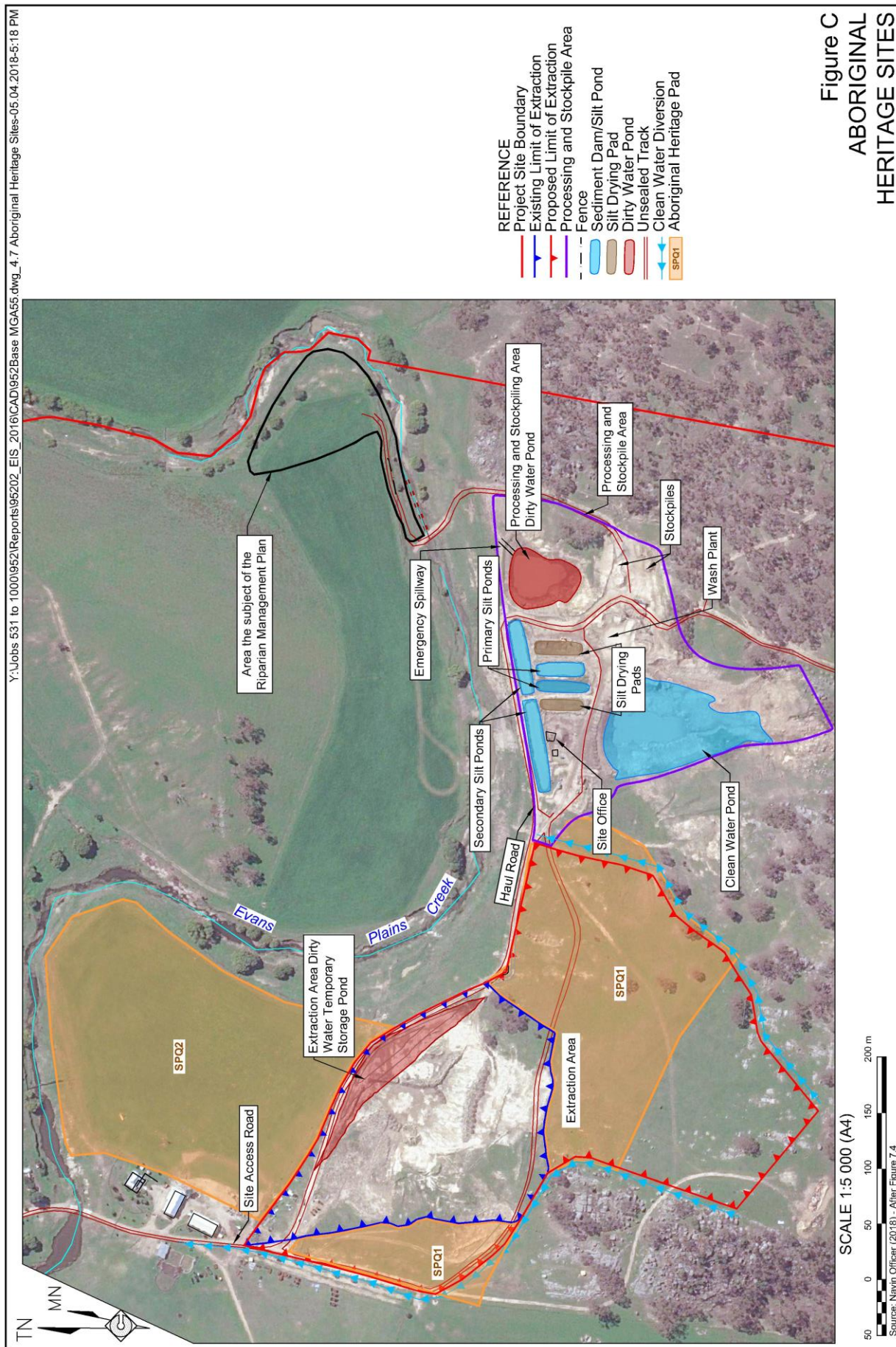
Aboriginal Heritage

A heritage assessment was completed by Navin Officer Heritage Consultants Pty Ltd (Navin Officer, 2018) in consultation with and with the assistance of the local Aboriginal community. That assessment identified two sites of Aboriginal heritage significance as follows (see **Figure C**).

- Site SPQ1.

This site is an open scatter comprising 12 artefacts including flakes, partial flakes and cores of various materials in 8 locations. Navin Officer (2018) states that there is potential for artefacts not identified during the survey to be present, including within the shallow (<20cm) surface materials.

Navin Officer (2018) have assessed the site as having moderate to low (local) scientific significance, with the social, cultural, historical and aesthetic values a matter for the Aboriginal community to determine. Notwithstanding this, Navin Officer (2018) state that the Aboriginal parties that contributed to the assessment have not indicated that the site has any particular connection to myths and stories, events or persons of importance to the Aboriginal community.



- Site SPQ2.

This site is a potential archaeological deposit (PAD) located adjacent to Evans Plains Creek. Limited ground visibility was available during the survey, however, Navin Officer (2018), in consultation with the Registered Aboriginal Parties, determined that Aboriginal artefacts are likely to be present, including below the surface.

Given the sensitivity of this landform, the Applicant determined that it would remove the proposed “topsoil” extraction activities within this site from this Proposal.

The Proposal would directly impact on Site SPQ1. Navin Officer (2018) recommend that a salvage program be implemented prior to and during surface disturbance operations within this site. Based on implementation of this recommendation, and the fact that an AHIP will be obtained prior to surface disturbance, Proposal-related impacts on matters of Aboriginal heritage are unlikely to be unacceptable.

Surface Water

Evans Plains Creek flows through the Project Site, immediately to the north of the Extraction and Processing and Stockpile Areas. The Applicant holds Water Access Licences that permit extraction of water from Evans Plains Creek for Proposal-related use.

In addition, where required, the Applicant pumps water from the existing Dirty Water Ponds to irrigate its lucerne crop. The Applicant, would ensure that those ponds retain adequate capacity to retain a 1 in 50 year, 72-hour rainfall event. As a result, except in exceptional circumstances, no sediment-laden water is or would be permitted to flow to Evans Plains Creek.

In light of the above, the Applicant contends that there would be no adverse surface water-related impacts associated with the Proposal.

Noise

A noise assessment was completed by Muller Acoustics Consulting (MAC, 2017). In summary, two noise scenarios representing existing and proposed operations were assessed.

That assessment determined that maximum predicted noise level at any surrounding residence would be 32dBA. This compares with the Project-specific noise assessment criterion of 48dBA and the default *Industrial Noise Policy* default criterion of 35dBA.

Similarly, MAC (2017) determined that the proposed changes to traffic levels and types from the Proposal would not increase existing noise levels by more than 2dBA.

Transportation and Traffic

A traffic impact assessment was completed by Barnson Pty Ltd (Barnson, 2018). That Assessment determined that:

- the level of service for the Mid Western Highway will remain unchanged as a result of the Proposal; and
- that a Basic Auxiliary Left/Basic Auxiliary Right intersection was required for the site entrance and that the existing entrance would appear to comply with that requirement.

Biodiversity

Two vegetation communities were identified within the Project Site, namely:

- Blakely's Red Gum – Yellow Box open woodland of the tablelands (an Endangered Ecological Community); and
- disturbed land.

The Proposal would disturb only previously disturbed land. As a result, tests of significance for threatened species and vegetation communities under both the NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* determined that the Proposal would not have a significant adverse impact on biodiversity.

Other Potential Impacts

Finally, the Applicant undertook an assessment of visual amenity, air quality, historic heritage, groundwater, land resources and hazards and determined that there would be no significant impacts associated with the Proposal.

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 through consideration of the principles of ecologically sustainable development. As well as a review of the biophysical and socio-economic impacts of the Proposal. This evaluation has found that, with the implementation of the proposed operational controls, safeguards and/or mitigation measures, 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 and that potential residual impacts can be justified in terms of the positive economic and social benefits to the local community.

CONCLUSION

The Proposal has been designed to extract and produce sand and fill material in both an efficient and environmentally responsible manner. Furthermore, the Proposal would not result in any unacceptable adverse impact on the surrounding environment and the socio-economic benefits of the Proposal, through the provision of employment and flow-on economic effects, outweigh any minor impact that would occur. In particular, the Applicant has amended the Proposal, substantially reducing the resource to be extracted, to avoid potential Aboriginal objects adjacent to Evans Plains Creek.

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 Swan Ponds Quarry and includes:

- *an outline and scope of the Environmental Impact Statement;*
 - *a description of the Project Site;*
 - *details about the Applicant, The Yarragrove Family Trust;*
 - *relevant background to the Proposal including a review of the current operations within the Project Site;*
 - *the format of the Environmental Impact Statement; and*
 - *identification of the personnel involved in the Proposal design, document preparation and specialist consultant investigations.*
-

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1.1 SCOPE

This *Environmental Impact Statement* (EIS) has been prepared by R.W. Corkery & Co. Pty Limited (RWC) on behalf of The Yarragrove Family Trust (the Applicant) to support a development application to Bathurst Regional Council (Council) for the continued operation and extension of the Swan Ponds Quarry (the Proposal).

The Swan Ponds Quarry (the Quarry) is located approximately 13km by road southwest of Bathurst in the Central West of NSW on Lot 241 DP1185616 (the Project Site) (**Figure 1.1**). The Applicant purchased the Quarry based on the assumption that continuing use rights applied to the operation. Subsequently, it has become apparent that those rights may not apply to the existing operations and that development consent may be required. This EIS has been prepared to support an application for development consent for existing operations and the expansion of extraction operations. A copy of the application for Development Consent is presented as **Appendix 1**.

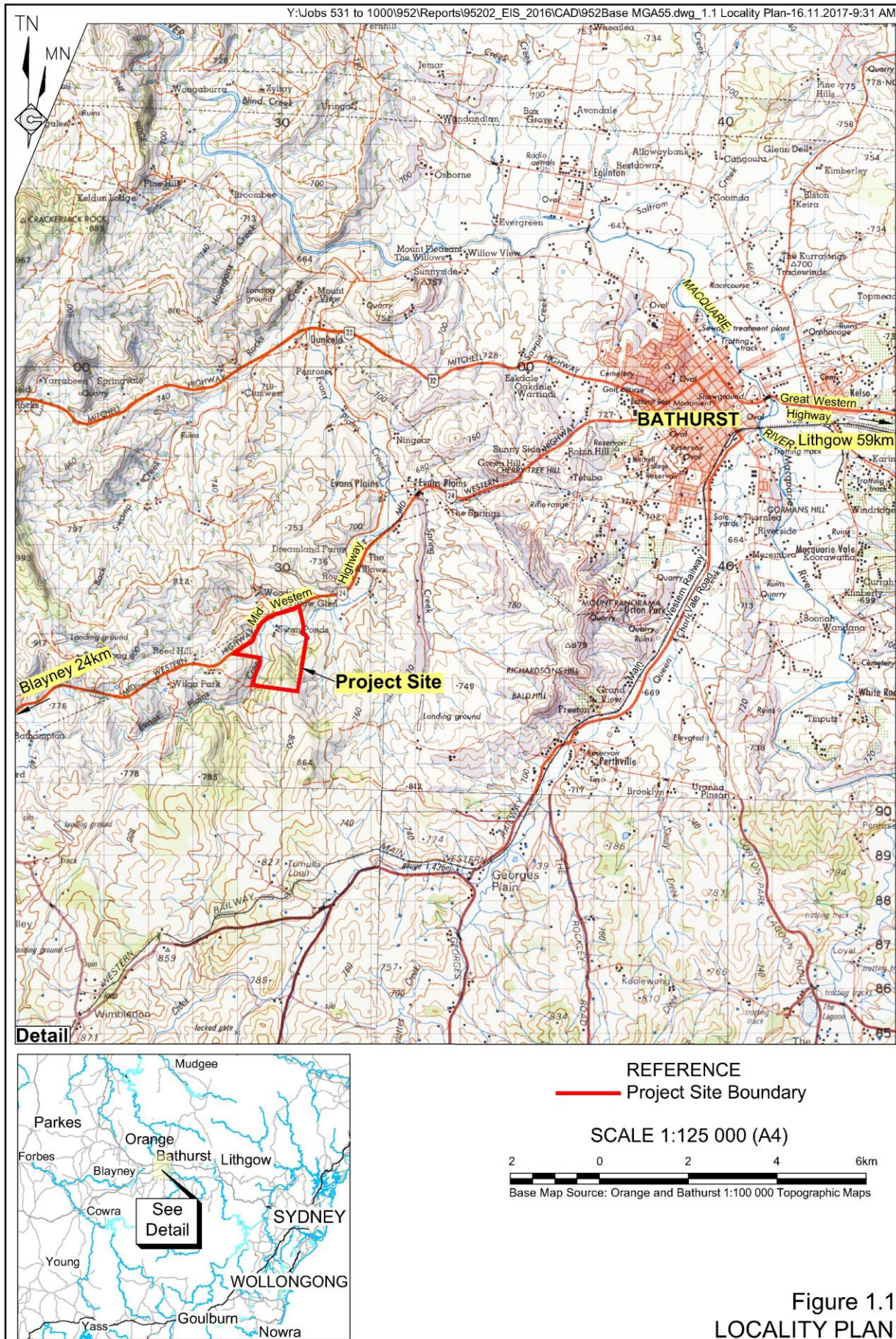
The Applicant is seeking development consent for the following.

- Extraction of weathered granite from the proposed Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, for a period of 18 years.
- Screening, washing and stockpiling of the extracted material.
- Campaign based crushing of material with a small mobile cone crusher.
- Transportation of the extracted material from the Project Site.
- The progressive rehabilitation of a modified landform.

By virtue of total disturbance exceeding 2ha and the Project Site being the subject of an extractive industry in the last five years, the Project Site being the subject of an extractive industry in the last five years, the Proposal is considered Designated Development under Clause 19 of Schedule 3(1) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg). Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) requires the preparation of an EIS to accompany the development application lodged to be lodged with Bathurst Regional Council (Council).

As Designated Development for the purpose of an extractive industry, the Proposal is classified as Regional Development under Part 4 of the *State Environmental Planning Policy (SEPP) State and Regional Development 2011* by effect of Clause 8 of Schedule 4A of the EP&A Act. As Regional Development, the development application is to be assessed by Council and determined by the Joint Regional Planning Panel.

In addition to Development Consent, the Applicant will also require an Environment Protection Licence under Clause 19 of Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act) and an Aboriginal Heritage Impact Permit under Section 90 of the *National Parks and Wildlife Act 1974*. As a result, the Proposal is also classified as Integrated Development under Section 4.46 of the EP&A Act.



This EIS identifies the aspects of the environment that could be adversely impacted by the Proposal and, for each aspect, provides a description of the existing environment and presents an assessment of the residual impact. The assessment of environmental impacts is presented together with design and operational safeguards and mitigation measures to ensure the level of impact upon the surrounding environment meets specified criteria, accepted industry standards or reasonable community expectations.

The environmental issues assessed and general content of the EIS reflect:

- the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning & Environment (DPE) on 1 July 2016 and reissued on 18 September 2017 (**Appendices 2 and 3**);
- consideration of the *EIS Guideline for Extractive Industries – Quarries* (DUAP, 1996), and matters identified in Schedule 2 of the EP&A Reg;
- issues identified through consultation with local and government stakeholders; and
- the experience of RWC in the preparation of documentation for similar projects throughout NSW.

1.2 PROJECT SITE AND LAND ZONING

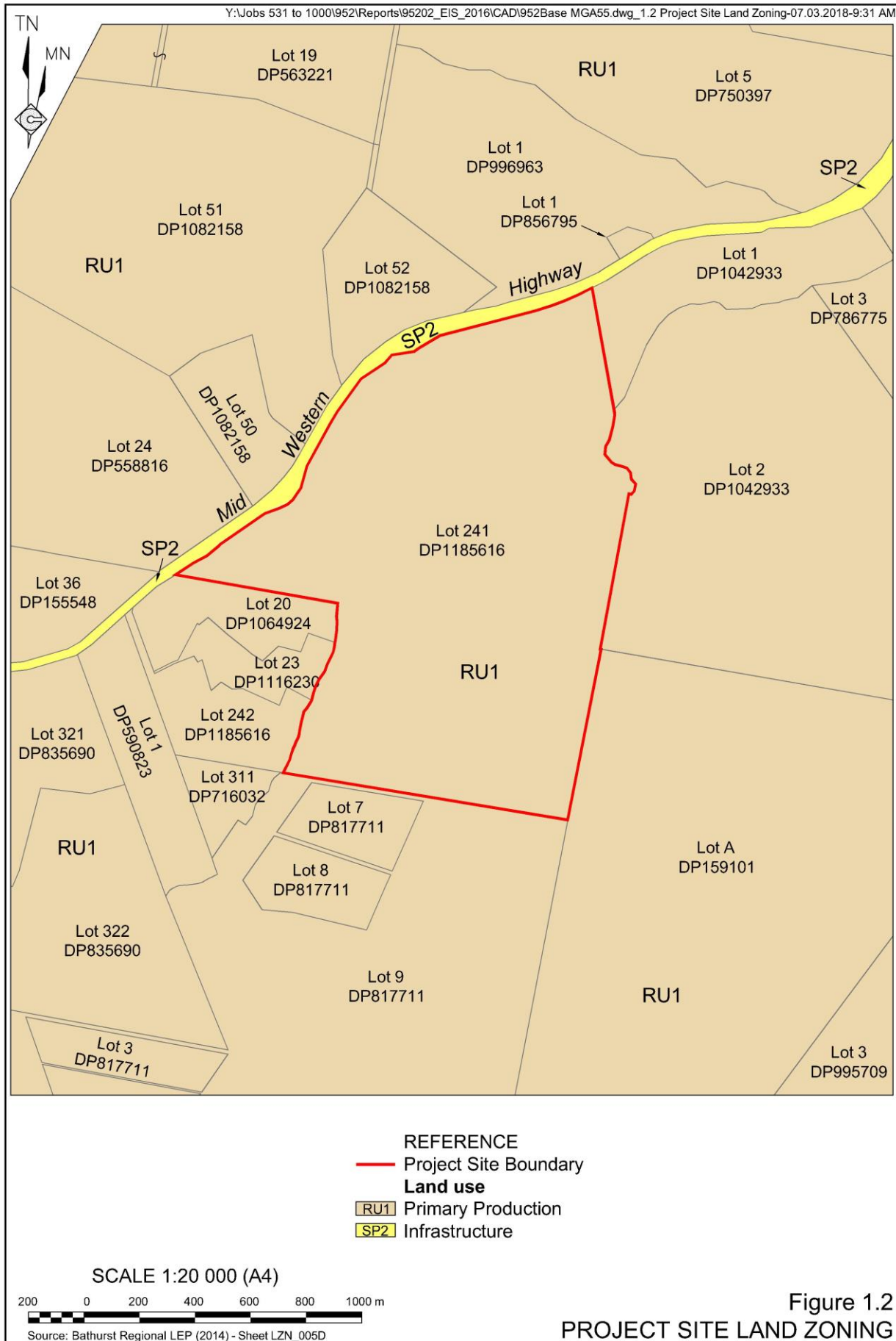
The Project Site comprises approximately 183ha of land within Lot 241 DP1185616. **Figure 1.2** presents the land titles within and adjacent to the Project Site. The Project Site includes all existing and proposed Quarry-related activities, including the Site Access Road, recognising that not all land within the Project Site is used for such activities.

All land within the Project Site is zoned RU1 – Primary Production under the Bathurst Regional Local Environmental Plan 2014 (**Figure 1.2**). Extractive Industries are permissible with consent within this zone.

1.3 THE APPLICANT

The Applicant, The Yarragrove Family Trust, was established on 24 October 2003 in view of managing the Quarry and agricultural operations within the Project Site. The Trustees of the Trust are Mr JA (Tony) and Mrs MB Allbut. Mr and Mrs Allbut were founding directors of TruFlo Pumping Systems Pty Ltd, a Bathurst-based company that currently employs more than 60 people, of which approximately 45 are based in Bathurst. The Trust directly employs two to three people within the Project Site.

In purchasing the Project Site, the Applicant saw the potential in a small rural property having diversified income stream. The Applicant, in preparing this application, has sought to ensure the continues, secure supply of concrete aggregates to concrete batching plants within the Bathurst Regionals Local Government Area and surrounding areas.



Mr Allbut has had long experience in managing businesses in a competent and sustainable manner as evidenced for the current successful operation of the TruFlo business. Mr Allbut's training is in the horticultural and landscaping sectors, areas that are consistent with the competent and responsible management of the proposed activities. The Applicant has a history of investing in infrastructure to ensure the sustainable operation of its activities, including installation of a well-designed entrance and Site Access Road and planting of ornamental and native trees. In addition, as issues have arisen, the Applicant has promptly and comprehensively implemented actions to address those issues.

1.4 BACKGROUND TO THE PROPOSAL

1.4.1 Introduction

As indicated in Section 1.1, the Applicant purchased the land on which the Quarry is located in approximately 2003 based on the assumption that continuing use rights applied to the operation. The Applicant operated the Quarry until mid-2016 when it was recognised that continuing use rights may not in fact exist. During discussions with Council it was agreed that the Quarry could continue to operate provided that the Applicant sought development consent in a timely manner.

SEARs were originally applied for and subsequently issued on 1 July 2016. An onsite meeting with the Applicant and the following government agencies was held on 1 August 2016.

- Bathurst Regional Council.
- Environment Protection Agency.
- DPI Fisheries.
- DPI Water.

During the second half of 2016 and first half of 2017, the Applicant undertook a review of its operations and identified the potential for an additional extraction area to extract growth material or "topsoil." On 9 August 2017, RWC provided the Department of Planning and Environment with an outline of the revised Project Site layout, including the additional extraction area, with a request to consider whether SEARs should be reissued. The Department determined that revised SEARs would be required, and a *Revised Background Paper* was subsequently prepared and submitted to Department of Planning and Environment. SEARs were reissued on 18 September 2017.

Finally, following completion of the heritage survey for the Proposal, the Applicant was advised that there was a high likelihood of buried Aboriginal objects in the vicinity of the proposed additional growth medium extraction area. As a result, that component of the Proposal was withdrawn.

1.4.2 Existing Approvals and Licences

Table 1.1 presents the Water Access Licences (WALs) held by the Applicant. No other approvals or licences are held.

Table 1.1
Water Access Licences

Authority	Holders	Grant Date	Work Approval	Share	Water Source
WAL34811	Anthony James Allbut & Margaret Beryl Allbut	23 October 2015	80WA717557	1 Unit	Queen Charlottes Vale Evans Plains Creek Water Source
WAL34794	Anthony James Allbut & Margaret Beryl Allbut	23 October 2015	80CA717577	30 Units	Queen Charlottes Vale Evans Plains Creek Water Source
Source: The Yarragrove Family Trust					

1.4.3 Approvals Required

The Proposal will require Development Consent under Part 4 of the EP&A Act. As the Proposal would disturb more than 2ha of land and the Project Site being the subject of an extractive industry in the last five years, it would be classified as Designated Development under Clause 19 of Schedule 3 of the EP&A Reg. As a result, the application for development consent must be accompanied by an EIS.

This EIS has been prepared in accordance with the SEARs (**Appendices 2 and 3**). The EIS provides a detailed description of the proposed activities to be undertaken throughout the life of the Proposal and an assessment of the anticipated environmental impacts.

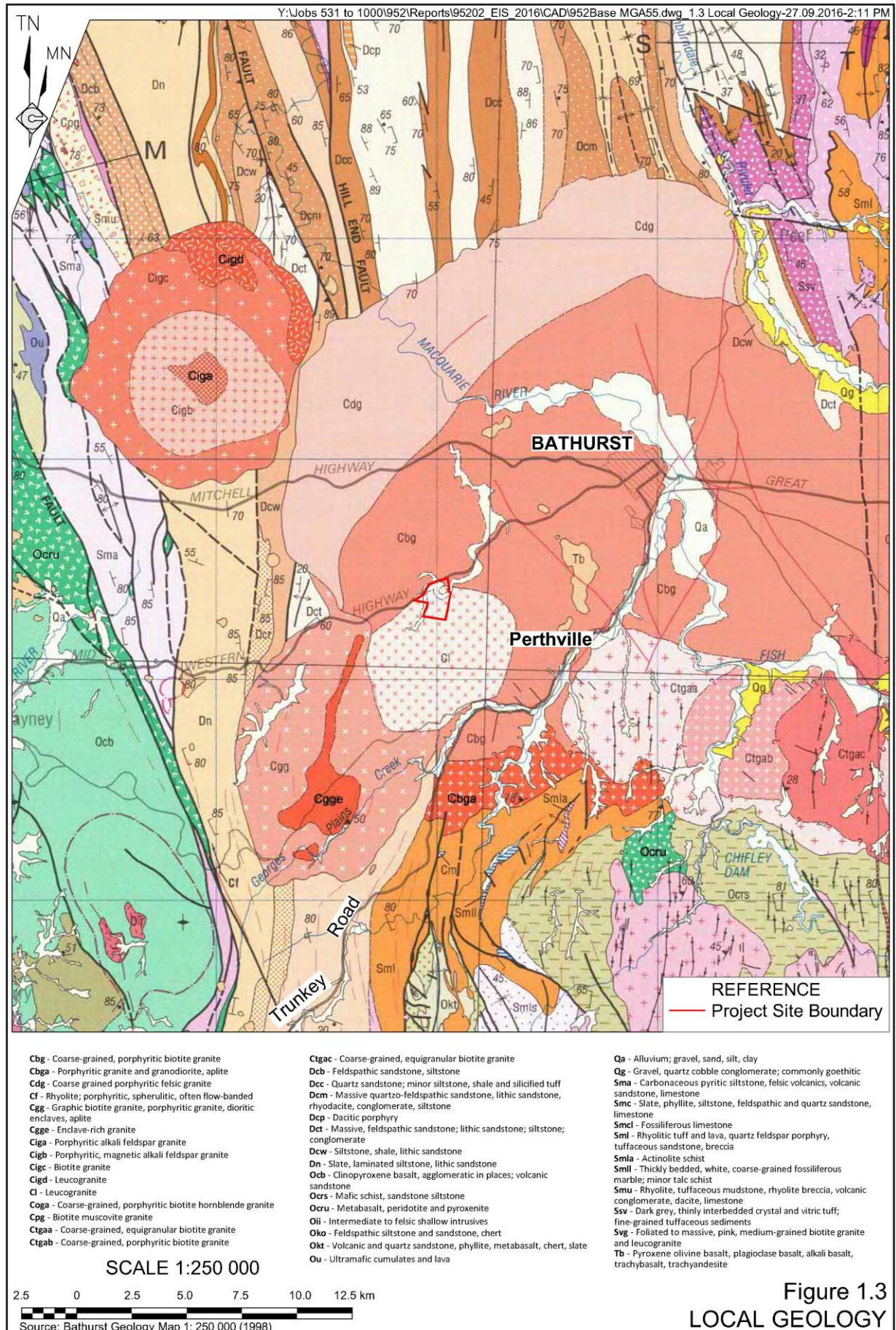
As Designated Development for the purpose of an extractive industry, the Proposal is classified as Regional Development under Clause 8(a) of Schedule 4A of the EP&A Act. As a result, under Clause 21(1)(a) of the *State Environmental Planning Policy (State and Regional Development) 2000* Bathurst Regional Council is to accept, exhibit and assess the application, with the Joint Regional Planning Panel to determine the application.

In addition, as the Proposal would produce more than 30 000t of materials per year, an Environment Protection Licence would be required under Clause 19 of Schedule 1 of the *Protection of the Environment Operations Act 1997*. The Proposal would also require an Aboriginal Heritage Impact Permit under Section 90 of the *National Parks and Wildlife Act 1974*. As a result, the Proposal may also be classified Integrated Development under Section 4.46 of the *Environmental Planning and Assessment Act 1979*.

Finally, the Applicant notes that minor modifications to the intersection of the Site Access Road and the Mid Western Highway may be required to achieve the required BAL/BAR design standard. Should such works be required, the consent of the Roads and Maritime Service will be required under Section 138 of the *Roads Act 1993*.

1.4.4 Geological Setting and Resource

The Project Site is located within the Bathurst Batholith, a complex series of Carboniferous-aged granitic intrusions. These intrusions are surrounded by older Devonian and Silurian-aged volcanics and sediments which have been themselves intruded by younger Tertiary-aged basalts (**Figure 1.3**).



The Project Site is underlain by a leucogranite, a light-coloured granite with abundant quartz and feldspar and limited dark-coloured minerals. This material, when weathered, produces a sandy material that makes excellent concrete aggregate and is suitable for use in road bases and as select fill and drainage material.

The depth of the weathered profile has been estimated based on excavations undertaken to date within the existing Extraction Area to be approximately 2m to 4m. Based on the proposed Extraction Area of approximately 10.3ha, and excavation of the weathered granite material to a depth of 3m, the resource is approximately 309 000m³. Assuming an in situ density of 2.4t/m³, the pre-extraction resource within the proposed Extraction Area was approximately 740 000t. The Applicant estimates that approximately 100 000t of material has been removed since extraction commenced, leaving a resource of approximately 640 000t.

1.4.5 Existing Quarry Activities

1.4.5.1 Introduction

Figure 1.4 presents the existing Project Site layout. The existing Quarry activities are presented in the *Interim Excavation Management Plan* prepared for the Quarry (RWC, 2016a). The following subsections provide a brief summary of the extraction, processing and transportation activities.

1.4.5.2 Extraction

Extraction is undertaken on a campaign basis. Quarry products are extracted using a bulldozer or excavator to rip and push the weathered granite. The material is then loaded using a front-end loader into a haul truck for delivery to the Processing and Stockpile Area. Select fill and other material not requiring further processing is stockpiled within the Extraction Area for loading into road trucks for transportation off site.

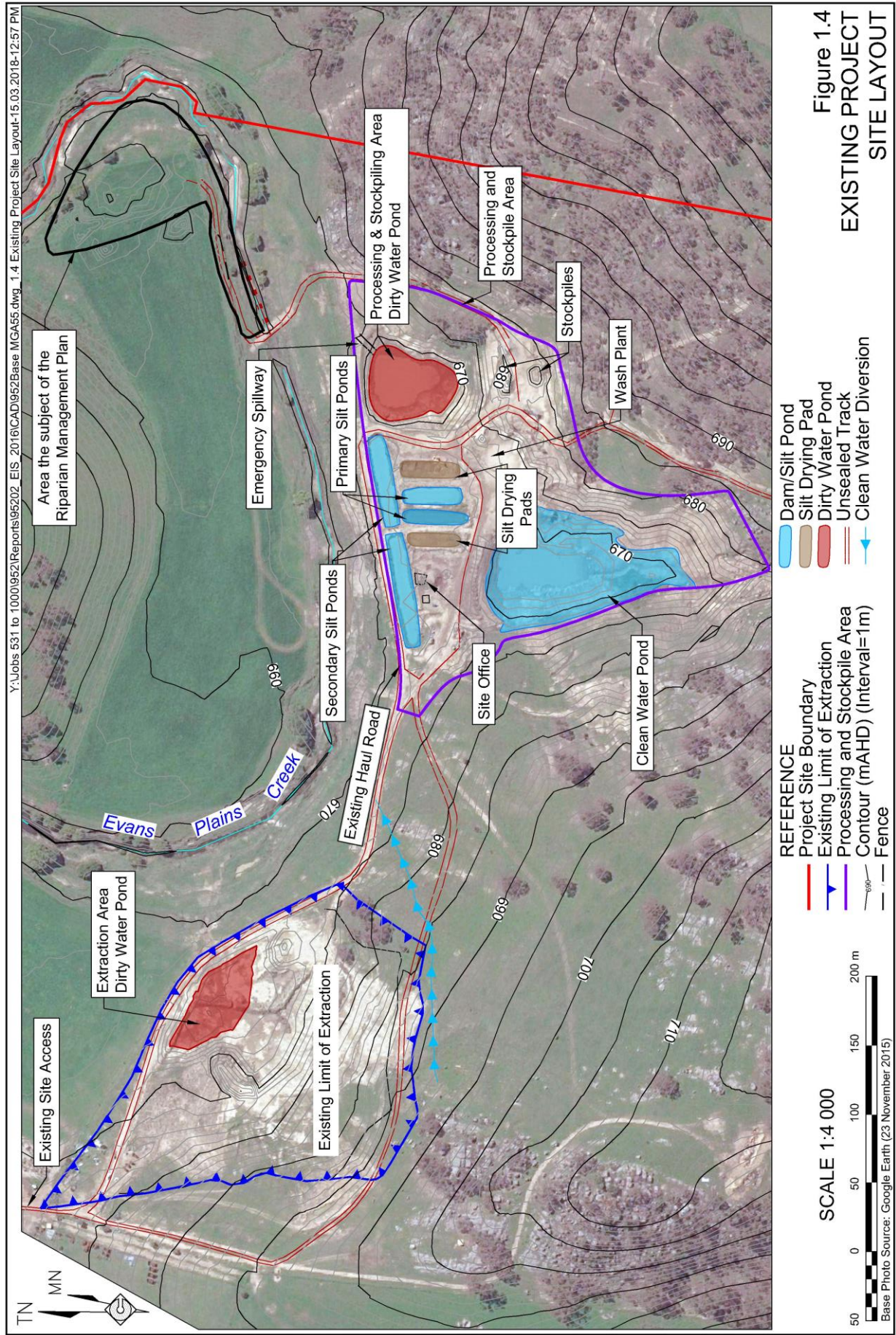
1.4.5.3 Processing

Stockpiled material is passed over a screen, with oversize material processed with a small mobile cone crusher on a campaign basis. Approximately 15% of all extracted material may be classified as oversize. The crushed material is returned to the raw feed stockpiles and passed back over the screen.

The undersize material is washed using a conventional Wash Plant. Coarse material (hereafter referred to as sand) is stockpiled and permitted to dewater.

Wash water containing fine material, primarily silts and clays, from the wash plant is passed to the Primary and then the Secondary Silt Ponds where the fines are permitted to settle out prior to the water being returned to the wash Plant for reuse. When silt loads increase to a level that is not acceptable, the water is pumped to the Dirty Water Pond from where it is pumped to the Applicant's lucerne paddocks.

Settled fines from the Primary and Secondary Silt Ponds are excavated and stacked on the silt drying ponds and used to backfill and rehabilitate the extraction area.



1.4.5.4 Product Transportation

Extracted material is transported from the Project Site using semi-trailer road registered trucks or smaller with very occasional B-double dispatched from site. All vehicles transporting material from the Project Site are required to cover their loads. Once loaded, trucks exit the Project Site via the Site Access Road turning onto the Mid-Western Highway, either turning left to supply customers around Blayney (15%) or turning right to supply customers around Bathurst (85%).

1.5 FORMAT OF THE STATEMENT

This EIS has been assembled in a single volume with seven sections of text and a set of accompanying appendices.

Section 1: introduces the Proposal and provides an overview of the Applicant and background information relevant to the application, the Project Site, existing operations and approvals required. The section concludes with information on the management of investigations undertaken during the preparation of the EIS.

Section 2: provides a description of the Proposal including the objectives of the Proposal. Section 2 also describes the proposed operations including extraction, processing and transportation operations. Finally, an overview is provided of proposed infrastructure, utilities and services, hours of operation, employment, Proposal life and the progressive rehabilitation strategy.

Section 3: reviews the planning and legislative requirements of the Proposal including State Environmental Planning Policies and local planning instruments.

Section 4: commences by describing the general environmental setting within which the Proposal is located, with particular reference to aspects of the local environment likely to constrain the Proposal. The order of presentation of those issues and level of detail reflects the level of priority attributed to each key issue.

The operational safeguards, controls and management procedures that have been incorporated into the Proposal design to protect the local environment are presented and the potential impact of the Proposal, following the adoption of the proposed safeguards and procedures, assessed.

Section 5: provides a conclusion to the document which evaluates and justifies the Proposal in terms of biophysical, economic and social considerations, and ecologically sustainable development. This section also outlines the consequences of not proceeding with the Proposal.

Section 6: lists the various source documents referred to for information and data used during the preparation of the EIS.

Section 7: presents a glossary of terms, acronyms and symbols.

Appendices: present the following additional information.

1. A copy of the application for development consent.

2. A copy of the SEARs issued on 18 September 2017, as well as the requirements of other government agencies.
3. Coverage of Secretary's Environmental Assessment Requirements.
4. A Heritage Assessment completed by Navin Officer Heritage Consultants Pty Ltd.
5. A Noise Impact Assessment completed by Muller Acoustic Consulting Pty Ltd.
6. A Traffic Impact Assessment completed by Barnson Pty Ltd.

1.6 MANAGEMENT OF INVESTIGATIONS

The preparation of this document has involved a study team managed by Mr Mitchell Bland, BSc(Hons), MEconGeol, LLB(Hons), Principal Environmental Consultant with R.W. Corkery & Co Pty. Limited, assisted by Ms Andrea Kubin, B.Sc. (Environmental Science), Dip. Engineering (Electrical), also with RWC.

Details of the Proposal have been provided by Mr Tony Allbut, as representative of the Applicant.

Emphasis has been placed upon a multi-disciplinary team approach to the design of the Proposal, the description of the existing environment, identification of key issues, development of appropriate mitigation measures and management controls and assessment of impacts. The following commissioned team comprised specialised consultants and personnel.

- Muller Acoustic Consulting Pty Ltd – Noise Assessment.
 - Mr Oliver Muller, B.Sc. (REM& HGeog).
- Navin Officer Heritage Consultants Pty Ltd – Heritage Assessment.
 - Ms Lucy Blackam, B. Archaeological Practice, M. Archaeological Science.
- Barnson Pty Ltd – Traffic and Transport Assessment.
 - Mr Luke Morris, B.E. MIEAust CPEng (NPER).

The results of the studies from each of the above consultancies have been incorporated into this document and full copies of their reports are included as **Appendices 4, 5 and 6**.

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Section 2

Description of the Proposal

PREAMBLE

This section outlines the Applicant's proposed extraction, processing, transportation, rehabilitation and related activities.

The description of these activities is provided in sufficient detail to enable the environmental impacts of the Proposal to be assessed (see Section 4).

Alternatives to the proposed activities are addressed at the end of this section.

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2.1 INTRODUCTION

2.1.1 Objectives of the Proposal

The Applicant's principal objectives for the continuation and extension of operations within the Project Site are as follows.

- To provide an ongoing source of coarse and fine sand from weathered granite for concrete aggregates, as well as material for 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 nature conservation and agricultural activities.
- To ensure the ongoing operation of the Quarry in a safe, reliable and cost-effective manner, contributing to the local economy of the Bathurst Regional LGA.

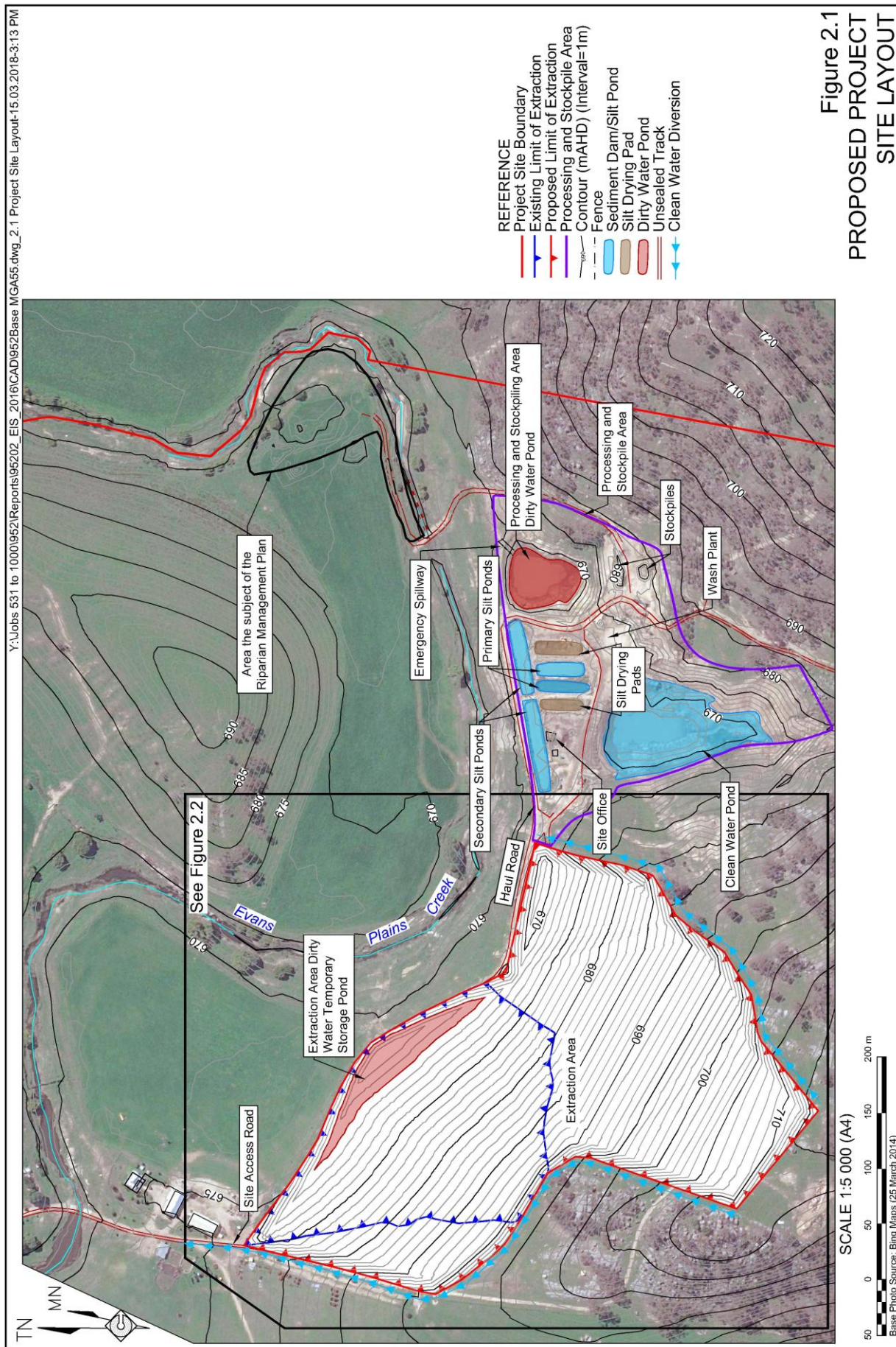
These objectives would be achieved by:

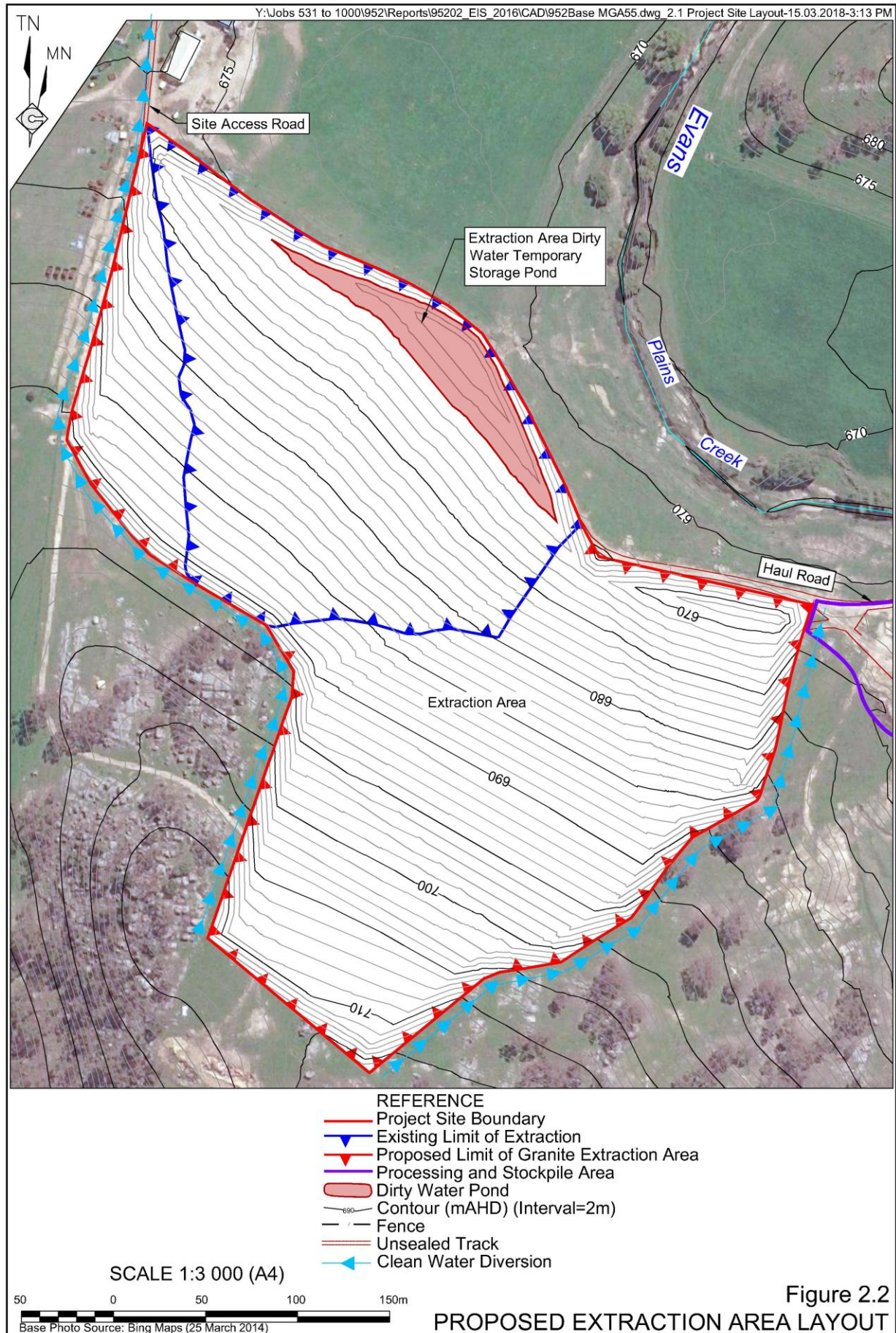
- planning and extracting the resource in a manner that maximises the quality of materials removed and ensures efficient resource utilisation;
- undertaking all activities in an environmentally responsible manner that enables compliance with all relevant requirements;
- planning and undertaking activities 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 incorporates the following key components (**Figures 2.1** and **2.2**).

- Extraction of weathered granite from an enlarged Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, using a bulldozer, excavator, scraper or similar for a period of approximately 18 years.
- Processing of extracted weathered granite, including screening and washing.
- Campaign based crushing of weathered granite using a small mobile cone crusher.
- Loading and transportation of extracted and stockpiled material from the Project Site via the Mid Western Highway.
- Progressive rehabilitation of the Project Site to achieve a final land use of nature conservation and/or agriculture.





2.2 SITE ESTABLISHMENT

2.2.1 Survey and Mark Out

Prior to the commencement of any ground-disturbing activities in areas outside the existing Extraction Area, the Applicant would survey all areas of proposed disturbance and physically mark out approved areas of disturbance using appropriately labelled permanent survey pegs. All site personnel would be made aware of the approved areas of disturbance and the significance of not disturbing areas outside the approved areas.

2.2.2 Clearing of Vegetation

During vegetation clearing operations, limited larger vegetation would be removed using a bulldozer with its blade positioned just above the surface. This material would be stockpiled adjacent to the area of disturbance for later use during rehabilitation. No cleared vegetation material would be burnt.

Ground cover vegetation would be removed with the topsoil to maximise the retention of the seed bank and nutrients within the soil, as well as to minimise opportunities for erosion and dust lift-off between removal of the larger vegetation and soil stripping.

2.2.3 Stripping and Stockpiling of Growth Medium

Remaining soil in the proposed extraction area, where present and recoverable, would be stripped using a small bulldozer or excavator and either stockpiled for future use in rehabilitation activities or directly transferred to an area to be revegetated. The Applicant anticipates that between 100mm and 200mm of skeletal topsoil exists within undisturbed sections of the Extraction Area. Based on an undisturbed area of 5.1ha and an average depth of 150mm, approximately 7 650m³ of soil would be stripped and stockpiled during the life of the Proposal.

The following soil stripping, stockpiling and management measures would be implemented.

- Selectively strip soil from all areas of disturbance.
- Ensure soil is not stripped when either excessively dry or wet to preserve the soil structure.
- Stockpile the stripped soil within the identified stockpile locations.
- Construct the soil stockpiles no more than 2m high, with side slopes no more than 1:3 (V:H) and stabilise immediately with suitable pasture grasses.
- Prevent the operation of machinery on soil stockpiles once formed to avoid compaction.
- Signpost all soil stockpiles to ensure inadvertent disturbance is avoided.
- Maintain a soil inventory to ensure that sufficient resources are available at the commencement of rehabilitation operations.

2.3 EXTRACTION OPERATIONS

2.3.1 Layout of the Extraction Area

The layout of the proposed Extraction Area is presented in **Figures 2.1** and **2.2**.

The proposed Extraction Area would have the following design criteria.

- Approximate area – 10.3ha.
- Maximum wall slopes of 1:4 (V:H).
- A sloping floor that would be approximately 4m lower than the existing landform.

2.3.2 Extraction Method

The following methods would continue to be used to extract weathered granite.

- Extraction would be undertaken on a campaign basis using a bulldozer or excavator to rip and push the weathered granite into stockpiles.
- Material would be loaded into haul trucks using a front-end loader and transported to the Processing and Stockpile Area. Material not requiring further processing would stockpiled within the Extraction Area for loading into road trucks for transportation off site.

The Applicant may over-steepen sections of the extraction area walls and backfill those sections with overburden or silt to achieve the required 1:4 (V:H) final slope.

Where required, a water cart would be used for dust suppression within the Extraction Areas and on the Haul Road and Site Access Road. Water for dust suppression would be sourced from the Clean Water Pond.

2.3.3 Extraction Rate

Extraction of weathered granite would not exceed 50 000tpa, with the annual average extraction level expected to be approximately 35 000tpa.

2.3.4 Extraction Equipment

Table 2.1 presents the indicative list of mobile equipment that would be used during the life of the Proposal. Additional equipment would be brought to site as required for specialty tasks.

Table 2.1
Indicative Equipment List

Equipment	Number	Model/Capacity (indicative only)	Use
Bulldozer	1	Komatsu DI555AX-6 with silencer	Ripping, pushing and stockpile management.
Excavator	1	Hyundai R250LC	Extraction operations.
Front-end Loader	2	Hyundai HL730 and Hyundai HL740-9	Loading of trucks, stockpile management and growth medium extraction.
Dump Truck	1	CAT D35E 30T	Internal raw feed and product transportation.
Road Truck	2	Kenworth K609 (or similar)	Transportation of material off site.
Water Truck	1	Ford Louisville	Dust suppression.
Screening/Wash Plant	1		Screening and washing of weathered granite.
Source: The Yarragrove Family Trust			

2.4 PROCESSING AND STOCKPILING OPERATIONS

The following activities would be associated with the processing of weathered granite (**Figures 2.1 and 2.2**).

- At the processing plant, weathered granite would be passed over a screen with undersized material washed using a conventional washing plant.
- Coarse, washed material (referred to hereafter as sand) would be stockpiled and permitted to dewater.
- Fines would be passed to the Primary and Secondary Silt Ponds where the fines would be permitted to settle out. Remaining water would pass to the Processing and Stockpile Area Dirty Water pond where it would either be reused within the Processing Plant or pumped to the Applicant's lucerne paddocks.
- Settled fines would be excavated from the settling ponds, stacked on the silt drying ponds and used to backfill the extraction area or spread on the Applicant's lucerne paddocks.
- Oversize weathered granite would be processed with a small mobile cone crusher on a campaign basis. It is anticipated that 15% of all extracted weathered granite will be subject to crushing. Once crushed, this material would then be processed per the above steps to provide a final product.

2.5 TRANSPORTATION

2.5.1 Introduction

Quarry products would be transported from the Project Site using semi-trailer trucks or smaller. Very occasionally, B-double road registered trucks may be used. All vehicles transporting material from the Project Site would be required to cover their loads. The Applicant anticipates vehicles transporting material from the Project Site would transport an average of 28t per load.

This subsection presents a description of the proposed transport operations and the required modifications to roads and intersections.

2.5.2 Anticipated Traffic Levels

On average 1 250 laden vehicle loads per year would be required to transport 35 000tpa from the Project Site. At the maximum rate of production, namely 50 000tpa, 1 785 laden vehicles loads would be required, or between 6 and 7 loads per day if evenly spread throughout the year.¹ However, as demand for the Applicants products will vary throughout the year, the maximum rate of transportation would be 20 laden vehicles per day.

2.5.3 Site Entrance

Vehicles would continue to access the Project Site via the existing Site Entrance (**Figure 2.3**). Barnson (2018) undertook a Traffic Impact Assessment for the Proposal. That assessment is described in full in Section 4.5. However, in summary, the intersection of the site access road is a 40m wide entry, with a lockable access gate located approximately 33m from the edge of the seal of the Mid Western Highway. The entrance provides adequate off-road storage for at least one B-double truck should the access gate be closed. Sight distance to the east is approximately 180m and approximately 171m to the west.

Barnson (2018) state that considering the existing traffic levels on the Highway and the proposed traffic levels associated with the Proposal, a Basic Auxiliary Left/Basic Auxiliary Right (BAL/BAR) intersection is required. The Applicant contends that the current intersection complies with this standard, however, this would be confirmed by a suitably qualified traffic engineer following receipt of Development Consent. If required, works needed to bring the intersection up to the required standard would be completed.

2.5.4 Site Access Road

The Site Access Road is an unsealed, single lane, all weather road with a concrete sealed causeway across Evans Plains Creek (**Figure 2.3**). The Applicant currently uses the road for heavy vehicle access and water is applied as required to suppress dust emissions during transportation operations.

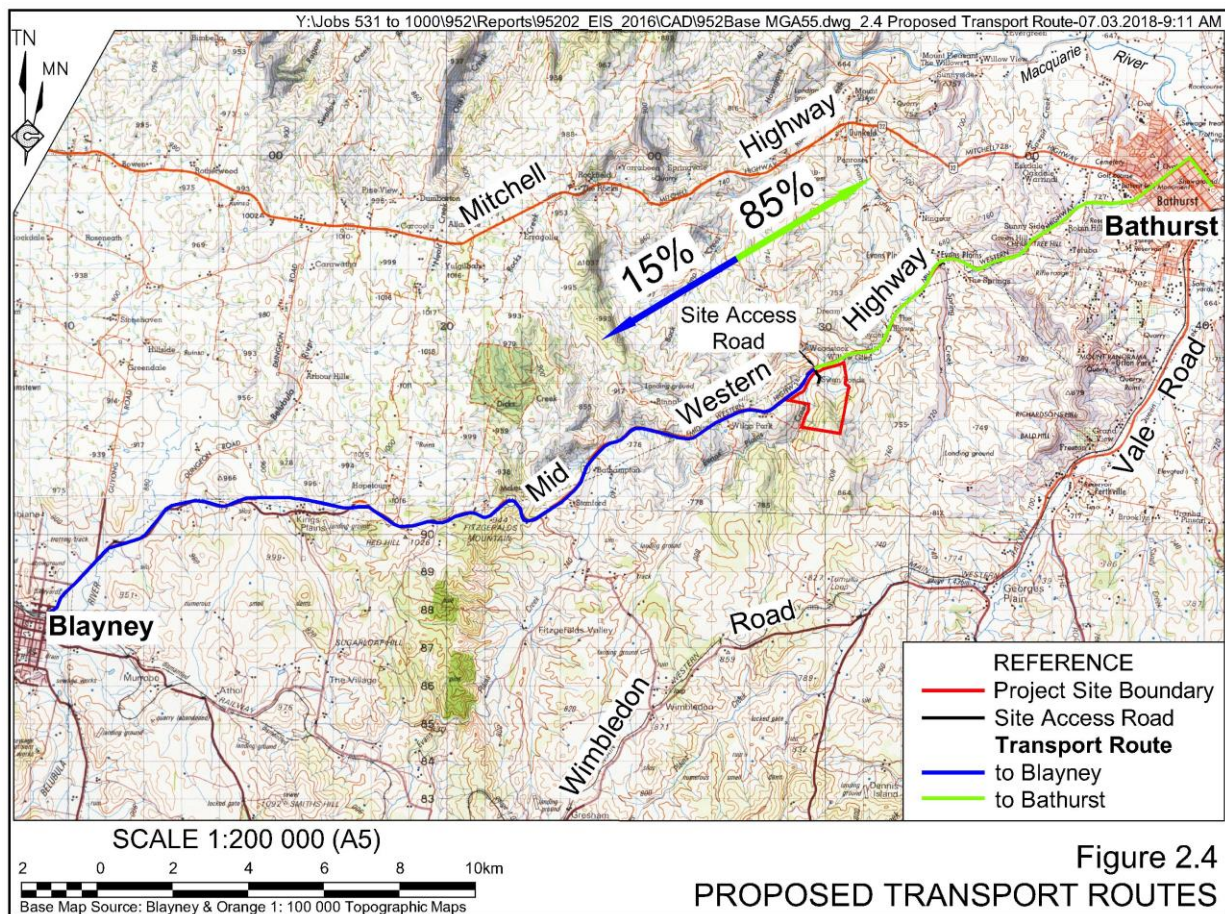
¹ Based on 270 days per year transportation.



2.5.5 Transportation Routes

The proposed transportation routes and the anticipated proportion of heavy vehicles on each transportation route are presented in **Figure 2.4**.

In summary, laden trucks would exit the Project Site via the Site Access Road. Approximately 85% of heavy vehicles would turn right at the intersection of the Site Access Road with the Mid Western Highway and travel east towards Bathurst. The remaining 15% of heavy vehicles would turn left at the intersection of the Site Access Road with the Mid Western Highway and travel west towards Blayney.



2.5.6 Heavy Vehicle Classes

The Applicant would use a range of classes of heavy vehicles, including B-doubles, semi-trailers, truck and dog trucks and rigid trucks to transport products from the Project Site to the Applicant's customers.

2.6 WATER MANAGEMENT

There are two main uses of water within the Project Site.

1. Process water for processing activities.
2. Dust suppression.

The Applicant holds two water licences under the Queen Charlottes Vale Evans Plains Creek Water Source, namely WAL34811 and WAL34794, that have a combined share of 31 units.

Water for the wash plant is sourced from the Secondary Silt Pond, with makeup water sourced from the Clean Water Pond or Evans Plains Creek under the above licences. Water for dust suppression is sourced from the Clean Water Pond only.

Dirty water from the wash plant is and would continue to be permitted to flow to the Primary and Secondary Silt Ponds before being returned to the Wash Plant for reuse. If the silt load in the Secondary Silt Pond is too high, that water is pumped to the Processing and Stockpile Area Dirty Water Pond and from there to the Applicant's lucerne crop via a series of fixed pipes and sprinklers. No dirty water is permitted to flow to Evans Plains Creek.

Similarly, the Extraction Area is and would continue to be internally draining and all water from the Extraction Area would be retained in the Extraction Area Dirty Water Pond. When required, accumulated water within the Extraction Area Dirty Water Pond would be used to irrigate the Applicant's lucerne crop. A minimum 1m freeboard would be maintained on this Pond and dirty water would not be permitted to flow to Evans Plains Creek.

No water from disturbed sections of the Project Site is permitted to flow to Evans Plains Creek.

In the event of a significant rainfall event or wet period, excess water from the Clean Water Pond is permitted to flow offsite via a piped discharge without interacting with water from disturbed sections of the Project Site.

2.7 WASTE MANAGEMENT

2.7.1 Production Waste

The Applicant anticipates that the Proposal would not result in any production wastes. Materials produced within the Project Site, and their final uses, would include the following.

- Select fill and road base – stored within the Extraction Area and transported off site.
- Fine and coarse sand – stored within the Processing and Stockpile Area and transported off site.
- Silts, clays and fines – permitted to settle within the Silt Ponds and periodically extracted and stashed within the Silt Drying Pads. Once dry, this material would be used:
 - to backfill over steepened sections of the Extraction Area;

- for rehabilitation operations; or
- spread as topdressing on the Applicant's lucerne paddocks.

2.7.2 Non-Production Waste

Table 2.2 presents an estimate of the non-production wastes that would be generated during the life of the Proposal and briefly describes how each class of waste would be stored and subsequently removed from the Project Site.

Table 2.2
Non-Production Waste Management

Waste Type	Storage/Management	Removal
General waste (including food scraps)	Covered bins or skips located as required. Where located in open areas, the bins would be fitted with animal-proof lids.	Collected on a regular basis by a licensed waste contractor and transported to a licensed waste disposal/recycling facility or transported off site by the Applicant to be disposed of with waste from its other operations.
General Recyclables		
Waste oils and greases	Placed within bunded tank(s). Where required, smaller, temporary storage containers may be positioned close to work areas, with the contents of those containers transferred to a larger storage tank prior to collection.	Collected on a regular basis by a licensed waste contractor and transported to an appropriately licensed facility for recycling.
Batteries	Used batteries would be placed within a covered and marked used battery storage area until removed from site.	Used batteries would be collected on a regular basis by an appropriate contractor and recycled.
Tyres	Tyres would be placed within a marked used tyre storage area until removed from site or used for another purpose.	Collected on a regular basis by a licensed waste contractor and transported to a licensed waste disposal facility.
Scrap Steel/Metal	Stored in a specified area within the workshop area or elsewhere as required.	Collected on a regular basis by a scrap metal recycler.

2.8 AMENITIES, SERVICES AND FACILITIES

2.8.1 Site Office

The existing Site Office (**Figure 2.1**) would continue to be used as a crib room and office. A chemical toilet is provided for the use of employees and visitors to the Project Site.

The Site Office area would continue to incorporate a light vehicle parking area for staff and visitor vehicles.

2.8.2 Potable Water

Potable water would be sourced from rain water collected from the roof of the Site Office and stored within the rainwater tanks. In the event that tank water runs out, water would be transported to site for this purpose.

2.8.3 Power

Given the distance from the Project Site to a suitable mains power supply, the Applicant currently maintains a diesel generator which is used to power the Project Site. The Applicant would continue to maintain this diesel generator.

2.8.4 Communications

All communications within the Project Site are currently conducted wirelessly by mobile phone and two-way radio. The Applicant would continue to conduct communications wirelessly.

2.9 HOURS OF OPERATION AND PROJECT LIFE

2.9.1 Hours of Operation

Table 2.3 presents the proposed hours of operation for the Proposal.

Table 2.3
Proposed Hours of Operation

Activity	Monday to Friday ¹	Saturday ¹	Sunday
Site Establishment	7:00am to 5:00pm	8:00am to 12:00pm	-
Extraction	7:00am to 5:00pm	8:00am to 12:00pm	-
Screening	7:00am to 5:00pm	8:00am to 12:00pm	-
Loading and Transportation	7:00am to 5:00pm	8:00am to 12:00pm	-
Rehabilitation	7:00am to 5:00pm	8:00am to 12:00pm	-
Note ¹ : Excludes public holidays which would operate as per the proposed hours of operation for Sunday			
Source: The Yarragrove Family Trust			

2.9.2 Life of the Proposal

The intended lifespan of the Quarry is approximately 18 years.

2.10 EMPLOYMENT AND ECONOMIC CONTRIBUTION

2.10.1 Employment

The Applicant anticipates the Proposal would require two Full Time Equivalent positions under the average production rate of 30 000tpa. Additional employees would be required on a temporary basis should extraction rates approach 50 000tpa.

Product truck drivers are typically employed by the Company's customers or contract transportation companies.

2.10.2 Economic Contribution

The Applicant anticipates that the Proposal would continue to contribute approximately \$392,500 per annum (pa) to the local and regional economy as follows.

- Wages (direct employees only):\$140,000pa.
- Consumables, goods and services:\$120,000pa.
- Contractors and suppliers:\$130,000pa.
- Rates and taxes\$2,500pa.

In addition, the Proposal would contribute to local, regional and State economies by providing competitively priced coarse and fine sand products for use as concrete aggregates and select fill.

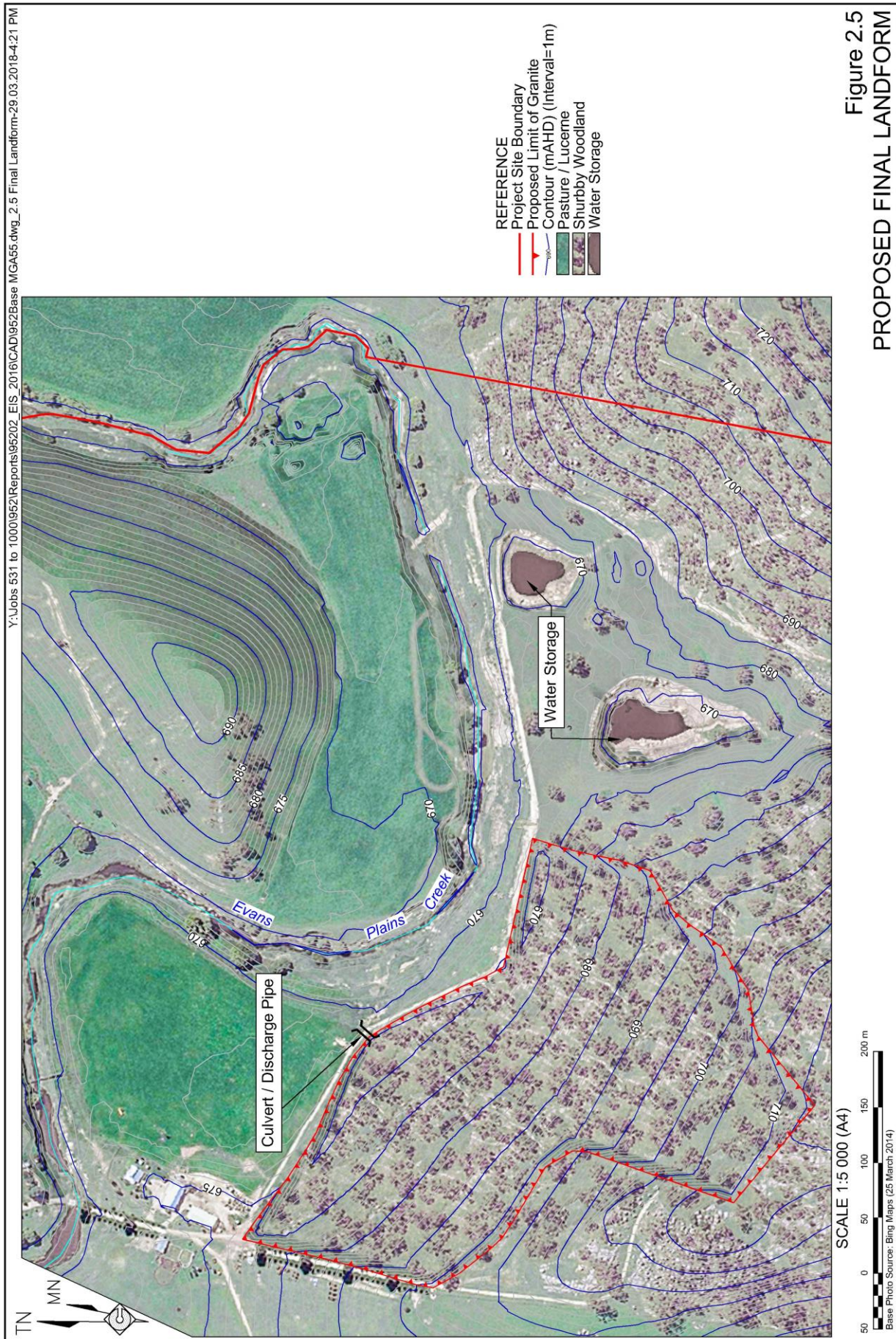
2.11 BIODIVERSITY OFFSET STRATEGY

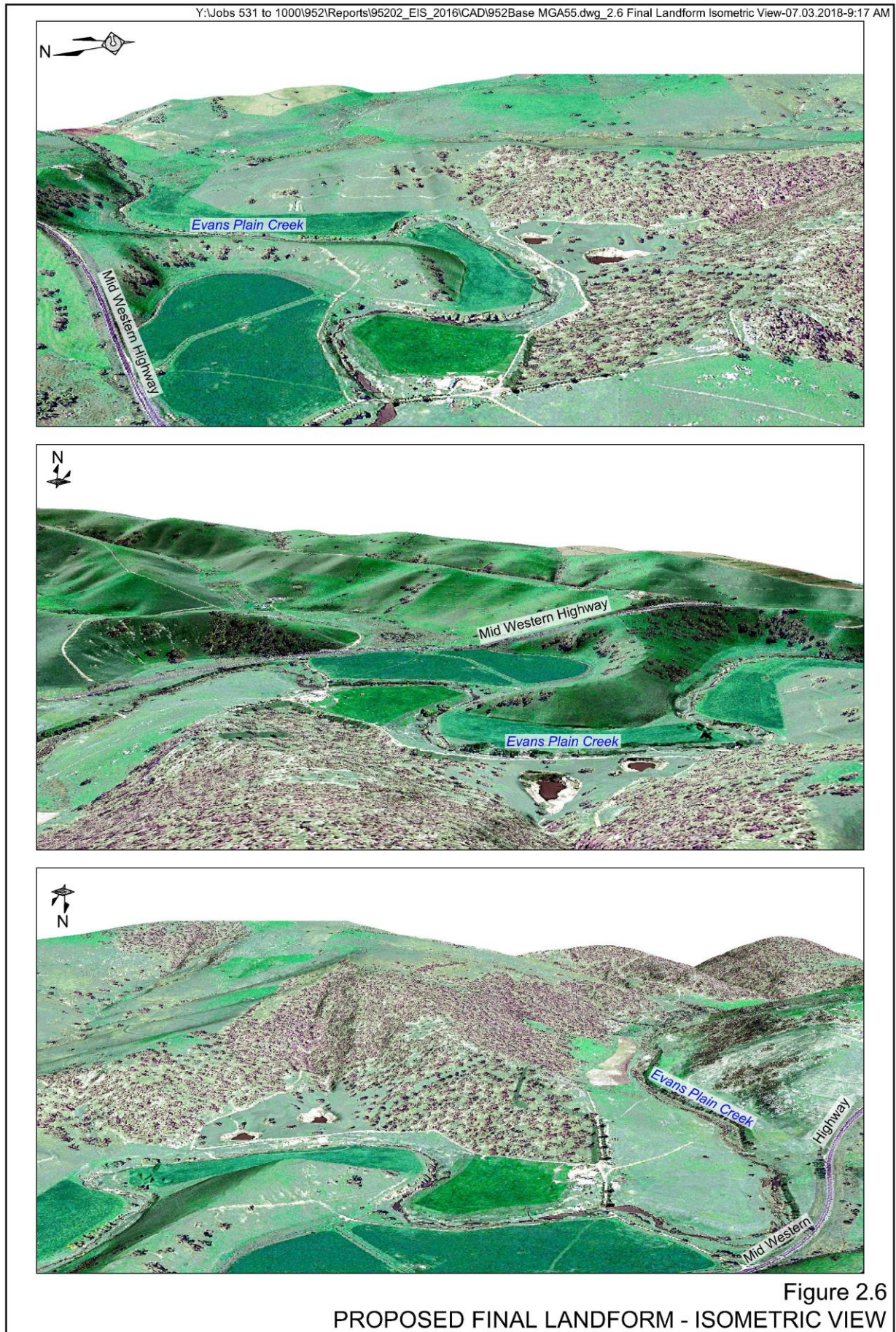
The Project Site has been extensively used for extractive operations and agriculture. As a result, all areas of proposed disturbance have been previously disturbed. Given the level of existing disturbance, the Proposal would not result in significant adverse impacts on threatened flora, fauna or endangered ecological communities. Therefore, a biodiversity offset would not be required.

2.12 SITE DECOMMISSIONING AND REHABILITATION

2.12.1 Introduction

The Applicant would, where practicable, adopt a progressive approach to the rehabilitation of disturbed areas to ensure that, as extraction is completed, the proposed final landform is quickly shaped and vegetated to provide a stable landform (**Figures 2.5 and 2.6**). The progressive formation of the post-extraction landform and the establishment of a vegetative cover would also minimise the potential Project-related visual amenity and air quality impacts at surrounding residences.





The following sub-sections describe:

- 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 Quarry operations and modified if appropriate, to reflect the operational experience gained.

2.12.2 Rehabilitation and Final Land Use Objectives

An integrated approach to the rehabilitation of all the areas of proposed disturbance resulting from the operations within the Quarry would be implemented. The following objectives would be adopted.

- To produce a stable final landform that maintains or increases the agricultural / conservation suitability of the Quarry.
- To optimise the use of fines in backfilling completed sections of the Extraction Area.
- To ensure no contamination of the final landform or watercourses as a consequence of the Proposed operations.
- To minimise disruption to existing drainage patterns, achieve a stable and functional drainage system within the Project Site and prevent any detrimental impacts on water quantity and quality.
- To minimise the environmental impact of all site earthworks associated with environmental controls and rehabilitation activities.

2.12.3 Rehabilitation Procedures

2.12.3.1 Infrastructure Decommissioning and Removal

At the completion of extraction and processing activities, all infrastructure would be removed from the Project Site, including:

- Site Office and associated infrastructure; and
- Wash Plant and associated infrastructure;

The Site Access Road would be maintained as access for the final land use.

2.12.3.2 Backfilling and Shaping Activities

As the Extraction Area is progressively completed, fine material would be transferred and placed against the terminal faces of the Extraction Area which would be shaped and profiled by excavator or bulldozer to achieve slopes no more than 1:4 (V:H).

2.12.3.3 Topsoil Replacement and Final Land Preparation

As the final landform is created, stockpiled soil would be spread as follows.

- The soil would be spread to a minimum depth of 10cm.
- Any better-quality topsoil stripped and stockpiled separately would be used to top dress the soil / overburden growth medium.
- Following soil placement, further ripping or light grading may be undertaken to prevent erosion of these areas prior to the establishment of a vegetative cover.

2.12.3.4 Revegetation

The proposed final landform would be stabilised and seeded using hydromulch of native grass species. Tube stock of tree and shrub species would also be planted. Species would be chosen based on the species surrounding the Extraction Area and processing and Stockpile Area.

2.12.3.5 Rehabilitation Maintenance

The focus of the rehabilitation maintenance activities would be to maintain sufficient moisture content within the soil to allow for immediate pasture germination and establishment of tube stock. The best success for revegetation, both from seed and tube stock, would occur if revegetation is undertaken prior to significant rainfall. Seed to be used for revegetation activities would be obtained from a local, reputable nursery or seed wholesaler and until required would be stored in a cool, dry place (preferably the source nursery or wholesaler).

Watering of the revegetated areas would be avoided unless the establishing vegetation showed significant signs of stress.

The Applicant would also be committed to managing and where possible eradicating noxious weeds within the Project Site. Targeted weed spraying would be undertaken following germination of noxious weeds.

Finally, following successful completion of rehabilitation within the Extraction Area, a culvert / discharge pipe would be installed under the haul road to permit surface water to flow to the Applicant's lucerne crop.

2.13 ALTERNATIVES CONSIDERED

The following presents the alternatives considered by the Applicant during the planning stages of the Proposal. The alternative of not proceeding with the Proposal is presented in Section 5.2.6.

- Additional extraction area.

The Applicant considered a topsoil extraction area on the floodplain adjacent to Evans Plains Creek. A number of different scenarios were considered, with a potential extraction area identified immediately north of the existing Extraction Area. However, during the heritage assessment, it was recognised that the proposed extraction area had a high likelihood of Aboriginal objects being present, either at the surface but obscured by the lucerne crop or at depth and buried by successive flooding and deposition of sediment. As a result, this option was not considered further.

- Deeper extraction.

The Applicant considered extracting more than 4m below the natural surface, however, prior experience indicates that when extraction operations extend below this level, the material extracted includes substantial oversize and the product produced is inferior. As a result, this option was not considered further.

Section 3

Consultation, Issue Identification and Prioritisation

PREAMBLE

This section describes the consultation undertaken during the design and evaluation phase of the Proposal, as well as during the preparation of this Environmental Impact Statement.

This information, together with a review of relevant legislation, planning documents and environmental guidelines and a range of background environmental studies was used to develop a comprehensive list of all relevant environmental issues.

A review of the design of the Proposal and the components of the local environment was undertaken to identify the relative priority of each issue, which in turn instructed the order of assessment and breadth of coverage within Section 4.

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3.1 INTRODUCTION

In order to undertake a comprehensive assessment of the environmental impacts arising from the Proposal, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the local and broader community. To ensure this has occurred, a program of community and government agency consultation and review of environmental planning documentation has been undertaken to identify and prioritise relevant environmental issues and potential impacts.

3.2 CONSULTATION

3.2.1 Government Agencies

3.2.1.1 Introduction

Both formal and informal consultation was undertaken with a range of government agencies at State and local levels throughout the preparation of this document. The following subsection provides an overview of government agency consultation in formalised meetings and throughout the ongoing development of the Proposal.

3.2.1.2 Initial Site Meeting

An Initial Site Meeting was held within the Project Site on 1 August 2016, attended by the following State and local government agencies.

- Bathurst Regional Council.
- Department of Primary Industries Water (now Crown Lands & Water).
- Department of Primary Industries Fisheries.

The attendees inspected the Project Site, the proposed area of disturbance and the area that is now the subject of the Riparian Management Plan. At the conclusion of the site inspection, the attending government agencies verbally outlined the issues from their perspectives that the *Environmental Impact Statement* should address.

3.2.1.3 Application for SEARs

Following the Initial Site Meeting, a *Background Paper* was prepared and submitted with an application for Secretary's Environmental Assessment Requirements (SEARs). The resulting SEARs were issued on 1 July 2016.

Following receipt of the SEARs, the Applicant amended the proposed activities to include an additional "topsoil" extraction area. A *Revised Background Paper* was submitted, and reviewed SEARs were issued on 18 September 2017.

3.2.2 Community Consultation

The Applicant notes that it has operated the Quarry since purchasing the Project Site in approximately 2003. Prior to that time, the Applicant understands that an extractive industry had been operating within the Project Site for many years. The Applicant has not received a complain from surrounding residents during the 15 years it has operated the Quarry.

During finalisation of this document the Applicant notified the surrounding landholders that an application for the continued use of the Quarry was in preparation and provided an overview of the proposed activities. The letter also provided contacted details for landholders to seek additional information and to provide feedback on the Proposal. The Applicant will work with surrounding landholders who may have concerns to ensure that those concerns are considered in the ongoing operation of the Quarry.

3.3 PLANNING CONTEXT

3.3.1 Introduction

A range of Commonwealth and NSW Legislation, policies and guidelines apply to the Proposal. These documents were reviewed to identify any environmental aspects requiring consideration in the *Environmental Impact Statement*. In addition, the SEARs identified a number of guideline documents that would potentially be of assistance during the preparation of the *Environmental Impact Statement* (see **Appendix 2**). A brief summary of each relevant piece of legislation and planning instrument is provided in the following subsections. The application and relevance of planning instruments related to specific environmental issues have been addressed in Section 4 and/or the relevant Specialist Consultant assessments.

3.3.2 Commonwealth Legislation

The key Commonwealth legislation relating to the Proposal is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) which covers ‘matters of national environmental significance’. Relevant matters of national environmental significance include:

- listed threatened species and ecological communities; and
- listed migratory species protected under international agreement.

Given the disturbed nature of those section of the Project Site the subject of this application, the Proposal would not impact on matters of national environmental significance and as a result, a referral under the EPBC Act will not be required.

3.3.3 NSW Legislation

3.3.3.1 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 and Environment.

The EP&A Act aims to protect and conserve the environment through ecologically sustainable development. This is achieved through managing development to conserve resources, including agricultural land, natural areas, forests, minerals, water, and towns with the purpose of promoting social and economic welfare of the community and an enhanced environment.

Development consent is required under the EP&A Act for the purposes identified under the relevant Local Environment Plan (see Section 3.3.5). The Proposal may be classified as development which is permissible with development consent.

By virtue of total disturbance exceeding 2ha and the Project Site being the subject of an extractive industry in the last five years, the Proposal is considered Designated Development under Clause 19 of Schedule 3(1) of the EP&A Reg. Section 4.12(8) of the EP&A Act requires the preparation of an EIS to accompany the development application lodged with Council. This document has been prepared in satisfaction of that requirement.

As Designated Development for the purpose of an extractive industry, the Proposal is classified as Regional Development under Part 4 of the *State Environmental Planning Policy (SEPP) State and Regional Development 2011* by effect of Schedule 4A(8) of the EP&A Act. As Regional Development, the development application will be determined by the Joint Regional Planning Panel.

In addition to Development Consent, the Applicant also anticipates that an Environment Protection Licence will be required under Clause 19 of Schedule 1 of the POEO Act. Two Water Access Licences are also currently held in relation to the Quarry (see Section 1.4.1). As a result, the Proposal is also classified as Integrated Development under Section 4.46 of the EP&A Act.

3.3.3.2 Protection of the Environment Operations Act 1997

The POEO Act provides the framework for regulation and reduction of pollution and waste in NSW. The POEO Act is regulated by the Environment Protection Authority (EPA), which issues Environment Protection licences (EPLs) for scheduled activities, including extractive industries.

The POEO Act also requires immediate reporting of pollution incidents which cause or threaten to cause material harm to the environment. All holders of EPLs are required to prepare, implement and regularly test a *Pollution Incident Response Management Plan*.

An EPL will be required, as the Proposal exceeds the 30 000tpa threshold specified in Section 19 of Schedule 1 of the POEO Act.

3.3.3.3 Water Management Act 2000

An objective of the *Water Management Act 2000* (WM Act) is the sustainable and integrated management of the State's water for the benefit of both present and future generations. Part 1, Division 2, Section 56 of the WM Act provides arrangements for access licences under Section 56.

Water Access Licences have previously been issued for the Project Site under this Act (Section 1.4.1 and **Table 1.1**).

3.3.3.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NP&W Act) aims to manage and conserve nature, objects, places and features that have ecological and cultural value. The NP&W Act is administered and enforced by the OEH.

Aboriginal places and objects are protected under the NP&W Act. Navin Officer (2018) undertook a due diligence Heritage Assessment of the Proposal. That assessment did not identify objects of Aboriginal heritage significance within the proposed areas of disturbance. However, the flood plain / terrace sections of the Project Site adjacent to Evans Plains Creek were identified as having potential for sub-surface objects. As a result, the proposed "topsoil" extraction area was removed from the Proposal.

As no Aboriginal objects would be disturbed, no Aboriginal Heritage Impact Permit would be required, and this Act is not considered further.

3.3.3.5 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) aims to conserve biodiversity and promote ecologically sustainable development by preventing extinction and promoting recovery of threatened species, populations, ecological communities and their habitats. This is done through eliminating and managing threats to the survival or evolutionary development of species, populations, ecological communities, such as the impacts of development.

This Act has been considered in Section 4.7.4.1.

3.3.3.6 Heritage Act 1977

The *Heritage Act 1977* aims to promote and protect the State's heritage, by preventing harm to buildings, relics or places that are on the State Heritage Register.

Under the Heritage Act, approval is required to carry out development on land on which an item listed on the State Heritage Register is located or that is subject to an interim heritage order. No items listed on the State Heritage Register or under the *Bathurst Regional Local Environment Plan 2014* (Bathurst Regional LEP) exist within the Project Site. As a result, this Act is not considered further.

3.3.4 State Environmental Planning Policies

3.3.4.1 State Environmental Planning Policy (State and Regional Development) 2011

As Designated Development for the purpose of an extractive industry, the Proposal is classified as Regional Development under Part 4 of the *State Environment Planning Policy* by effect of Schedule 4A(8) of the EP&A Act. As Regional Development, the development application will be determined by the Joint Regional Planning Panel.

The Proposal does not meet the requirements for State Significant Development as it does not meet the thresholds identified in Clause 7, Schedule 1 of the SEPP.

3.3.4.2 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development. **Table 3.1** presents a summary of the matters that the Minister or his/her delegate needs to consider when assessing a new or modified Proposal and a reference to the section(s) in this *Environmental Impact Statement* where each relevant element of the SEPP is addressed.

3.3.4.3 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would (or potentially would) pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

In accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33), the hazardous materials to be held or used within the Project Site are required to be identified and classified in accordance with the risk screening method contained within the Appendix 4 of *Applying SEPP 33 January 2011* (DoP, 2011). Hazardous materials are defined within that document as substances falling within the classification of the *Australian Code for the Transportation of Dangerous Goods by Road and Rail* (Dangerous Goods Code) (Department of Infrastructure, Transport, Regional Development and Local Government, 2009).

The Applicant notes that the potentially hazardous goods that would be used or stored within the Project Site would include limited quantities of diesel and other hydrocarbons.

As the quantities of diesel and other hydrocarbons and explosives to be stored and used within the Project Site do not meet the thresholds identified in the SEPP, a preliminary hazard analysis is not required for the Proposal.

Table 3.1
Application of the Mining SEPP

Page 1 of 2

Relevant SEPP Clause	Description	EIS Section
12AA:Significance of resource	1) In determining an application for consent for development for the purposes of mining, the consent authority must consider the significance of the resource that is the subject of the application, having regard to: (a) the economic benefits, both to the State and the region in which the development is proposed to be carried out, of developing the resource, and (b) any advice by the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services as to the relative significance of the resource in comparison with other mineral resources across the State.	2.10 NA
	2) The following matters are (without limitation) taken to be relevant for the purposes of subclause (1) (a): (a) employment generation. (b) expenditure, including capital investment. (c) the payment of royalties to the State.	2.10 NA NA
	3) The Director-General of the Department of Trade and Investment, Regional Infrastructure and Services is, in providing advice under subclause (1) (b), to have regard to such matters as that Director-General considers relevant, including (without limitation): (a) the size, quality and availability of the resource that is the subject of the application; (b) the proximity and access of the land to which the application relates to existing or proposed infrastructure; (c) the relationship of the resource to any existing mine; and (d) whether other industries or projects are dependent on the development of the resource.	1.4.4 Fig. 1.1 NA 5.2.3 and 5.2.6
	4) In determining whether to grant consent to the proposed development, the significance of the resource is to be the consent authority's principal consideration under this Part.	1.4.4
	5) Accordingly, the weight to be given by the consent authority to any other matter for consideration under this Part is to be proportionate to the importance of that other matter in comparison with the significance of the resource.	NA
	6) To avoid doubt, the obligations of a consent authority under this clause extend to any application to modify a development consent.	NA
12: Compatibility with other land uses	Consideration is given to: - the existing uses and approved uses of land in the vicinity of the development; - the potential impact on the preferred land uses (as considered by the consent authority) 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. 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.	1.2, 4.1.4 and Fig. 1.2 4 3.3.5 4.13.3 and 5.2.3 4

Table 3.1 (Cont'd)
Application of the Mining SEPP

Page 2 of 2

Relevant SEPP Clause	Description	EIS Section
12A: Consideration of voluntary land acquisition and mitigation policy	This clause applies only to State Significant Development.	NA
12AB: Non-discretionary development standards for mining	This clause applies only to mining-related development.	NA
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible. Measures taken by the applicant to avoid or minimise any incompatibility are considered. The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	4 4 4.13.3 and 5.2.3
14: 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.	4.3 and 4.10 4.7 NA
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.7 and Table 2.2
16: Transportation	The following transport related issues are considered. a) The transport of some or all of the materials from the site by means other than public road. b) Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools. c) The preparation of a driver's code of conduct for the transport of materials on public roads.	2.5 NA 4.5.3
17: 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.	2.12, Fig. 2.5 and Fig. 2.6 2.7 and Table 2.2 2.12.2 2.12
Source: State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007		

3.3.4.4 State Environmental Planning Policy No. 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection aims to encourage the proper conservation and management of Koala habitat. As the Bathurst Local Government Area is identified in Schedule 1 of the SEPP as an area in which potential habitat may exist, this SEPP is addressed in Section 4.7 of the *Environmental Impact Statement*.

3.3.4.5 State Environmental Planning Policy No. 55 – Remediation of Land

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. In particular, this policy requires consideration of whether a development requires a consent for remediation works or not and, where warranted, requires that remediation works meet certain standards and notification requirements.

As the areas proposed for disturbance within the Project Site have previously been used only for extractive industry, agriculture and/or nature conservation, the Applicant is satisfied that no contaminated land occurs within the Project Site. This SEPP is therefore not considered further in this document.

3.3.5 Local Planning Issues

3.3.5.1 Bathurst Regional Local Environment Plan 2014

The existing quarry and proposed extension are located on land zoned RU1 – Primary Production under Bathurst Regional LEP. The aim of the Bathurst Regional LEP is to guide appropriate planning and environmental control through the use and development of land within the LGA, in order to uphold and promote the objectives of the *Environmental Planning and Assessment Act 1979*. The objectives of the zone are to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- encourage diversity in primary industry enterprises and systems appropriate for the area.
- minimise the fragmentation and alienation of resource lands.
- minimise conflict between land uses within this zone and land uses within adjoining zones.
- maintain the rural and scenic character of the land.
- provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.

Extractive Industries are permissible with consent in this zone.

3.3.5.2 Bathurst Regional Development Control Plan

The aim of the Bathurst Regional Development Control Plan (DCP) 2014 is to enable detailed provisions to be made to control and guide development and subdivision within the Bathurst Regional LGA.

Table 3.2 identifies the specific matters addressed by the DCP, relevance to the Proposal and where in the EIS the matters raised are addressed.

3.4 PRIORITISATION OF ENVIRONMENTAL ISSUES

The prioritisation of the key environmental issues as a result of the risk analysis, and hence their general order of presentation in this document, has been established through reference to the following.

- The results of the Government agency and community consultation process described in Section 3.2.
- The results of the review of relevant legislation, planning issues, policies and guidelines presented in Section 3.3.
- The experience of RWC in assembling *Environmental Impact Statements* for similar projects.

The environmental issues identified by this identification process are the following.

1. Surface Water.
2. Noise.
3. Transportation and Traffic.
4. Visual Amenity.
5. Heritage.
6. Biodiversity.
7. Air Quality.
8. Groundwater.
9. Land Resources.
10. Hazards.
11. Social and Economic.

Table 3.2
Specific Matters of the Bathurst Regional Development Control Plan 2014

Section (of DCP)	Relevant	Comment	Section
1. Exhibition and Notification of Development Applications	N	Development is designated.	-
2. Subdivision of Land	N	Sub-division is not proposed.	-
3. Residential Development	N	Development is not within Zones R1, R2, B1, B3, B5 or RU5 of the Bathurst LEP.	-
4. Business and Industrial Development	N	Development is not within Zones B1, B3, B5, IN1, R1, R2 or RU5 of the Bathurst LEP.	-
5. Rural and Rural Lifestyle Development	Y	Development is within Zone RU1.	3.3.6.1
5.1 Strategic Priority and Objectives	Y	Considered throughout the EIS.	
5.2 Siting	Y	Development Standards b) to d) apply. The Project Site does not occur on land identified as either 'sensitive land areas', sensitive waterways' or 'high or moderate biodiversity sensitivity'.	-
5.3 Access, Entrances and Fencing	Y		2.5.3 and 2.5.4
5.4 On-site Effluent Disposal	N	None proposed.	-
5.5 Water Supply Requirements	N	Reticulated water supply available.	-
5.6 Building Form and design	N	No building proposed.	
5.7 Soil and Water Management	Y	Disturbance > 2 500m ² – Blue Book standards applied.	4.3 and 4.11
5.8 – 5.13	N	Specific zoning or location not relevant to the Proposal.	-
6. Rural Village Development	N	Development is not within Zone RU5 of the Bathurst LEP.	-
7. Mount Panorama and Environs	N	Development is not on land identified by Map 28.	-
8. Environmental Considerations			
8.1 Strategic Priorities and Objectives	Y	Considered throughout the EIS.	
8.2 Land Resources	Y	The local setting and potential impacts of the Proposal on each feature of the environment are considered with reference to the nominated controls, safeguards and mitigation measures.	4.11
8.3 Riparian Land and Waterways	Y		4.1.2 and 4.3
8.4 Biodiversity	Y		4.7
8.5 Groundwater	Y		4.10
8.6 Flooding	Y		4.3
8.7 Bushfire Prone Land	Y		4.12
8.8 Flora and Fauna Surveys	Y		4.7
8.9 Sustainable Building Design and Energy Efficiency	N	No buildings required by the Proposal.	-
9. Urban Design and Heritage Conservation	N	Development is not within urban zones, lands within a heritage conservation area or which contain a heritage item.	-
10. Outdoor Lighting	N	Development to be undertaken during daylight hours only.	2.9.1
11. Signage and Colour Schemes	N		-
12. Landscaping and Greening	Y		2.12 and 4.6
13. Parking	Y		2.8.1
14. Crime Prevention	N	Refers to residential development.	-
15. Earthworks	Y		2.2, 2.3 and 2.12

Section 4

Assessment and Management of Key Environmental Issues

PREAMBLE

This section describes the environmental features of the Project Site and surrounds that would or may be affected by 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.

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4.1 ENVIRONMENTAL SETTING

4.1.1 Introduction

The descriptions of various environmental aspects of the Proposal throughout this section are reliant upon a range of background information common to many of the key environmental issues. In this subsection, the local setting is described, and background information is provided on the topography and drainage, land ownership and residences and climate of the surrounding area. The local setting relevant to specific environmental features is described throughout the remainder of Section 4.

4.1.2 TOPOGRAPHY AND DRAINAGE

4.1.2.1 Regional Topography and Drainage

The topography of the region is variable, ranging from mountainous areas associated with the Great Dividing Range approximately 40km to the east of the Project Site, to low gently undulating land and valleys associated with the Macquarie River to the east of the Project Site (**Figure 4.1**). To the west and north of the Project Site, a series of undulating ridge lines and plateaus exist.

Crackenback Rock, approximately 11km to the northwest of the Project Site, has a maximum elevation of approximately 930m AHD. Mt Panorama, located approximately 7km to the east of the Project Site has a maximum elevation of approximately 900m AHD.

By contrast, the Macquarie River rises below the locality of White Rock near Bathurst at an elevation of 671m AHD and flows to the east and north of the of the Project Site and forms part of the Macquarie-Barwon catchment within the Murray-Darling basin. The Macquarie River flows through the region in a northwest direction past the towns of Bathurst, Wellington, Dubbo, Narromine and Warren to the Macquarie Marshes. It is one of the main inland rivers in NSW and supplies Lake Burrendong.

4.1.2.2 Local Topography and Drainage

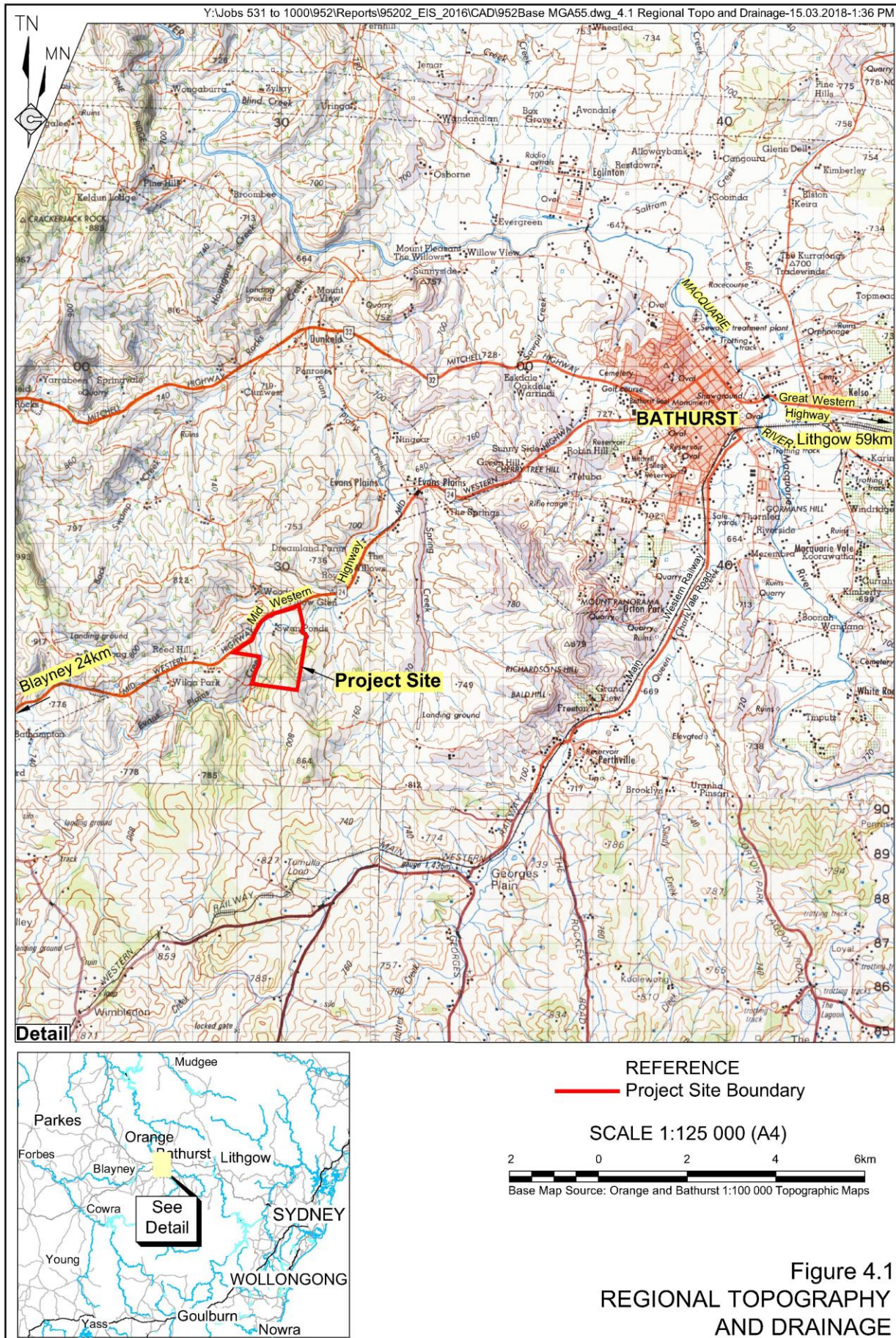
The Project Site is located on an undulating north / south orientated ridgeline (**Figure 4.2**). The maximum elevation along the ridgeline is 864m AHD, approximately 1.75km south of the Project Site. Maximum slopes in the vicinity of the Project Site are typically approximately 1:7 (V:H), with more gently sloped to flat areas in the vicinity of Evans Plains Creek.

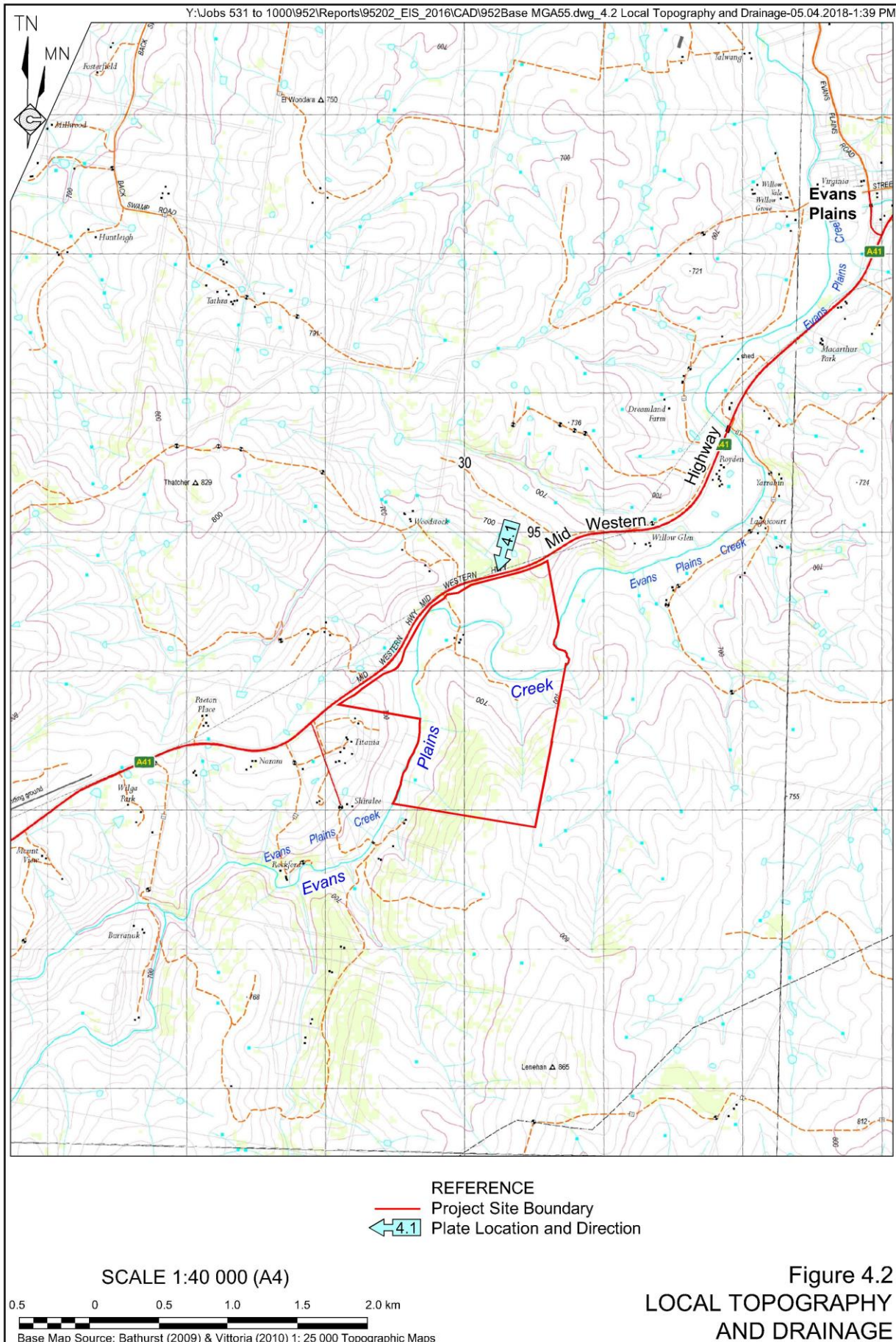
Evans Plains Creek is a perennial watercourse that flows to the northeast, falling from an elevation of approximately 690m AHD approximately 1.75km to the southwest of the Project Site to approximately 665m AHD approximately 1.75km to the northeast of the Project Site.

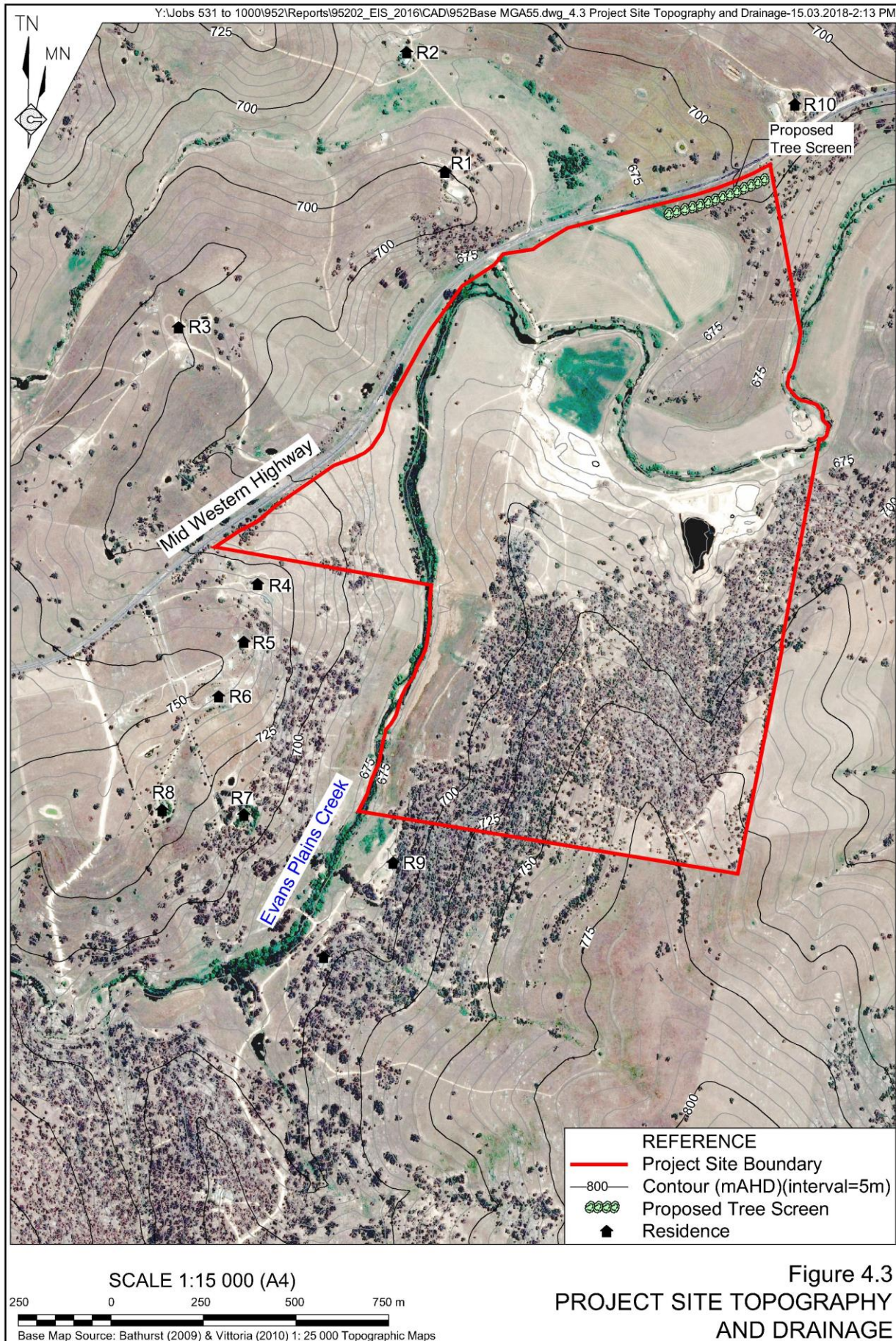
4.1.2.3 Project Site Topography and Drainage

The Project Site is dominated by a north / south orientated ridgeline, with a maximum elevation of approximately 771m AHD on the southern boundary of the Project Site. Slopes on the ridgeline are typically between 1:5 (V:H) to 1:7 (V:H) (see **Figure 4.3**).









The northern section of the Project Site is dominated by flood plains associated with Evans Plains Creek, with elevations of approximately 660m AHD.

The western section of the Project Site is dominated by west-sloping land with typical slopes of 1:7 (V:H).

Evans Plains Creek within the Project Site occurs within a well-defined channel up to 5m deep, flanked by flood plains and terraces. The creek falls from approximately 672m AHD on the southwestern boundary of the Project Site to 665m AHD on the eastern boundary, a channel distance of approximately 3km.

4.1.3 METEOROLOGY

4.1.3.1 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.

4.1.3.2 Source of Data

Meteorological data from the following Bureau of Meteorology-operated stations is presented in **Table 4.1**. The following stations were selected in order to best represent the conditions at the Project Site.

- Bathurst Agricultural Station (rainfall 1908 to 2017).
- Bathurst Airport AWS (rainfall 1994 to 2017).

4.1.3.3 Temperature

January is typically the hottest month, with an average maximum temperature ranging from 28.1°C to 28.6°C. July is the coldest month with an average maximum temperature of 11.3°C to 11.9°C and an average minimum temperature of 0.5°C to 0.8°C.

4.1.3.4 Rainfall and Evaporation

Average annual rainfall ranges from 607.6mm to 638.0mm. An increase in monthly rainfall is observed during the period between October and March as compared to the rest of the year (**Table 4.1**). The driest year on record was in 1982 when 214.2mm of rain was recorded. By contrast, the wettest year on record was 1950 when 1 275.2mm of rain was recorded. Both measurements were recorded at the Bathurst Agriculture Station.

Table 4.1
Meteorological Data

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Temperature (C°) – Bathurst Agricultural Station													
Mean maximum	28.1	27.3	24.6	20.2	15.7	12.2	11.3	13	16.4	20	23.4	26.4	
Mean minimum	13.4	13.4	10.8	6.7	3.3	1.6	0.5	1.3	3.4	6.2	8.9	11.6	
Temperature (C°) – Bathurst Airport													
Mean maximum	28.6	27.5	24.7	20.7	16.3	12.6	11.9	13.8	17	20.3	23.7	26.6	
Mean minimum	13.7	13.5	10.6	6.4	3.1	1.9	0.8	1.2	3.6	6.2	9.3	11.7	
Rainfall (mm) Bathurst – Agricultural Station													
Mean rainfall	67.6	58.0	52.1	41.8	41.4	44.3	48.7	49.4	46.9	59.1	60.9	66.3	638.0
Highest monthly rainfall	223.7	235.5	205.3	166	115	193.1	154.7	163.2	130.1	215.8	195.7	218.5	1 275.2
Lowest monthly rainfall	1.4	0	0	0.5	1	0.8	3.7	1.4	3.8	2.3	0.8	0	214.2
Mean number of rain days	7.4	7	6.3	6.2	8.3	10.2	11.2	10.9	9.3	9.3	8.5	8	102.6
Highest daily rainfall	91.4	101.1	92	60.4	49.8	82.3	108.7	93.5	48.2	54.6	66.2	96.5	108.7
Rainfall (mm) – Bathurst Airport													
Mean rainfall	58.5	57.8	55.4	34.0	33.3	39.7	43.6	40.2	47.0	52.8	64.3	74.2	607.6
Highest monthly rainfall	148.2	131.2	165	122.4	85.4	104.8	103	121	117	193	138.4	218.6	1 067.4
Lowest monthly rainfall	12.4	3	0.4	1.2	2	11.6	11.8	1.4	2.6	1.2	9.2	12.4	365.8
Mean number of rain days	8.1	8.2	7.8	7.5	11.5	14.7	15.5	12.3	10.4	9.5	10.3	9.6	125.4
Highest daily rainfall	68.2	92	74.4	38	55.6	38	38	44	42.8	56	49.2	59.8	92
Evaporation (mm) – Bathurst Agricultural Station													
Mean monthly evaporation ²	210.8	168.2	139.5	87.0	52.7	33	37.2	55.8	84.0	127.1	159	201.5	113
Note 1: All data in this table is from Bathurst Agricultural Station (1908-2018) or Bathurst Airport AWS records (1994-2018)													
Note 2: Monthly evaporation rates are calculated from daily averages, which are multiplied by number of days per month													
Source: Bureau of Meteorology – Bathurst Agricultural Station (Station Number: 063005) and Bathurst Airport AWS (Station Number: 063291)													

The maximum daily rainfall recorded at the Bathurst Agricultural Station was 108.7mm on the 25 July 1922. The number of rain days in the summer months is less than that observed for the winter months. As average rainfall is higher in the summer months than in the winter months, the data indicates that summer rainfall events tend to be less frequent but higher intensity than those that occur in the winter months.

Evaporation records are only available for Bathurst Agricultural Station. Records indicate that monthly rainfall generally exceeds values recorded for evaporation, except during the months of January, February and November.

4.1.3.5 Wind

Wind rose data from the Bathurst Airport AWS is presented in **Figure 4.4**. On an annual basis, there is a high frequency of winds from north, northwest, west and southwest directions, with the most frequent winds from the west.

Seasonally, wind direction does not vary substantially from the annual distribution.

4.1.4 Land Ownership and Land Use

4.1.4.1 Land Ownership and Surrounding Residences

Figure 4.5 presents the land ownership and residences within and surrounding the Project Site.

4.1.4.2 Land Use

Land uses surrounding the Project Site includes the following (**Figure 4.6**).

- Primary Production – areas used for agriculture and rural activities, including rural residences.
- Nature conservation.
- Infrastructure – including the Mid Western Highway.
- Extractive industries – including Dreamland Quarry, located approximately 3km to the north of the existing extraction area.

4.2 ABORIGINAL HERITAGE

4.2.1 Introduction

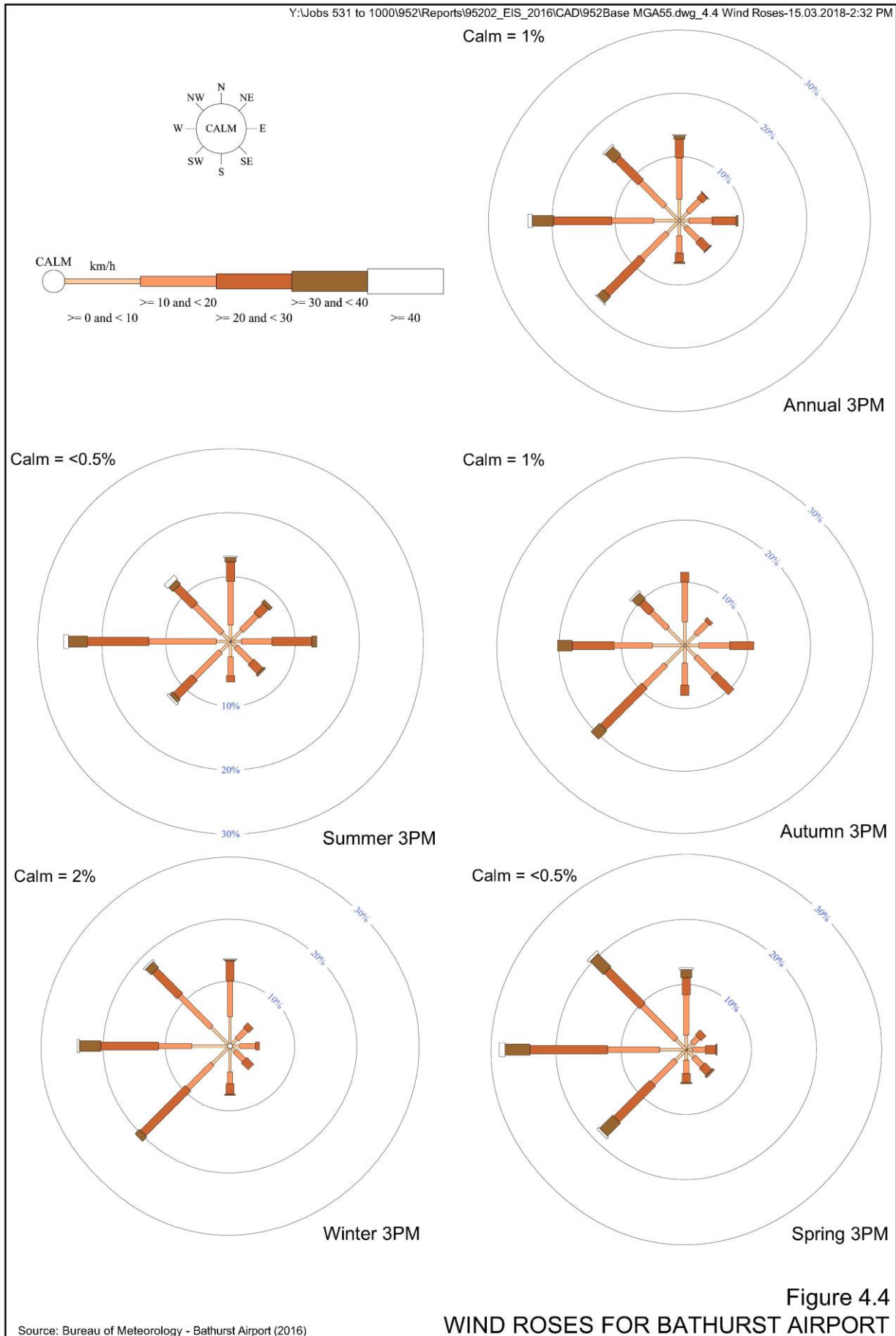
The SEARs identify “*Heritage*” as a key issue for assessment in the EIS. Matters to be addressed include:

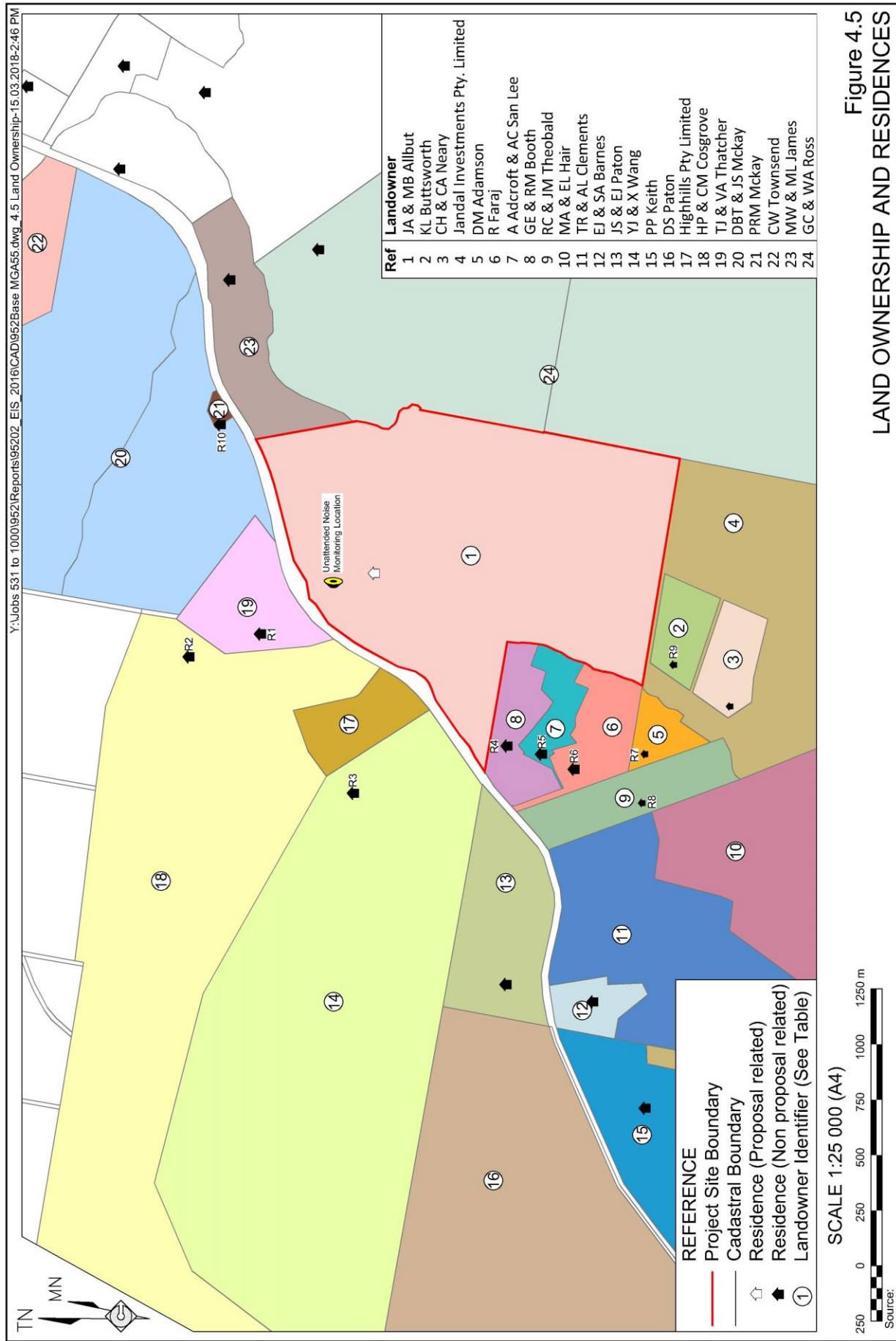
“an assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage; and

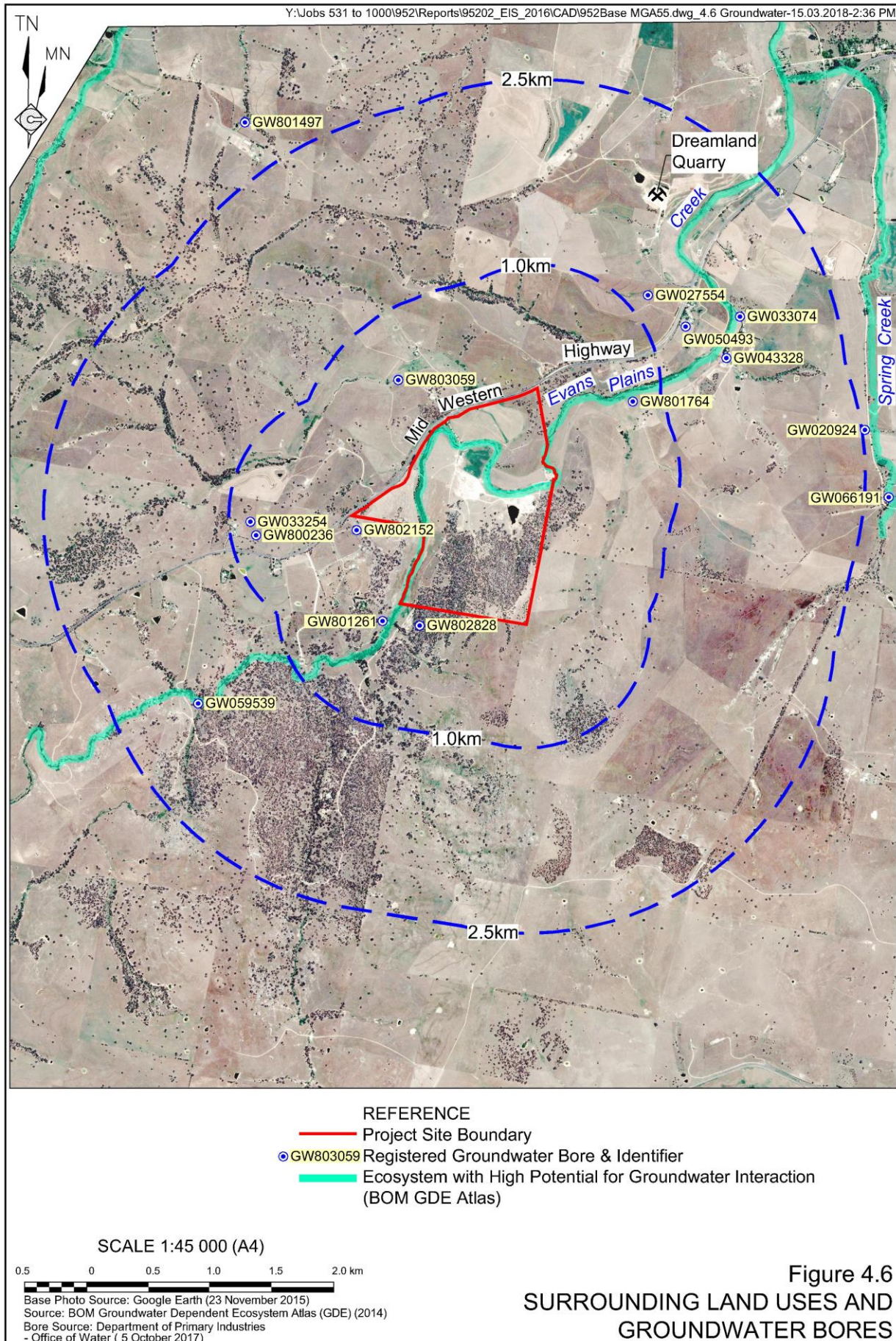
The SEARs are included in full as **Appendix 2**.

A Heritage Assessment has been completed by Navin Officer Heritage Consultants Pty Ltd (Navin Officer) as part of the EIS. The resulting report, referenced hereafter as Navin Officer (2018) is reproduced as **Appendix 4**. It is noted that **Appendix 4** presents a version of the report with sensitive information removed. A full version of the report has been provided to the Registered Aboriginal Parties, Office of Environment and Heritage and Bathurst Regional Council.

This subsection provides a summary of Navin Officer (2018).







4.2.2 Consultation

Navin Officer (2018) undertook consultation with the Aboriginal community in accordance with the document *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. Section 4.2 of Navin Officer (2018) fully describes the consultation undertaken, including the timeframes for each of the consultation stages.

Based on the consultation, the following Registered Aboriginal Parties were identified.

- Bathurst Local Aboriginal Land Council;
- Gundungarra Aboriginal Heritage Association Inc;
- Dhuulu-Yala Aboriginal Corporation;
- Esther and Stuart Cutmore, Justin Hardy;
- Gundungarra Tribal Council Aboriginal Corporation;
- Warrabinga NTCAC;
- Wiradyuri Traditional Owners Central West Aboriginal Corporation;
- Murra Bidge Mullangari Aboriginal Corporation Cultural Heritage;
- Gunjeewong Cultural Heritage Aboriginal Corporation; and
- Muragadi Heritage Indigenous Corporation.

Each of the Registered Aboriginal Parties were provided with a copy of the draft survey methodology and final assessment report and provided with an opportunity to respond. It is noted in particular that Warrabinga NTCAC provided a detailed response and series of recommendations which the Applicant has considered and incorporated, where relevant, into the management and mitigation measures presented in Section 4.2.7. The Applicant would like to acknowledge and thank each of the respondents for their comments and time taken to review the relevant documentation.

4.2.3 AHIMS Registered Sites

Navin Officer (2018) searched the Aboriginal Heritage Information Management System (AHIMS) database for previously identified Aboriginal sites in the vicinity of the Project Site. Two sites were identified as follows.

- Site 44-2-0012 – an “open camp site” located 1.5 kilometres southwest of the Project Site.
- Site 44-2-0118 – an “open camp site” located 1.7 kilometres northeast of the Project Site.

A copy of the AHIMS search is provided in Appendix 2 of Navin Officer (2018).

4.2.4 Predictive Model

Based on the results of the AHIMS search and Navin Officer's experience in the Central Tablelands, the following predictive model for the general area surrounding the Project Site was developed.

- Artefact scatters are the most common site type and generally contain low numbers of artefacts and are found in low densities.
- The most important site location determinants appear to be the following (both singly and in combination):
 - level or near level ground;
 - well drained and locally elevated ground;
 - proximity to permanent water; and
 - location on a major watershed.
- Crest topographies on major watersheds which offer an effective through-access route across rugged and incised terrain do appear to have a higher site incidence than lesser order crest-line topographies.
- Site location trends toward mid-valley slope contexts may be indicative of avoidance of cold air drainage.
- Wetland/swampy meadow margins are a focus for Aboriginal occupation.

Navin Officer (2018) therefore state the following in relation to potential sites within the Project Site.

- Small sporadic artefact scatters or isolated finds may occur in the vicinity of Evans Plains Creek.
- Sites may be located on various landscape profiles such as hills, ridges and wetland/swampy meadow margins.

4.2.5 Survey Methodology

The heritage survey was undertaken by Nicola Hayes and Elle Lillis of Navin Officer and Tina Scott of the Bathurst Local Aboriginal Land Council on 27 October 2017 date. All areas of proposed disturbance were inspected using systematic traverses and all trees of a suitable age to have cultural scars were inspected. All identified sites were discussed with Ms Scott on the day and information required to be included in Navin Officer (2018) and on site cards was collected.

4.2.6 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for Aboriginal heritage-related

impacts. The Applicant acknowledges the contribution made by the Registered Aboriginal Parties, in particular, Warrabinga NTCAC, in developing these measures.

- Ensure that all relevant staff and contractors are made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act 1974* as part of the site induction and reinduction program.
- Ensure that the boundary of Site SPQ1 is suitably marked or fenced and that access to the area is limited to authorised personnel.
- Ensure that an AHIP is obtained prior to disturbance of any areas outside the existing Extraction Area.
- Implement the following protocol during site preparation activities within the area of Site SPQ1. It is noted that these procedures may be superseded by the conditions of any AHIP granted for the Proposal.
 - Inspect of all areas of ground disturbance by an archaeologist and Aboriginal representative, both before and after initial ground disturbance.
 - Collect cultural material identified as a result of ground disturbance in bags with appropriate identification on the bag.
 - Ensure that photographs and drawings (where appropriate) are prepared.
 - Compile a short report will be compiled detailing the result of the above.
- Implement the following unanticipated finds protocol in the event that any objects of suspected Aboriginal heritage significance are identified in areas to be disturbed.
 - Cease any further excavation or ground disturbance, in the area of the find.
 - Do not remove any find or unnecessarily disturb the area of the find.
 - Ensure that the area of the find is adequately marked as a no-go area and that the potential for accidental impact is avoided;
 - Report the find to the Office of Environment and Heritage, and if skeletal human remains, the Police.
 - Following consultation Office of Environment and Heritage and any other relevant stakeholder groups, the significance of the finds should be assessed and an appropriate management strategy followed.
 - Development works in the area of the find may re-commence, if and when outlined by the management strategy developed in consultation with and approved by the relevant statutory authority.

4.2.7 Survey Results

Two sites of Aboriginal heritage significance were identified during the site survey as follows (Figure 4.7).



Site SPQ1

This site is an open scatter comprising 12 artefacts comprising flakes, partial flakes and cores of various materials in 8 locations. Navin Officer (2018) states that there is potential for artefacts not identified during the survey to be present within the boundaries of the Site, including within the shallow (<20cm) surface materials.

Navin Officer (2018) provides the following assessment of significance of Site SPQ1.

- Social or cultural value – This is a matter that only the Aboriginal community can determine, however, Navin Officer (2018) have not been informed that this site has any particular social or cultural value through being connected with myths and stories, events of oral history or any intangible cultural values.
- Historical value – This is also a matter that only the Aboriginal community can determine, however, Navin Officer (2018) have not been informed that this site is historically important in terms of persons, events, phases or activities in the Aboriginal community.
- Scientific value – This site has been assessed by Navin Officer (2018) as having moderate to low (local) scientific significance.
- Aesthetic value – Navin Officer (2018) state that aesthetic value is often closely associated with social values and that information has been forthcoming from Aboriginal stakeholders regarding this value.

Figure 4.7 presents the boundary of Site SPQ1. The location of individual artefacts within the has been withheld from the publicly available version of this document at the request of the Registered Aboriginal Parties.

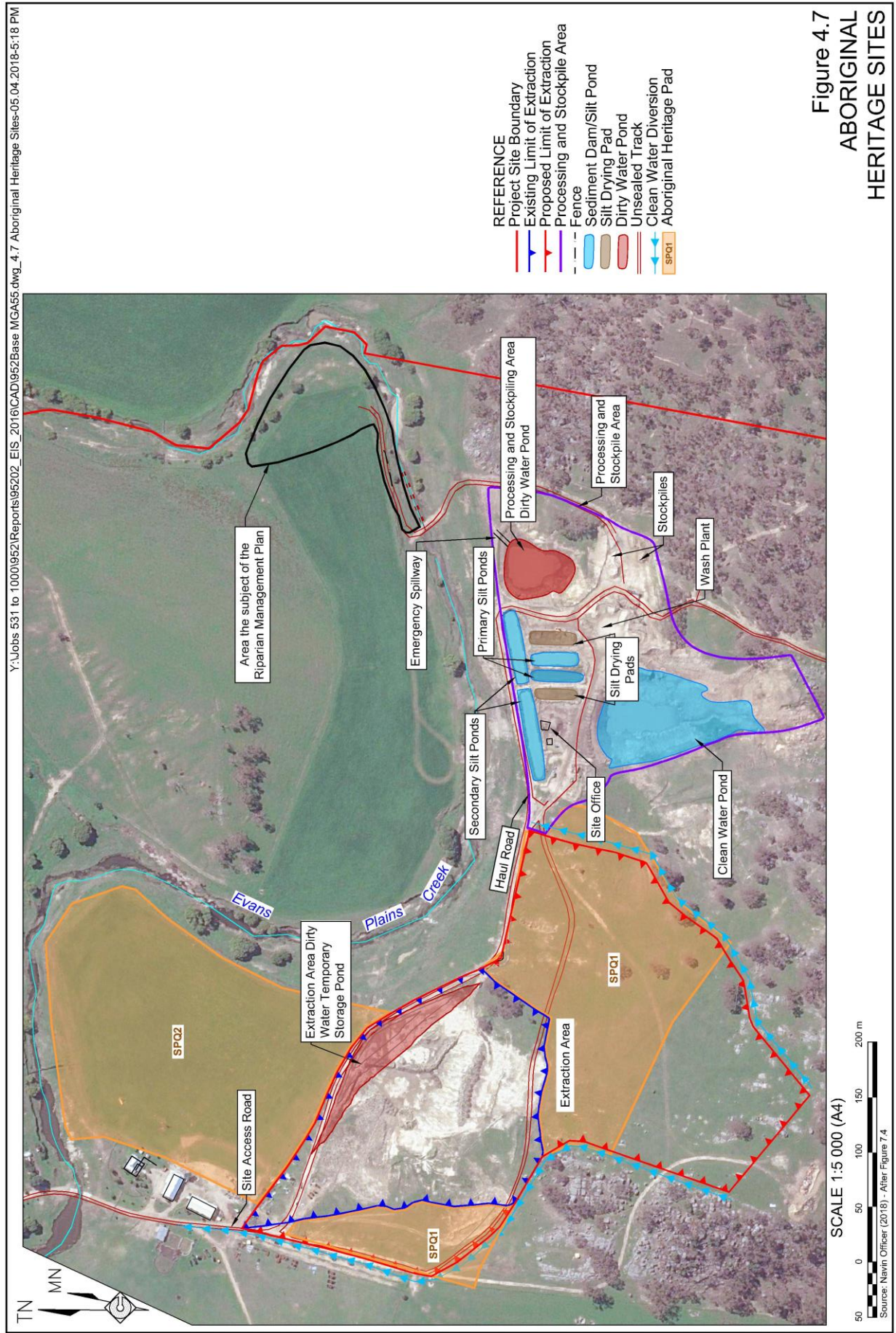
Site SPQ2

This site is a potential archaeological deposit (PAD) located adjacent to Evans Plains Creek. Limited ground visibility was available during the survey, however, Navin Officer (2018), in consultation with the Registered Aboriginal Parties, determined that Aboriginal artefacts are likely to be present, including below the surface.

Given the sensitivity of this landform, the Applicant determined that it would remove the proposed “topsoil” extraction activities from this Proposal.

4.2.8 Assessment of Impact

The Proposal will directly impact on Site SPQ1. Navin Officer (2018) recommend that a salvage program be implemented prior to and during surface disturbance operations within this site. Based on implementation of this recommendation, and the fact that an AHIP will be obtained prior to surface disturbance, Proposal-related impacts on matters of Aboriginal heritage are unlikely to be unacceptable.



4.3 SURFACE WATER

4.3.1 Introduction

The SEARs identify “water” as a key issue for assessment in the EIS. Matters relevant to surface water include the following.

- “a detailed site water balance and an assessment of any volumetric water licensing requirements, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges), water supply infrastructure and water storage structures;
- identification of any licensing requirements or other approvals required under the Water Act 1912 and/or Water Management Act 2000;
- demonstration that water for the construction and operation of the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP)
- 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;
- an assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts;
- an assessment of any likely flooding impacts of the development;
- 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
- a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts.”

In addition, the EPA requests that an adequate and secure water source be identified for the Proposal, that impacts to surface water are considered, that annual volumes of surface water from each source are presented, details of works within 40m of a watercourse are provided, that mitigation measures are presented and that sediment and erosion control measures are considered for the management of stormwater within the Project Site. The SEARs are included in full as **Appendix 2**.

The following subsections have been prepared by RWC and provide an overview of the existing water storage structures within the Project Site and the changes that are proposed to manage the changing landscape throughout the life of the Proposal, including any operational controls or management measures that would be implemented. A site water balance and an assessment of residual impacts assuming the adoption of the nominated management measures are provided.

4.3.2 Existing Surface Water Environment

The topography and drainage of the Project Site and surrounds are described in Section 4.1.2. In summary, Evans Plains Creek, a perennial watercourse, flows through the Project Site, immediately north of the Extraction Area (**Figure 4.3**). All surface waters within the Project Site flow to Evans Plains Creek, with the exception of surface waters within disturbed sections of the Project Site which flow to either the Extraction Area or Processing and Stockpile Area Dirty Water Ponds, from where the water is reused or applied to the Applicant's lucerne crop. No water from disturbed sections of the Project Site is permitted to flow to Evans Plains Creek.

In addition, the Extraction Area and Processing and Stockpile Areas are both 3m to 4m above the level of the Evans Plains Creek flood plain. However, the Site Access Road includes a concrete sealed causeway across the Creek. As a result, while the Extraction Area and Processing and Stockpile Areas would become isolated during a flood event, the disturbance areas themselves would not be flooded.

4.3.3 Site Water Balance

Section 2.6 describes the existing water management within the active sections of the Project Site. **Figure 4.8** provides a schematic representation of the existing water balance to illustrate water movement within the Project Site. This water balance would remain unchanged as a result of the Proposal. In summary:

- All potentially sediment laden water from disturbed sections of the Extraction Area flows to the Extraction Area Dirty Water Pond from where it is used for dust suppression or to irrigate the Applicant's lucerne crop.
- Water within the Processing and Stockpile Area flows wither to the Silt Ponds of the Processing and Stockpile Area Dirty Water Pond. This water is either reused in the Wash Plant or used to irrigate the Applicant's lucerne crop. At the request of the Environment Protection Authority, the Applicant installed an emergency discharge pipe into the Processing and Stockpile Area Dirty Water Pond. Discharge from this pond to Evans Plains Creek is not anticipated and would only occur under an extreme rainfall event.
- Surface water within the Clean Water Pond is used for makeup water within the Wash Plant. In the event of discharge from this pond, water flows via a pipe to Evans Plains Creek.
- In the event that makeup water is not available within the Clean Water Pond, water is pumped from Evans Plains Creek under WAL34811 and WAL34794.

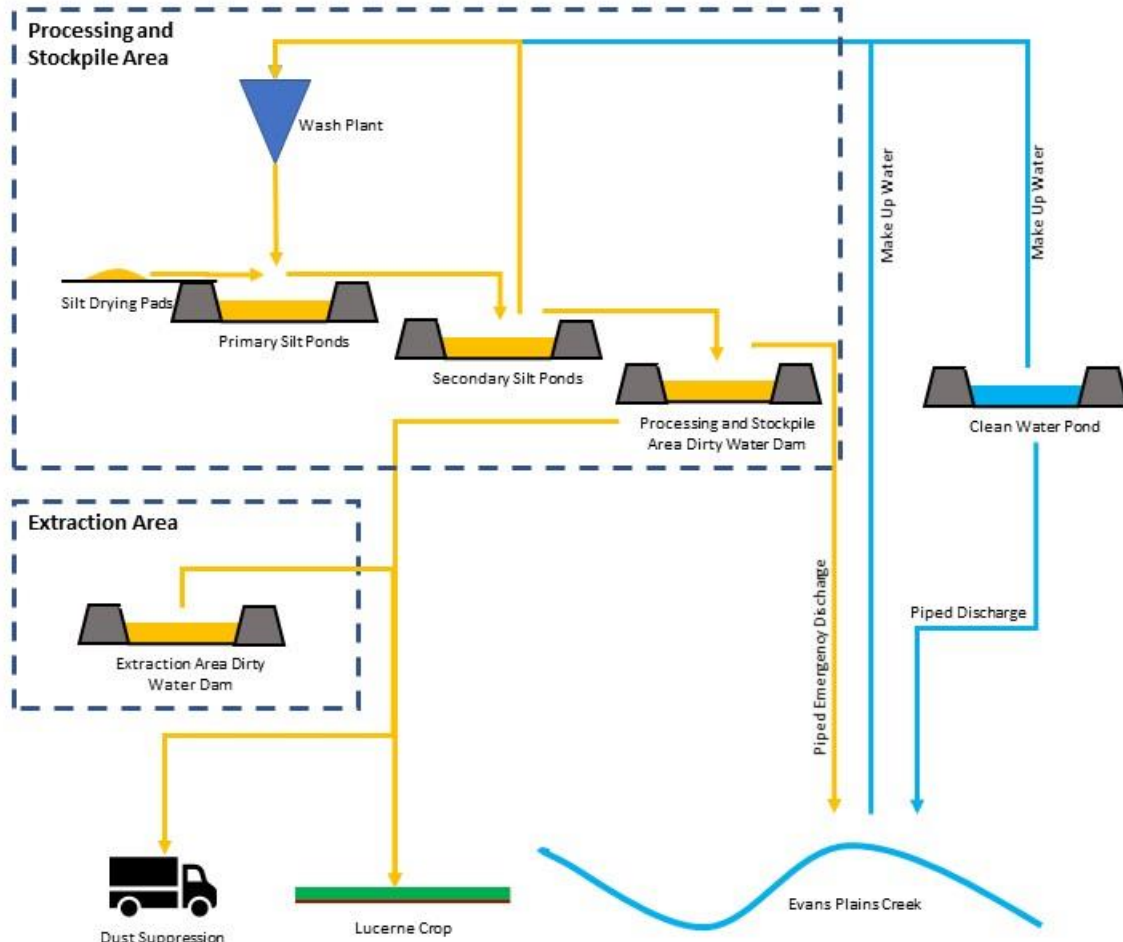


Figure 4.8 Conceptual Water Balance

4.3.4 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable surface water-related impacts.

- Ensure that the surface water management measures described in Sections 2.6 and 4.2.3 are fully implemented
- Ensure that all surface water flows from disturbed sections of the Project Site are directed to the Dirty Water Ponds.

- Ensure that adequate capacity exists within the Dirty Water Ponds to contain a 1 in 50 year 72-hour rainfall event.
- When irrigating sediment laden water to the Applicant's lucerne crop, ensure that the rate of irrigation is such that all irrigated water is permitted to enter the soil profile and that overland flow is not generated.
- Ensure that sediment control structures constructed for the Proposal remain in place until rehabilitated areas are sufficiently stabilised.

4.3.5 Impact Assessment

In light of the above, the Applicant notes the following.

- Water would be available at all times for dust suppression activities, either from the Dirty Water Ponds or from a licenced source.
- Water would not be discharged from the Project Site, except during an event that exceeds a 1 in 50 year 72-hour rainfall event. As a result, there would be no off-site adverse surface water quality impacts.
- The area of existing and proposed disturbance is small when compared with the catchment of Evans Plains Creek and the isolation of these areas from the catchment would have a negligible impact in the quantity of surface water in the watercourse.
- The Proposal is not on flood prone land and would be unlikely to be impacted by or to impact upon flood behaviour.

4.4 NOISE

4.4.1 Introduction

The SEARs identify “noise” as a key issue for assessment in the EIS and require 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 Industrial Noise Policy and NSW Road Noise Policy respectively;
- reasonable and feasible mitigation measures to minimise noise emissions; and
- monitoring and management measures.

The SEARs are included in full as **Appendix 2**.

As the Proposal would be consistent with activities that are currently undertaken within the Project Site, there would be no construction-related noise and this subsection provides an assessment of operational and off-site transport noise.

A Noise Impact Assessment has been completed by Muller Acoustics Consulting (MAC) as part of the EIS. The resulting report, referenced hereafter as MAC (2017) is reproduced in full as **Appendix 4**. This subsection provides a summary of that assessment.

4.4.2 Existing Noise Environment

The Project Site is situated within a rural setting (**Figure 4.6**). Environmental noise at surrounding residences consists of the following.

- Traffic on local roads, particularly the Mid Western Highway.
- Domestic noises such as lawn mowers, children, dogs, etc.
- Rural noises such as farm machinery, stock, birds and insects, etc.
- Noise generated by wind and tree foliage.
- Proposal-related noise from within the Project.

MAC (2017) undertook unattended noise monitoring between 11 and 18 October 2017, at a location within the Project Site representative of surrounding residences, namely, at a distance of approximately 150m from the Mid Western Highway (**Figure 4.3**). In summary, the rating background noise levels were determined by MAC (2017) to be as follows.

- Daytime background noise levels – 43dBA (L_{A90}).
- Evening background noise levels – 41dBA (L_{A90}).
- Night-time background noise levels – 34dBA (L_{A90}).

Attended noise monitoring was undertaken on 11 October 2017 in the absence of Quarry related activities. In summary, Mac (2017) determined that traffic on the Mid Western Highway was the most significant noise source, with no other audible industrial noise sources evident.

In addition, MAC (2017) reviewed publicly available meteorological data from the Bureau of Meteorology-operated Bathurst Airport Automatic Weather Station and concluded that prevailing winds were not a feature of the area and do not therefore need to be included in the assessment. Similarly, as all operations would be undertaken during the day, temperature inversions do not need to be included in the assessment.

4.4.3 Noise Assessment Criteria

The operational noise criterion for the Proposal was determined by MAC (2017) based on the existing noise environment and in accordance with the *Industrial Noise Policy*. In summary, the criterion was determined to be 48dBA L_{Aeq} (15 minute).

The road traffic noise criterion for a road depends on its classification under the *Road Noise Policy*. MAC (2017) has classified the Mid Western Highway as a “Freeway/arterial/sub-arterial road.”. The daytime noise assessment criterion for this class of road is 60dBA L_{Aeq} (15 hour) or an increase of less than 2dBA.

4.4.4 Noise Assessment Methodology

4.4.4.1 Operational Noise Assessment Methodology

Noise modelling was conducted using Brüel and Kjær's Predictor Type 7810 (Version 11.10) noise modelling software to assess potential noise impacts from the Proposal. All calculations were made in accordance with the following standards.

- ISO 9613-1 – *Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere; and*
- ISO 9613-2 – *Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation.*

Measurements of sound power levels were collected from the Project Site or sourced from the MAC noise database and are presented in Table 12 of MAC (2017).

Finally, MAC (2017) assessed two operational scenarios as follows.

- Scenario 1 – existing operations, comprising an excavator and bulldozer within the existing Extraction Area and concurrent operation of the Wash Plant (**Figure 4.9**).
- Scenario 2 – proposed operations, comprising operation of an excavator and bulldozer within the southern, most elevated section of the Extraction Area and concurrent operation of the Wash Plant (**Figure 4.10**).

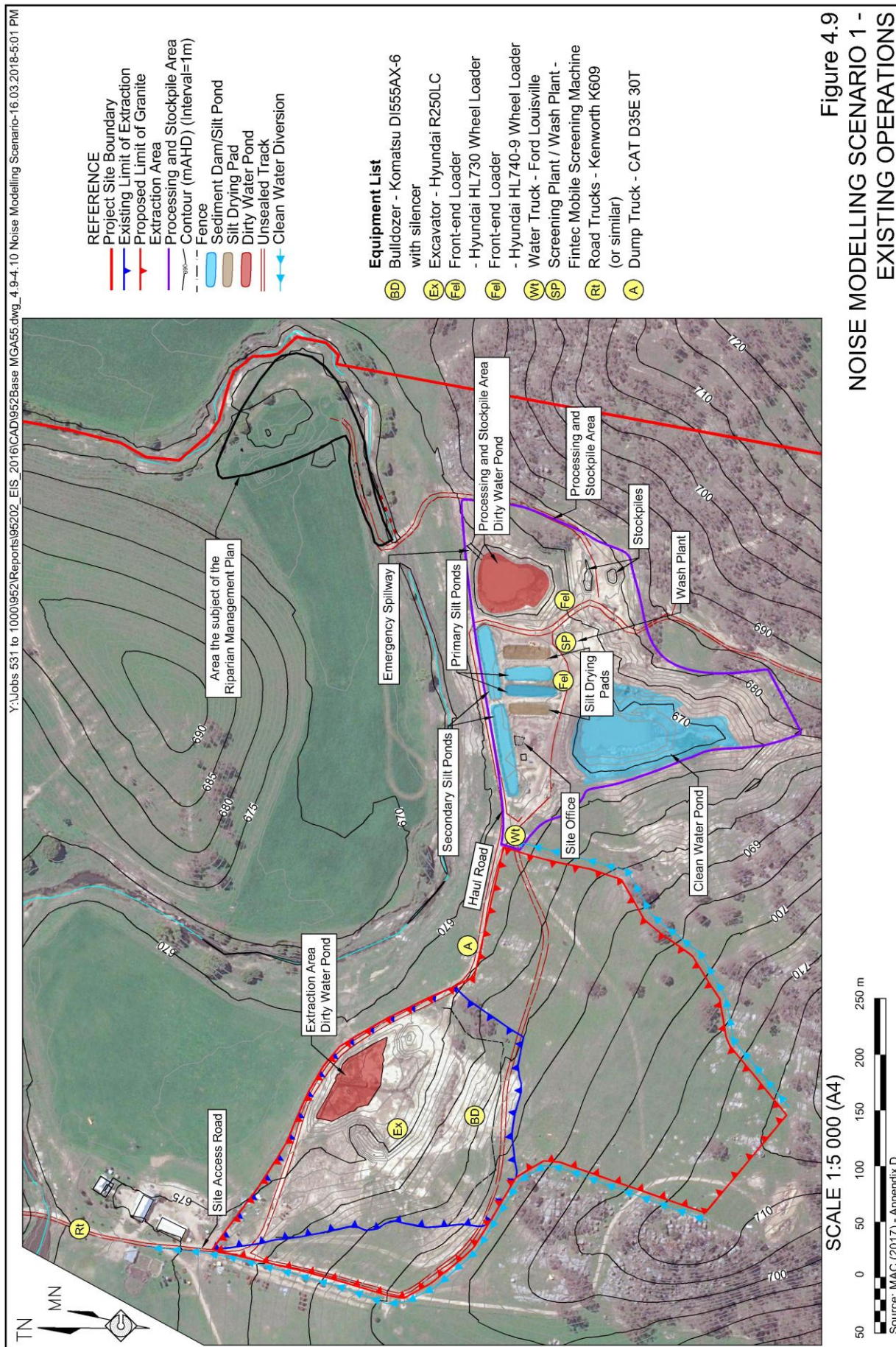
4.4.4.2 Road Traffic Assessment Methodology

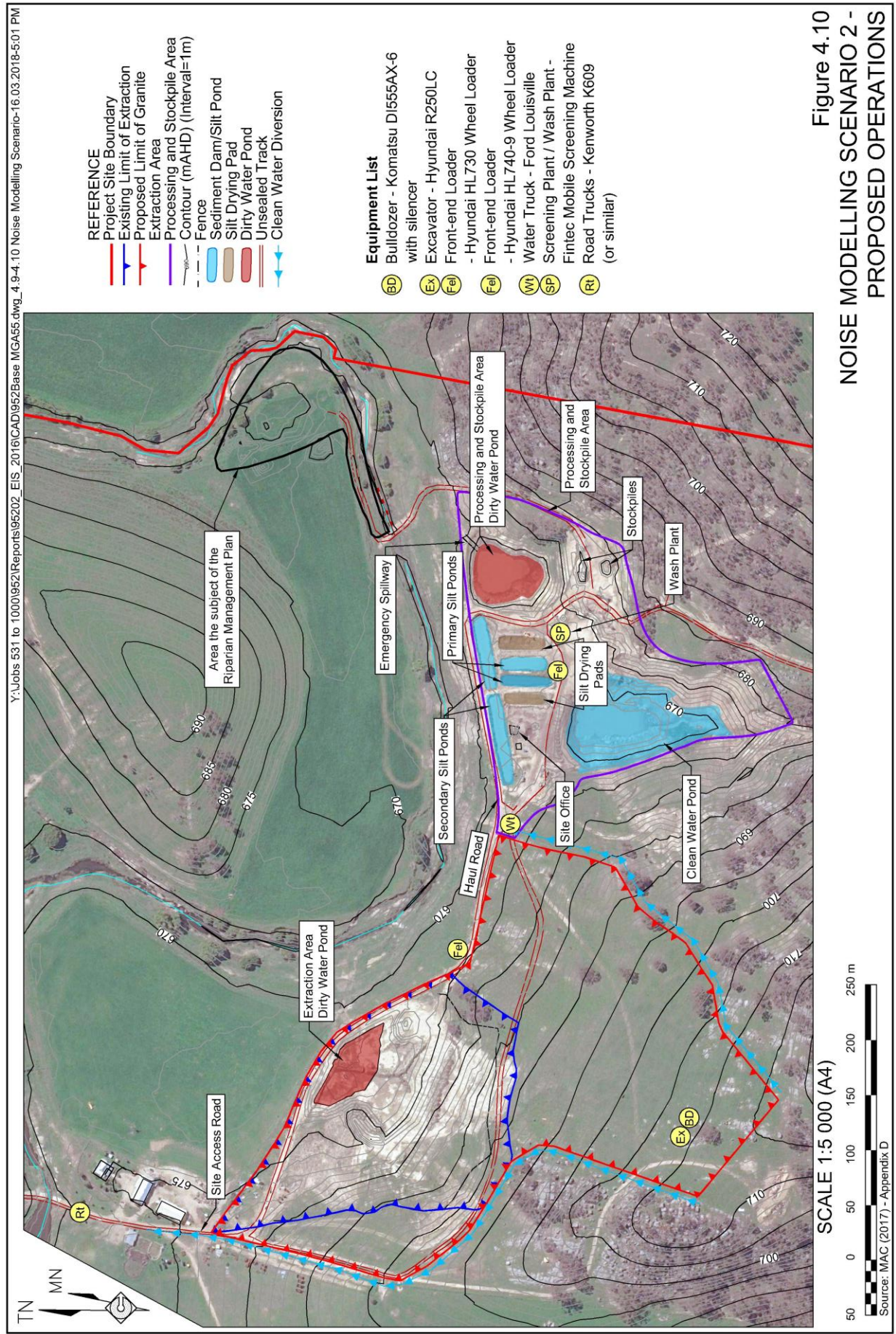
The United States (US) Environment Protection Agency's road traffic calculation method was used to predict the L_{Aeq} noise levels from project-related trucks travelling past receivers along public roads, based on a maximum of 40 additional heavy vehicle movements per day.

4.4.5 Management and Mitigation measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable noise-related impacts.

- Comply with the approved hours of operation.
- Install frequency modulated reversing alarms to all mobile equipment.
- Ensure that all truck drivers are required to comply with the Applicant's Driver's 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 or vibration are addressed.
- Maintain internal roads to minimise body noise from empty trucks.





4.4.6 Assessment of Impacts

4.4.6.1 Operational Noise

Figures 4.11 and 4.12 present the result of the operational noise assessment and Appendix E of MAC (2017) presents the assessment results for individual residences. In summary, the maximum predicted noise level at any surrounding residence would be 32dBA at Residence R4 during Scenario 2. This compares with the Project-specific noise assessment criterion of 48dBA and the default *Industrial Noise Policy* default criterion of 35dBA.

4.4.6.2 Traffic Noise

MAC (2017) estimates that the proposed changes to traffic levels and types from the Proposal would not increase existing noise levels by more than 2dBA and therefore the change in noise level would not be considered perceptible to the human ear.

4.5 TRANSPORTATION AND TRAFFIC

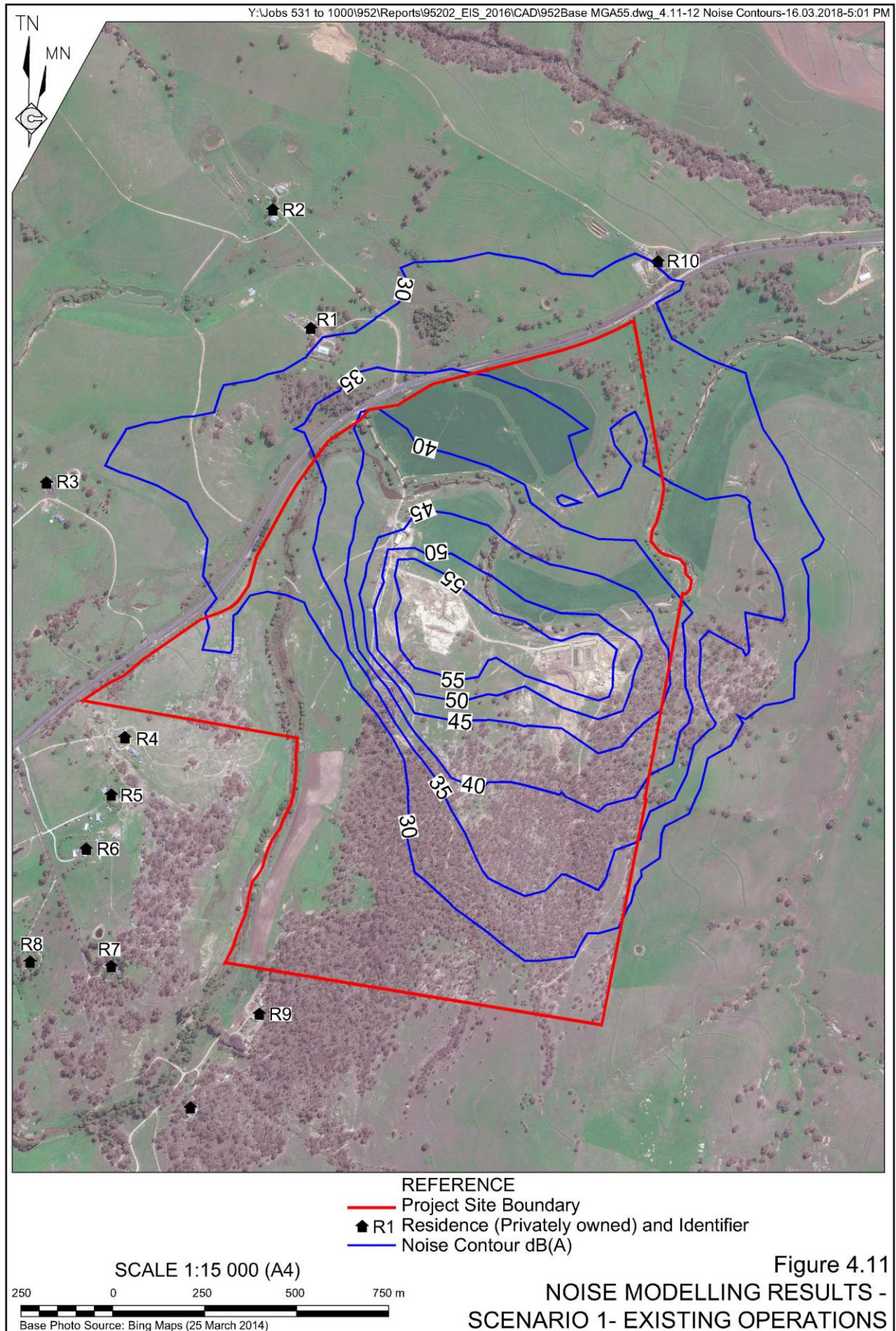
4.5.1 Introduction

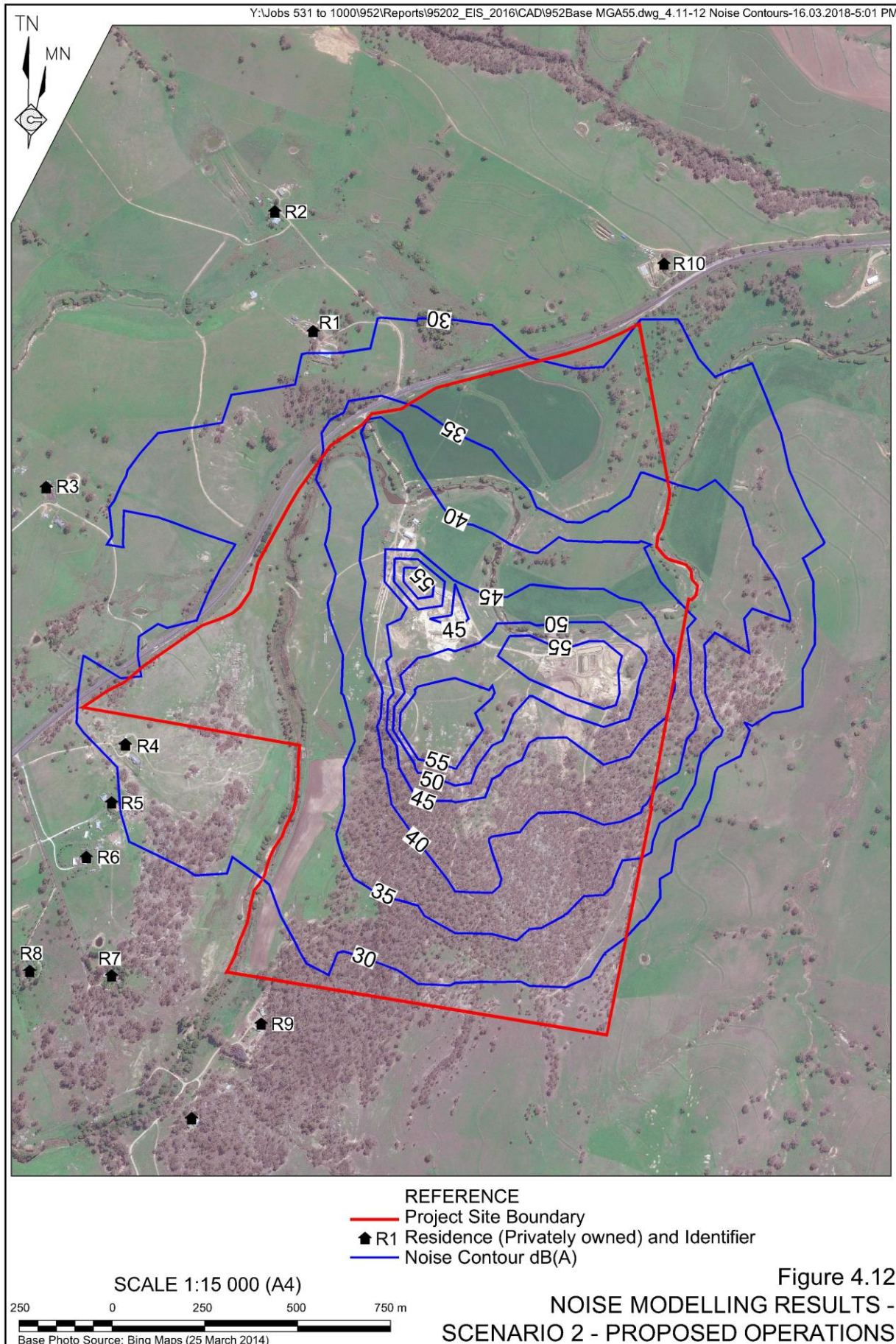
The SEARs identify “*traffic and transport*” as a key issue for assessment in the EIS. Matters to be addressed include the following.

- “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;
- 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;
- 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;
- evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and
- a description of access roads, specifically in relation to nearby Crown roads and fire trails.”

The SEARs are included in full as **Appendix 2**.

A Traffic Impact Assessment has been completed by Barnson Pty Ltd (Barnson) as part of the EIS. The resulting report, referenced hereafter as Barnson (2018) is reproduced in full as **Appendix 5**. This subsection provides a summary of that assessment.





4.5.2 Existing Traffic Environment

4.5.2.1 Road Network

Figure 2.4 presents the road network surrounding the Project Site. In summary, all Proposal-related traffic would travel via the Mid Western Highway. The Mid Western Highway is a two-lane, sealed State Road with lane widths between 3.3m and 3.5m wide and a verge that varies between 1.6m and 2.6m wide. The posted speed limit in the vicinity of the Project Site is 100km/h, with sections of the highway having a posted speed limit of 80km/h.

In relation to the intersection of the Site Access Road and the Mid Western Highway, Barnson (2018) note that the entrance is unsealed and approximately 40m wide, narrowing to a 5m wide entrance approximately 15m from the edge of the road reserve and approximately 33m from the edge of the formation. Barnson (2018) state that the intersection would appear to comply with the design requirements for a Basic Auxiliary Left/Basic Auxiliary Right (BAL/BAR) intersection, however, this will need to be confirmed following the granting of development consent through an on-site survey.

The sight distance from the Project Site intersection to the east is approximately 180m and approximately 171m to the west. The sight distance therefore exceeds the requirement for Approach Sight Distance (ASD) in accordance with Table 3.1 of *Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections*.

4.5.2.2 Existing Traffic Counts

Traffic counts were conducted in 2006 by Roads and Maritime Service on Mid Western Highway 2.68km to the east of the Bathampton Road, approximately 7km west of the Project Site entrance. That survey indicated an Average Annual Daily Traffic (AADT) level of 1941, of which 12% comprise heavy vehicles. Assuming a 1.5%pa growth rate, the estimated 2018 traffic level on the Mid Western Highway is 2320 vehicles per day. At the end of the life of the Proposal, Barnson (2018) anticipate that the estimated traffic level would be 3 034 vehicles per day.

4.5.2.3 Level of Service

Barnson (2018) state that the existing level of service on the Mid Western Highway is Level B or “satisfactory.”

4.5.2.4 Crash History

Barnson (2018) state that there were eight crashes in the vicinity of the site entrance. Three are identified as being “serious injury” incidents, one as “moderate injury”, one as “Minor/other injury” and three as “non-casualty” incidents. One incident in 2012, in close proximity to the site entrance, is described as “Off carriageway, right on left bend into object/parked vehicle” during the daytime. No one was injured, and the vehicle was towed away.

The Applicant states all the identified incidents were unrelated to the previous operation of the Quarry and that no Quarry-related traffic incidents have occurred since it assumed control of the Project Site in 2003.

4.5.3 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures to minimise the potential for unacceptable traffic-related impacts.

- Implement a suitable Code of Conduct identifying required driver behaviour and enforcement mechanisms for drivers of heavy vehicles, including subcontractors, regularly accessing the Project Site.
- Undertake a survey of the intersection of the Site Access Road and the Mid Western Highway to confirm that the intersection complies with the requirements of a BAL/BAR intersection within 3 months of the receipt of Development Consent.
- Undertake required works to upgrade the intersection of the Site Access Road and the Mid Western Highway in consultation with Roads and Maritime Service should the above survey indicate that the intersection does not comply with the design requirements for a BAL/BAR intersection
- Ensure that all loads are covered prior to leaving the Extraction or Processing and Stockpile Areas to prevent loose materials falling onto the roadway or the creation of excessive dust.
- Ensure that all laden heavy vehicles are operating within their approved mass limits and that no overloaded vehicles are permitted to leave the Project Site.
- Ensure that the site entrance gate is locked at all times when the Project Site is not occupied to prevent unauthorised access and ensure public safety.

4.5.4 Assessment of Impacts

Barnson (2018) conclude the following.

- The level of service for the Mid Western Highway will remain unchanged as a result of the Proposal.
- Based on *Austroads Guide to Road Design: Part 4A unsignalised and signalised intersections*, the intersection of the Site Access Road and the Mid Western Highway is required to comply with the design criteria for a BAL/BAR intersection. Barnson (2018) state that the existing intersection would appear to comply with this standard, however, this will need to be confirmed following the granting of development consent through an on-site survey.

As a result, the Proposal would not result in unacceptable traffic-related impacts.

4.6 VISUAL AMENITY

4.6.1 Introduction

The SEARs identify “*visual amenity*” as a key issue for assessment in the EIS. Matters to be addressed include:

“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.”

The following subsections have been prepared by RWC and provide an overview of the visual environment surrounding the Project Site and the visibility of the proposed activities throughout the life of the Proposal. It is, however, noted at the outset that visual amenity and the effects of changes to visual amenity are highly subjective and changes that may be acceptable to one person may not be acceptable to another.

4.6.2 Existing Visual Environment

The Project Site is located in a rural environment, with local views dominated agricultural operations and native vegetation (**Figures 4.3** and **4.6**). The Mid Western Highway and associated vehicles travelling on the highway, is a dominant feature from many vantage points.

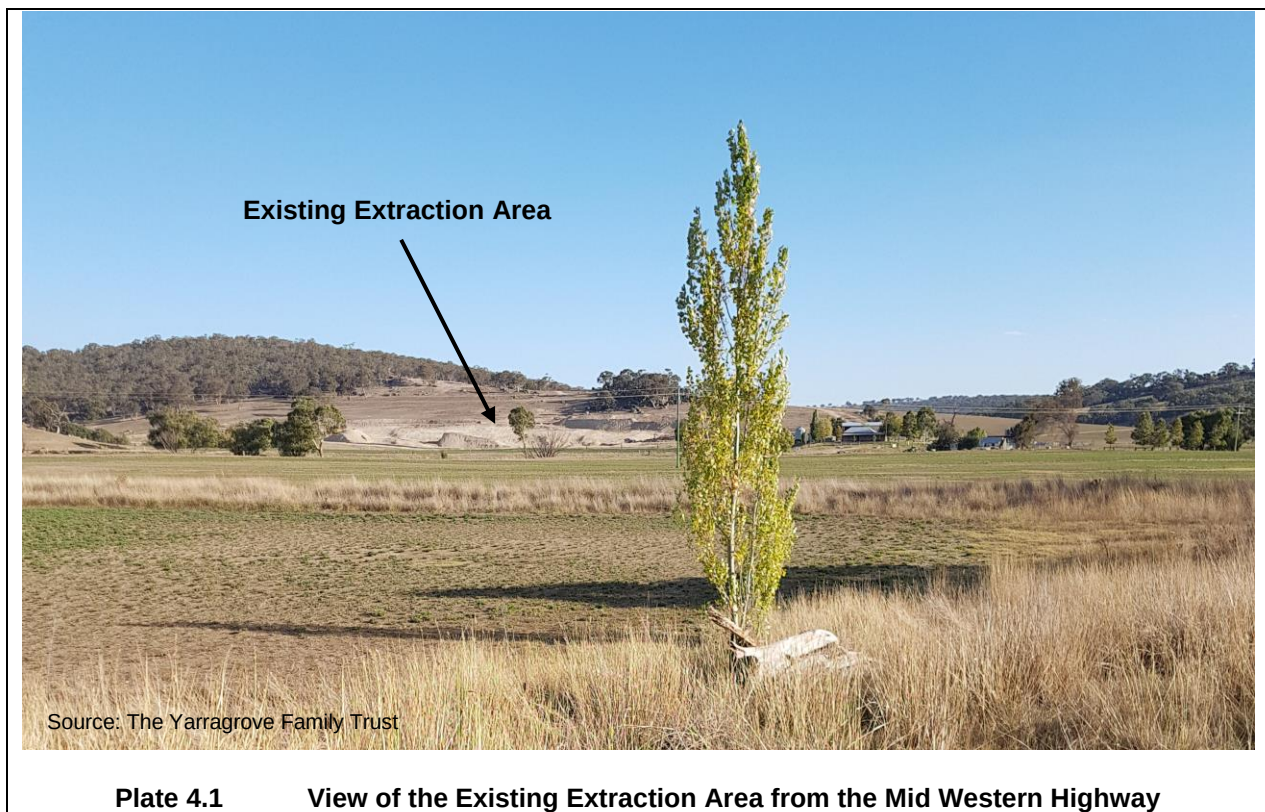
Existing disturbed sections of the Project Site occur on the northeastern flank of a northwest / southeast orientated ridgeline, with all disturbance below an elevation of approximately 693m AHD. The proposed Extraction Area would extend to a maximum elevation of approximately 717m AHD. The location of the Extraction Area and Processing and Stockpile Area means that they are not visible from residences and publicly available vantage points to the west, southwest and south of the Project Site. Similarly, a ridgeline located to the east of the Project Site means that these areas are not visible to the east of the Project Site.

As a result, views of the Extraction Area and Processing and Stockpile Area are only available from Residences R1 and R10 and motorists travelling to the southwest towards Blayney on the Mid Western Highway. **Plate 4.1** displays a representative view of the Extraction Area from the Mid Western Highway. In summary, views are available of the Extraction and Processing and Stockpiling Areas from distances of more than 750m, with views typically obscured by vegetation and intervening topography.

4.6.3 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for visual amenity-related impacts.

- Establish a tree screen on the northern boundary of the Project Site, adjacent to the Mid Western Highway, within 12 months of the granting of development consent.
- Ensure that the soil stockpiles are progressively rehabilitated to establish a cover of vegetation as soon as practicable.



- Ensure that terminal quarry faces are progressively rehabilitated to establish a cover of vegetation as soon as practicable once complete.
- Implement active dust suppression to reduce the potential for the creation of a 'dust cloud' over the Project Site.

4.6.4 Assessment of Impacts

The Applicant notes the following in relation to the visual amenity of the Project Site and surrounding lands.

- Views of the Extraction and Processing and Stockpile Areas are available from a limited number of locations to the north of the Project Site only and only from distances of more than 750m.
- The visibility of the Project Site from Mid Western Highway and from residences to the north of the Project Site is filtered by intervening vegetation.
- The Applicant would establish a tree screen on the northern boundary of the Project Site, adjacent to the Mid Western Highway within 12 months of granting of development consent.

- Disturbed sections of the Project Site would be progressively rehabilitated throughout the life of the Proposal.
- The Applicant, in the 14 years since it purchased the Project Site has not received a visual amenity-related complaint.

In light of the above, the Proposal would be unlikely to have an unacceptable impact on visual amenity from residences or publicly accessible vantage points surrounding the Project Site.

4.7 BIODIVERSITY

4.7.1 Introduction

The SEARs identify “*biodiversity*” as a key issue for assessment in the EIS. Matters to be addressed include:

- “accurate predictions of any vegetation clearing on site;
- 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;
- 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; and
- an assessment of whether a Species Impact Statement is required;”

The following subsections have been prepared by RWC and provide an overview of the biodiversity with the Project Site and the anticipated impacts of the Proposed activities on threatened species and communities.

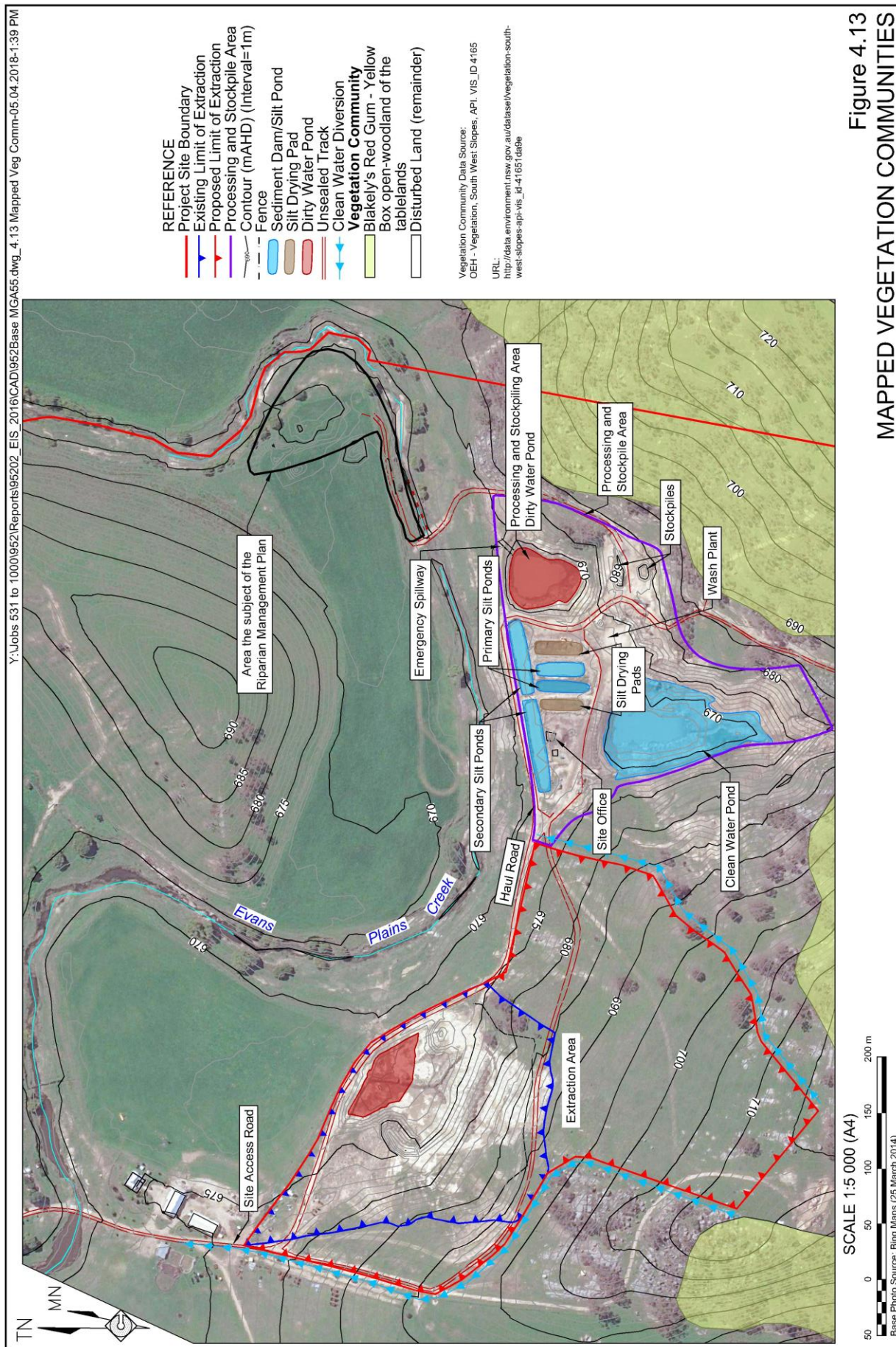
4.7.2 Existing Environment

4.7.2.1 Vegetation Communities

Based on a review of NSW Vegetation In, two vegetation communities exist within the Project Site as follows (**Figure 4.13**).

- Blakely’s Red Gum – Yellow Box open-woodland of the tablelands.
- Disturbed land.

Blakely’s Red Gum – Yellow Box open-woodland of the tablelands is typically an open-woodland with a grassy/herbaceous understorey. Typically, the dominant species include Blakely’s Red Gum, Yellow Box, Apple Box and White Box. This vegetation community is part of the ‘White Box-Yellow Box-Blakely’s Red Gum (Box-Gum) woodland’ Endangered Ecological Community.



Disturbed land within the Project Site includes land that has been the subject of:

- extraction or processing operations;
- cropping, including for lucerne; and
- grazing and pasture improvement, including regular application of superphosphate fertiliser.

Disturbed land within the Project Site is typically dominated by exotic species or bare ground.

4.7.2.2 Listed Species

A search of the following databases for records within a 10km radius of the Project Site was undertaken on 28 March 2018 to determine potentially occurring threatened and migratory species. **Table 4.2** presents the results of that search.

- The NSW Environmental Data Portal (SEED).
- NSW OEH BioNet Vegetation Classification Database.
- NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife.

Table 4.2
Listed Species within 10km of the Project Site

Page 1 of 2

Scientific Name	Common Name	BC Act Status ¹	EPBC Act Status ¹
FAUNA			
Mammals (excluding bats)			
<i>Phascolarctos cinereus</i>	Koala	V	V
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll	V	E
<i>Petauroides volans</i>	Greater Glider		V
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby		V
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox		V
Bats			
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat		V
Birds			
<i>Falco subniger</i>	Black Falcon	V	-
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	
<i>Anthochaera Phrygia</i>	Regent Honeyeater	V	CE
<i>Calidris ferruginea</i>	Curlew Sandpiper		CE
<i>Grantiella picta</i>	Painted Honeyeater		V
<i>Lathamus discolor</i>	Swift Parrot		CE
<i>Leipoa ocellate</i>	Malleefowl		V
<i>Numenius madagascariensis</i>	Eastern Curlew		CE
<i>Polytelis swainsonii</i>	Superb Parrot		V
<i>Rostratula australis</i>	Australian Painted Snipe		E

Table 4.2 (Cont'd)
Listed Species within 10km of the Project Site

Page 2 of 2

Scientific Name	Common Name	BC Act Status ¹	EPBC Act Status ¹
Fish			
<i>Maccullochella macquariensis</i>	Trout Cod		E
<i>Maccullochella peelii</i>	Murray Cod		V
<i>Macquaria australasica</i>	Macquarie Perch		E
Frogs			
<i>Litoria aurea</i>	Green and Golden Bell Frog		V
<i>Litoria booroolongensis</i>	Booroolong Frog		E
<i>Litoria castanea</i>	Yellow-spotted Tree Frog	CE	E
Reptiles			
<i>Aprasia parapulchella</i>	Pink-tailed Worm Lizard		V
<i>Delma impar</i>	Striped Legless Lizard		V
FLORA			
<i>Eucalyptus pulverulenta</i>	Silver-leafed Gum	V	V
<i>Lepidium hyssopifolium</i>	Aromatic Peppergrass	E	E
<i>Dichanthium setosum</i>	Bluegrass		V
<i>Eucalyptus aggregate</i>	Black Gum		V
<i>Euphrasia arguta</i>	-		CE
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray		E
<i>Thesium austral</i>	Austral Toadflax		V
<i>Zieria obcordate</i>	-		E
VEGETATION COMMUNITIES			
Natural Temperate Grassland of the South Eastern Highlands			CE
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland			CE
White Box Yellow Box Blakely's Red Gum Woodland		E	
Note 1: V = Vulnerable; E = Endangered; Critically Endangered			

4.7.3 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable biodiversity-related impacts.

- Identify the limit of approved disturbance areas on the ground through the use of permanent markers.
- Undertake vegetation clearing operations in Summer, Autumn or Winter only.
- 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).

- Salvage tree trunks, major limbs and, if practicable, minor branches for use in rehabilitation of disturbed areas within the Project Site.
- Implement a Weed Management Plan consistent with Bathurst Regional Council's control plan for each noxious weed.
- Ensure that all ground-engaging machinery is cleaned prior to arriving at or departing the Project Site.
- Ensure that surface water management measures identified in Section 4.3.4, including ensuring that sediment laden water is retained within the Dirty Water Ponds up to an including a 1 in 50 year 72-hour rainfall event.

Due to the very small area to be cleared and the relatively minor impact at a landscape scale, it is not considered that a biodiversity offset is required for any protected matters known to occur within the Project Site. The Applicant would implement the following control measures to avoid or mitigate the risk of adverse impacts on threatened species within the Project Site.

4.7.4 Impact Assessment

4.7.4.1 Species and Communities listed under the NSW BC Act

The following presents an assessment of significance of anticipated impacts on the species and vegetation communities presented in **Table 4.2** based on the criteria presented in Section 7.3 of the BC Act.

Mammals

The Koala habitat includes eucalypt woodlands and forests and the species feeds primarily on eucalypts. By contrast, the Spotted-tailed Quoll habitat includes forests, woodlands, coastal heathlands and rainforests constructing dens in rock shelters, small caves, hollow logs and tree hollows. Spotted-tailed Quoll is highly mobile and occupies large territories.

The Proposal would result in the disturbance of approximately 6.4ha of previously disturbed land that provides no habitat suitable for either species. As a result, the Proposal would not have an adverse impact on the life cycle or habitat of either species and would not exacerbate any key threatening process.

Furthermore, a resident population of Koala is not evident within the Project Site and no Koala feed species listed in Schedule 2 of SEPP 44 are known within the Project Site. As a result, the Project Site is neither core nor potential Koala habitat.

Bats and Birds

Each of the identified bats and birds identified is highly mobile and is unlikely to rely solely on resources within the proposed areas of additional disturbance. As a result, the Proposal would not have an adverse impact on the life cycle or habitat of any of the identified species and would not exacerbate any key threatening process.

Frogs

The Proposal would result in retention of all potentially sediment laden water within the Dirty Water Ponds or use of that water on the existing lucerne crops. As a result, sediment laden water would not be permitted to flow to natural drainage, except in the event of a rainfall event that exceeded the 1 in 50 year, 72-hour rain fall event. As a result, the Proposal would not have an adverse impact on the life cycle or habitat of the Yellow-spotted Tree Frog and would not exacerbate any key threatening process.

Flora and Vegetation Communities

The Proposal would only disturb land that has been the subject of previous disturbance, including spreading of superphosphate fertiliser. Based on this, exotic species are likely to comprise the majority of all species to be disturbed. As a result, the Proposal would not have an adverse impact on the life cycle or habitat of the Silver-leafed Gum or Aromatic Peppercreese and would not exacerbate any key threatening process. Similarly, the Proposal would not adversely impact on the extent or composition of the White Box Yellow Box Blakely's Red Gum Woodland.

4.7.4.2 Species and Communities listed under the Commonwealth EPBC Act

Mammals

The habitat requirements of each of the identified species may be summarised as follows.

- Koala – habitat includes eucalypt woodlands and forests and the species feeds primarily on eucalypts.
- Spotted-tailed Quoll – habitat includes forests, woodlands, coastal heathlands and rainforests constructing dens in rock shelters, small caves, hollow logs and tree hollows. Spotted-tailed Quoll is highly mobile and occupies large territories.
- Greater Glider – feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. The species shelters during the day in tree hollows and has a home range of between 1ha to 3ha.
- Brush-tailed Rock-wallaby – occupy rocky escarpments, outcrops and cliffs and feed on vegetation in and adjacent to rocky areas. The species is highly territorial, with an average home range size of about 15ha.
- Grey-headed Flying-fox – occupies subtropical and temperate rainforests, tall sclerophyll forests and woodlands, with roosting camps potentially having tens of thousands of individuals and generally located within 20km of a regular food source.

The Proposal would result in the disturbance of approximately 6.4ha of previously disturbed land that provides no habitat suitable for any of the above species. As a result, the Proposal would not:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;

- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely 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;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

Bats and Birds

Each of the identified bats and birds identified is highly mobile and is unlikely to rely solely on resources within the proposed areas of additional disturbance. As a result, the Proposal would not have an adverse impact on the species as a result of the matters identified above.

Frogs and Fish

The Proposal would result in retention of all potentially sediment laden water within the Dirty Water Ponds or use of that water on the existing lucerne crops. As a result, sediment laden water would not be permitted to flow to natural drainage, except in the event of a rainfall event that exceeded the 1 in 50 year, 72-hour rain fall event. As a result, the Proposal would not have an adverse impact on the species as a result of the matters identified above.

Reptiles

The habitat requirements of each of the identified species may be summarised as follows.

- Pink-tailed Worm Lizard – inhabits sloping well-drained, open woodland areas with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks
- Striped Legless Lizard – Found mainly where grassland is dominated by perennial, tussock-forming native grasses but may also be found in modified grasslands with a significant content of exotic grasses. The species actively hunts for spiders, crickets, moth larvae and cockroaches.

There is no suitable habitat for the Pink-tailed Worm Lizard within the Project Site. As a result, the Proposal would not have an adverse impact on the species as a result of the matters identified above.

The Striped Legless Lizard may occupy the proposed areas of disturbance, however, the proposed disturbance of 6.4ha of sub-optimal habitat in a landscape that includes abundant areas of such habitat would be unlikely to have an adverse impact on the species as a result of the matters identified above.

Flora and Vegetation Communities

The Proposal would only disturb land that has been the subject of previous disturbance, including spreading of superphosphate fertiliser. Based on this, exotic species are likely to comprise the majority of all species to be disturbed. As a result, the Proposal would not have a significant impact on Natural Temperate Grassland or Box Gum Woodland for the following reasons.

- There would be no reduction in the extent, fragmentation or composition of either community.
- There would be no adverse impact on habitat critical to the survival of either community.
- There would be no change to hydrological or hydrogeological conditions.
- The Proposal would not adversely impact on the recovery of either community.

4.8 AIR QUALITY

4.8.1 Introduction

The SEARs identify “*air quality*” as a key issue for assessment in the EIS. The SEARs are included in full as **Appendix 2**.

The following subsections have been prepared by RWC and provide a qualitative assessment of air quality-related impacts associated with the Proposal.

4.8.2 Existing Environment

The area surrounding the Project Site lies within a setting used primarily for agricultural activities and transportation and, within the Project Site, extractive activities.

The primary sources of dust emissions include:

- wind generated dust from exposed areas within the surrounding area;
- dust emissions from the existing extractive operations within the Project Site;
- dust generated from agricultural activities; and
- dust attributable to vehicle movement along unsealed and sealed roads.

No sensitive locations such as schools, churches or major urban development are located near the Project Site. A number of non-project related residences are located near the Project Site (**Figure 4.5**).

4.8.3 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable air quality-related impacts.

- Ensure that construction/soil stripping operations are undertaken only when winds are blowing from the northwest to southwest quadrant only.
- Ensure that soil stockpiles achieve 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.
- Spread seed of a suitable cover crop on all soil stockpiles to facilitate revegetation.
- Ensure that water is applied to internal roads, stockpile areas and other disturbed surfaces during operations and during dry and/or windy conditions to prevent wind erosion.
- Ensure that the exhausts of earthmoving equipment would be diverted away from the ground surface so as not to generate dust.
- Seal the Site Access Road for the first 100m to reduce tracking of mud onto the Mid Western Highway.
- Ensure that all product trucks have their loads covered prior to exiting the Project Site.
- Immediately cease any operations that are resulting in visible dust emissions at the western or southern Project Site boundary.
- Respond promptly to any air quality-related complaints, including modifying on-site operations in the event that dust emissions from those operations are not acceptable.

4.8.4 Impact Assessment

The Applicant notes the following.

- The proposed management and mitigation measures would minimise to the extent practicable the emission of particulate matter.
- The closest non-Project related residence to the Extraction Area is Residence R4, located approximately 750m to the southwest of the proposed Extraction Area. (**Figure 4.3**). A review of the wind roses presented in **Figure 4.4** indicates that the prevailing wind in the vicinity of the Project Site is from the west and southwest, away from Residence R4. The closest residence to the east of the Extraction Area

is Residence R10, located approximately 1.5km to the northeast. At that distance, dust emissions from the Project Site would be unlikely to adversely affect the residence.

- Progressive rehabilitation would reduce the area of the Project Site available for wind erosion.
- The Quarry has operated for an extended period without complaint from the surrounding residents, including in relation to dust emissions.
- Emissions of gaseous pollutants would be negligible.

As a result, the Applicant contends that the Proposal would be unlikely to have unacceptable air quality-related impacts.

4.9 HISTORIC HERITAGE

4.9.1 Introduction

The SEARs identify “*Heritage*” as a key issue for assessment in the EIS. Matters to be addressed include:

“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.”

The SEARs are included in full as **Appendix 2**.

A Heritage Assessment has been completed by Navin Officer Heritage Consultants Pty Ltd (Navin Officer) as part of the EIS. The resulting report, referenced hereafter as Navin Officer (2018) is reproduced as **Appendix 4**.

4.9.2 Existing Environment

Section 6 of Navin Officer (2018) presents a review of the historic (post-1788) exploration, settlement and development of the area surrounding the Project Site. The following presents a brief summary of the key points presented in that document.

- Established in 1815, Bathurst was the first recognised settlement west of the Blue Mountains.
- The land surrounding the Project Site was granted to Lieutenant-governor William Stewart in 1826. The property remaining in the Stewart family until the mid-1900’s.
- One historic site, namely “Binalong (former university building)” is registered under the Bathurst Regional LEP to the north of the Project Site. There are no registered historic heritage sites within the Project Site.

Navin Officer (2018) undertook an historic heritage survey in conjunction with the Aboriginal heritage survey described in Section 4.2.5. That survey did not identify any sites of historic heritage significance.

4.9.3 Impact Assessment

In light of the above, the Proposal would be unlikely to have an unacceptable impact on heritage within the Project Site.

4.10 GROUNDWATER

4.10.1 Introduction

The SEARs identify “Water” as a key issue for assessment within the EIS. Matters related to groundwater to be addressed include:

- “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;
- a detailed consideration of maintenance of an adequate buffer between all excavations at the highest predicted groundwater table;
- 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
- a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts.”

The SEARs are included in full as **Appendix 2**.

The following subsections have been prepared by RWC and provide an overview of the groundwater environment surrounding the Project Site and the anticipated impacts of the Proposed activities on the existing groundwater environment.

4.10.2 Existing Environment

The hydrogeological setting around Bathurst consists of:

- unconfined, shallow, highly permeable aquifers associated with drainage lines, including Evans Plains Creek; and
- fractured rock aquifers hosted by granitic and related rocks of the Bathurst Batholith.

Seven registered bores occur within approximately 1km of the proposed Extraction Area (**Figure 4.6**). **Table 4.3** presents publicly available information on each of the registered bores. In summary, groundwater surrounding the Project Site is typically between 12m and 65m below the surface, well below the proposed maximum depth of extraction of approximately 4m below the surface.

Table 4.3
Registered Bores within 1km of the Extraction Area

Bore Reference	Final Depth (m)	Water bearing Zone (m)	SWL (m)	Geological Description (with increasing depth)
GW803059	42.00	12.50 – 13.00 26.00 – 26.90 45.00 – 46.00	10.00 10.00 10.00	Topsoil, Weathered Granite, Granite
GW033254	45.90	42.10 – 43.30	10.70	Sand, Sandstone, Granite
GW800236	83.00	39.00 – 39.50	22.00	Topsoil, Decomposed Granite, Granite
GW802152	72.00	65.00 – 65.50	36.00	Topsoil, Clay, Granite
GW801261	27.00	22.00 – 27.00	6.00	Gravel, Granite
GW802828	54.00	48.00 – 48.90	36.00	Topsoil, Granite
GW801764	40.00	28.00 – 30.00	20.00	Topsoil, Clay, Decomposed Granite with Clay Bands, Decomposed Granite, Granite
Source: NSW DPI Water Groundwater Map, accessed on 26 September 2017				

Finally, the Bureau of Meteorology-hosted Groundwater Dependent Ecosystems Atlas identifies the land adjacent to Evans Plains Creek as having the potential to host “Aquatic Groundwater Dependent Ecosystems”.

4.10.3 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable groundwater-related impacts.

- Ensure that all hydrocarbons and any other chemicals stored on site are stored within an bunded and covered storage area.
- Ensure that any hydrocarbon or chemical spills are cleaned up immediately and that all contaminated material is removed from the Project Site to a suitably licenced facility.

4.10.4 Assessment of Impacts

In light of the above, the Applicant notes the following.

- No groundwater would be extracted or intercepted and therefore no aquifer interference or other groundwater approval of licence is required.
- Groundwater quality would not be affected.
- There are no Groundwater Dependant Ecosystems within or in the vicinity of the Project Site and any that may be present would not be impacted by the Proposal.

4.11 LAND RESOURCES

4.11.1 Introduction

The SEARs identify “*Land Resources*” as a key issue for assessment in the EIS, requiring an assessment of potential impacts on soils, land capability and landforms including the proposed mitigation measures, as well as an assessment of the compatibility of the development with other land uses.

The SEARs are included in full as **Appendix 2**.

4.11.2 Existing Environment

Based on information provided in the eSPADE database, the Project Site includes the following soil landscapes

- Evans Plains Soil Landscape – primarily on the flats and flood plains adjacent to Evans Plains Creek. Topsoils is described as being dark brown loamy massive sand to yellowish brown sand with a pH between approximately 7.0 to 7.5 and a depth to 40cm.
- Rocks Soil Landscape – primarily on the rolling to steep hills east and west of Bathurst, with siliceous sands and podzols and yellow sodic soils. This soil landscape is noted to be susceptible to moderate sheet erosion.

Based on *The Land and Soil Capability Assessment Scheme – Second approximation* published by Office of Environment and Heritage in 2012, the soils of the Project Site may be classified as follows.

- Flats and floodplains adjacent to Evan Plains Creek.
Class 3 – High capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.

- Slopes and ridgelines.

Class 5 – Moderate-low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation. Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture).

OR

Class 6 – Low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.

4.11.2.1 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable soil and land capability-related impacts.

- Clearly mark areas for stripping and stockpiling.
- Strip soil from all areas of disturbance and store in stockpiles orientated parallel to the contours no more than 3m high.
- Refrain from stripping or placing soil during wet 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 soil 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.
- Rip or scarify all areas to be respread with topsoil to allow the respread material to be keyed into the underlying material.

4.11.2.2 Impact Assessment

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.

4.12 HAZARDS

4.12.1 Introduction

The SEARs identify “*hazards*” as a key issue for assessment in the EIS and require assessment of the risks to public safety, bushfire risks and the transport and handling of hazardous or dangerous goods. The specific hazard-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 an assessment relate primarily to:

- the handling, storage and disposal of hydrocarbons; and
- potential for bushfire.

The hazards assessment was completed by RWC.

4.12.2 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the life of the Proposal to minimise the potential for unacceptable public safety-related impacts.

- Store hydrocarbons and hazardous materials in bunded, impervious areas undercover in accordance with the relevant Australian Standard, including *AS1940 – The Storage and Handling of Flammable and Combustible Liquids*.
- Remove waste oils from the Project Site the day that they are generated.
- Ensure that fuel loads in undisturbed sections of the Project Site are managed to minimise the potential for bushfire.
- Undertake all hot works within the Extraction Area and cease such activities on days when the fire danger rating is “Very High” or above.
- Ensure that the Project Site remains fenced and that the site entrance is locked when the Project Site is not occupied.

4.12.3 Assessment of Impact

The Proposal would not increase the number or type of ignition sources in the local area. Furthermore, the proposed controls and safeguards, in conjunction with general clearing activities associated with the Proposal would ensure that the Proposal would be unlikely to have unacceptable public safety-related impacts

4.13 SOCIAL AND ECONOMIC

4.13.1 Introduction

The SEARs identify “social and economic” impacts as a key issue for assessment in the EIS and request assessment of the social and economic impacts of the Proposal. Given the limited scale of the Proposal, the fact that the extractive industry is an established feature of the local setting and very minor reliance of the proposed operations on local services and infrastructure, the potential for impact on the local socio-economic climate is limited.

The social and economic assessment has been prepared by RWC. The following sections review those impacts and present management and mitigation measures that would be implemented to reduce the impact of the Proposal on local amenity, consider the costs and benefits of the Proposal and provide an assessment of overall impact.

4.13.2 Community Profile

4.13.2.1 Surrounding Communities

The Project Site is located within the Bathurst LGA in the Central West of NSW. Communities surrounding the Project Site include the following.

- Immediate neighbours and residents surrounding the Project Site.
- Residents of the city of Bathurst.
- Residents of surrounding rural properties and other areas within the Bathurst LGA.

Each of these communities would be impacted to a greater or lesser degree depending on their proximity to the Project Site 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, namely the State Suburb of Evans Plains and the Bathurst LGA.

The Bathurst Regional LGA is located within Central West NSW and is surrounded by the Lithgow and Oberon LGAs to the east, the Upper Lachlan and Boorowa LGAs to the south, the Cowra, Blayney and Cabonne LGAs to the west and the Mid-Western Regional LGA to the north. Bathurst is the largest city within Bathurst Regional LGA.

4.13.2.2 Community Statistics

The following demographic data was sourced primarily from the Australian Bureau of Statistics (ABS) 2016 census data, with limited supporting data from the 2011 census (where available). 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 “Evans Plains State Suburb” (Evans Plains SS) and the Bathurst Regional LGA as well as utilising NSW data for comparison purposes. The boundaries of the Evans Plains State Suburb were changed between the 2011 census and the 2016 census, substantially reducing the total area, which negates the value of comparison between the 2011 and 2016 Census results for that area. Therefore, only the 2016 census data is presented for the Evans Plains State Suburb.

Population and Age Characteristics

Table 4.4 presents the population data from both the 2011 and 2016 census. In summary, the population of the Evans Plains SS and Bathurst LGA in 2016 were 164 and 41 300 respectively. Population growth within the Bathurst Regional LGA between 2011 and 2016 was slightly lower than that of NSW as a whole, with a population gain of 7.2%, in comparison with an 8.1% population gain for NSW as a whole.

Table 4.4
2011 and 2016 Census Population Statistics

	Evans Plains SS			Bathurst Regional LGA			NSW		
	2011	2016	%	2011	2016	%	2011	2016	%
Total	-	164	-29.3	38 519	41 300	7.2	6 917 658	7 480 228	8.1
Males	-	92	-27.6	19 327	20 695	7.1	3 408 878	3 686 014	8.1
Females	-	69	-34.3	19 192	20 605	7.4	3 508 780	3 794 217	8.1
Source: ABS 2016 and 2011 Census									

Table 4.5 presents the 2016 Census population data broken down by age. In summary, the Bathurst Regional LGA age statistics were generally comparable to the whole of NSW. In contrast, the Evans Plains SS had a substantially lower proportion of people aged between 25 and 34, and a slightly higher proportion of people aged between 34 and 84.

Table 4.5
2016 Census Age Statistics

	Evans Plains SS		Bathurst Regional LGA		NSW	
	No.	%	No.	%	No.	%
Children						
0-4	8	4.9	2 546	6.2	465 135	6.2
5-14	26	15.9	5 571	13.5	921 195	12.3
Studying or Working						
15-19	6	3.7	2 980	7.2	448 425	6.0
20-24	12	7.3	3 148	7.6	489 673	6.5
25-34	9	5.5	5 171	12.5	1 067 524	14.3
35-44	25	15.2	4 878	11.8	1 002 886	13.4
45-54	27	16.5	5 238	12.7	977 984	13.1
Approaching Retirement or Retired						
55-64	21	12.8	4 991	12.1	889 763	11.9
65-74	18	11.0	3 862	9.4	677 020	9.1
75-84	11	6.7	2 019	4.9	373 115	5.0
85+	3	1.8	892	2.2	167 506	2.2
Total	164		41 300		7 480 228	
Source: ABS 2016 Census						

Employment

Table 4.6 presents employment statistics from the 2016 Census. These indicate that a greater proportion of people were involved in full-time employment in the Evans Plains SS than in the Bathurst Regional LGA and NSW. However, the percentage of people who were unemployed was also higher than the state average in the Evans Plains SS, and lower than the state average in the Bathurst Regional LGA. The total labour force participation rates indicate that the Evans Plains SS had significantly higher levels of full-time and part-time employment (70.9%) in comparison to the Bathurst regional LGA (58.3%) and NSW (59.2%).

Industry of Employment

Table 4.7 presents employment by industry statistics from the 2016 Census. The most significant industry of employment in both the Evans Plains SS and the Bathurst Regional LGA was health care and social assistance, with 12.0% and 13.4% respectively, which was comparable to the State average of 12.5%. In the Evans Plains SS, the agriculture, forestry & fishing industry was the second highest employer at 10.8%, much higher than in the Bathurst Regional LGA (3.8%) and NSW (2.1%). In the Bathurst Regional LGA, education and training was the second most significant industry of employment (12.0%), employing a much greater proportion of people than in Evans Plains SS (3.6%), and sitting above the state average of 8.4%.

Table 4.6
2016 Census Employment Statistics

	Evans Plains SS	Bathurst Regional LGA	NSW
	2016	2016	2016
Employed			
Full-time	57 (44.9%)	11 165 (33.6%)	2 134 521 (35.0%)
Part-time	27 (21.3%)	5 923 (17.9%)	1 071 151 (17.6%)
Employed, away from work	4 (3.1%)	730 (2.2%)	107 652 (1.8%)
Employed, hours not stated	0 (0.0%)	354 (1.1%)	67 003 (1.1%)
Total	83 (65.4%)	18 165 (54.7%)	3 380 332 (55.5)
Unemployed, Looking for			
Full-time work	4 (3.1%)	413 (1.2%)	123 987 (2.0%)
Part-time work	0 (0.0%)	237 (0.7%)	101 567 (1.7%)
Total	5 (3.9%)	645 (1.9%)	225 546 (3.7%)
Labour Force Participation			
Total labour force	90	19 332	3 605 881
Not in labour force	29	11 424	2 088 240
Labour force status not stated	7	2 433	399 773
Total Persons	127	33 181	6 093 895
Labour force participation	70.9%	58.3%	59.2%
Source: ABS 2016 Census			

Income

Table 4.8 presents income statistics from the 2016 Census. The data indicates that the median individual, family and household incomes in the Evans Plains SS were significantly higher than the Bathurst Regional LGA and NSW as a whole, while income levels in the Bathurst Regional LGA were slightly lower than the state average.

Table 4.7
2016 Census Industry of Employment Statistics

	Evans Plains SS		Bathurst Regional LGA		NSW	
	2016	% of Labour Force	2016	% of Labour Force	2016	% of Labour Force
Agriculture, forestry & fishing	9	10.8	698	3.8	72 625	2.1
Mining	3	3.6	258	1.4	31 736	0.9
Manufacturing	7	8.4	1 499	8.3	197 331	5.8
Electricity, gas, water & waste services	6	7.2	228	1.3	31 881	0.9
Construction	8	9.6	1 511	8.3	282 491	8.4
Wholesale trade	0	0.0	305	1.7	103 722	3.1
Retail trade	3	3.6	1 914	10.5	326 396	9.7
Accommodation & food services	3	3.6	1 311	7.2	239 222	7.1
Transport, postal & warehousing	0	0.0	632	3.5	158 760	4.7
Information media & telecommunications	3	3.6	273	1.5	73 398	2.2
Financial & insurance services	0	0.0	253	1.4	167 259	4.9
Rental, hiring & real estate services	3	3.6	235	1.3	59 652	1.8
Professional, scientific & technical services	3	3.6	727	4.0	274 078	8.1
Administrative & support services	3	3.6	546	3.0	117 482	3.5
Public administration & safety	4	4.8	1 587	8.7	204 173	6.0
Education & training	3	3.6	2 180	12.0	282 568	8.4
Health care & social assistance	10	12.0	2 442	13.4	422 195	12.5
Arts & recreation services	0	0.0	241	1.3	51 775	1.5
Other services	5	6.0	677	3.7	124 477	3.7
Inadequately described/Not stated	0	0.0	649	3.6	159 108	4.7
Total		83		18 165		3 380 332
Source: ABS 2016 Census						

Table 4.8
2016 Census Income Statistics

	Evans Plains SS	Bathurst Regional LGA	NSW
Median individual income (\$/weekly)	\$807	\$646	\$664
Median family income (\$/weekly)	\$2,075	\$1,632	\$1,780
Median household income (\$/weekly)	\$2,019	\$1,310	\$1,486
Source: ABS 2016 Census			

Housing Cost

Table 4.9 presents housing cost statistics from the 2016 Census. The data indicates that median housing loan repayments in the Evans Plains SS were similar to the NSW average, while those in the Bathurst Regional LGA were lower than the NSW average. In contrast, median weekly rents were significantly lower in the Evans Plains SS than in the Bathurst Regional LGA, which in turn were slightly lower than in NSW as a whole.

Table 4.9
2016 Census Cost of Housing and Household Size Statistics

	Evans Plains SS	Bathurst Regional LGA	NSW
Median housing loan repayment (\$/monthly)	\$1,975	\$1,670	\$1,993
Median rent (\$/weekly)	\$204	\$280	\$300
Average number of persons per bedroom	0.8	0.8	0.9
Average household size	2.6	2.5	2.6
Source: ABS 2016 Census			

Education

Table 4.10 presents post-school education statistics from the 2016 Census. The data indicates that a lower proportion of people held bachelor degrees in the Evans Plains SS (13.6%) than in the Bathurst LGA (18.4%), with both areas below the NSW average of 26.3%. By contrast, the percentage of people holding Certificate Level qualifications was substantially higher in both the Evans Plains SS (40.7%) and the Bathurst Regional LGA (38.5%) compared to NSW as a whole (29.7%).

Table 4.10
2016 Census Post School Level of Education

	Evans Plains SS	Bathurst Regional LGA	NSW
Postgraduate Degree Level	8 (9.9%)	951 (4.7%)	344 490 (9.3%)
Graduate Diploma and Graduate Certificate Level	3 (3.7%)	645 (3.2%)	103 340 (2.8%)
Bachelor Degree Level	11 (13.6%)	3 759 (18.4%)	976 888 (26.3%)
Advanced Diploma and Diploma Level	13 (16.0%)	2 672 (13.1%)	543 142 (14.6%)
Certificate Level	33 (40.7%)	7 856 (38.5%)	1 100 959 (29.7%)
Level of education inadequately described	3 (3.7%)	250 (1.2%)	58 379 (1.6%)
Level of education not stated	13 (16.0%)	4 259 (20.9%)	582 903 (15.7%)
Total	81	20 390	3 710 095
Source: ABS 2016 Census			

4.13.3 Adverse and Beneficial Socio-economic 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

- The previously considered impacts on local noise, air quality, traffic and visibility would each have some very minor impact on the neighbouring properties and users of the Mid Western Highway.
- The aesthetic appeal of the local setting may be reduced. It is noted, however, that the Quarry is already existing and that the proposed backfill and rehabilitation would return the disturbed areas to a landform and vegetation similar to the pre-quarry environment.

Beneficial Impacts

- The Proposal would continue to provide employment for the on-site employee(s) and local truck drivers.
- The Proposal would continue to supply sand and fill material to local industry.

4.13.4 Management and Mitigation Measures

To minimise any social and economic impacts on residents the following mitigation measures would be implemented by the Applicant.

- Continue to employ locally, where practicable.
- Continue to utilise local resources, where practicable.
- Implement the nominated design features, management and mitigation measures identified throughout Section 4 with respect to noise, air, traffic and visibility.

4.13.5 Impact Assessment

As a consequence of the Applicant's commitment to employ and utilise local resources where practicable, there would be a slight increase in economic benefit for the Evans Plains area. It is also assessed that as a result of the proposed design features, management and mitigation measures, any impacts on local amenity would not be noticeable to most residents of the local area or users of the Mid Western Highway. On balance, it is assessed that the Proposal would not noticeably change the overall amenity of the local setting.

4.14 CUMULATIVE IMPACTS

Other industries located within the locality of Evans Plains include the Dreamland Quarry, located approximately 3km northeast of the Project Site. The Applicant notes that the Swan Ponds and Dreamland Quarry operations have co-existed for several years without causing unacceptable accumulation of noise, air quality or traffic impacts. As the Proposal does not involve and significant increase in the intensity of activities currently undertaken with the Project Site, it is not expected that there will be any significant cumulative impacts associated with the Proposal.

Section 5

Evaluation and Justification of the Proposal

PREAMBLE

This section concludes the document with an evaluation and justification of the Proposal in the context of the principles of Ecologically Sustainable Development (ESD) as well as in terms of the biophysical socio-economic, planning and statutory considerations.

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5.1 ECOLOGICAL 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 37 years. Throughout this time, RWC has gained a detailed understanding of the physical and social environment associated with extractive and 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.

- Muller Acoustic Consulting Pty Ltd – Noise Assessment.
 - Mr Oliver Muller, B.Sc. (REM& HGeog).
- Navin Officer Heritage Consultants Pty Ltd – Heritage Assessment.
 - Ms Lucy Blackam, B. Archaeological Practice, M. Archaeological Science.
- Barnson Pty Ltd – Traffic and Transport Assessment.
 - Mr Luke Morris, B.E. MIEAust CPEng (NPER).

After a full evaluation of the potential environmental impacts of the Proposal, there are no activities or features for which there is a level of uncertainty in achieving an acceptable level of environmental performance. In reaching this conclusion, the Applicant notes that the nature and scale of the proposed operations are consistent with those that have historically been undertaken



within the Project Site. As those activities have not resulted in unacceptable environmental outcomes, the Applicant contends that the proposed operations would similarly be unlikely to result in unacceptable environmental outcomes.

There are no features of the local environment that would be irreversibly damaged. Features of the local environment such as water quality, soil resources, noise and air quality would be managed throughout the life of the Proposal such that they will be comparable before and after the proposed operations.

5.1.3 Social Equity

The objective of this ESD 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). This principle is based on social equity for the current generation (intra-generational) and future generations (inter-generational).

Intra-generational equity requires that the economic and social benefits of the development be distributed appropriately among all members of the community. The Proposal, and particularly the safeguards proposed with respect to soil and water, noise, air emissions, transportation and visibility, have been designed to ensure that no part of the community would be unacceptably disadvantaged. In addition, the benefits of the continued operation of the Quarry would be felt by the wider community through:

- provision of local employment and flow-on benefits to local goods and service providers; and
- supply of a high quality, competitively priced sand and select fill product necessary for the construction and other industries.

The non-material well-being or "quality of life" of existing and future residents in the vicinity of the Project Site would be maintained throughout and beyond the life of the Proposal through:

- implementation of safeguard measures and operational controls to mitigate any environmental impacts; and
- the planned progressive rehabilitation of the Project Site.

Ongoing communication with those landowners and residents surrounding the Project Site would be important in ensuring that issues associated with local amenity are appropriately managed.

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.

The Proposal would result in disturbance of previously disturbed land dominated by exotic species. Assuming the implementation of the proposed safeguards to control surface water flow (erosion and sedimentation), dust and noise, there would be negligible impact on ecosystem integrity. Considering the minimal immediate and short-term impacts on local biodiversity, and the proposed rehabilitation operations, the Proposal meets the objectives of this principle by ensuring no net loss of biodiversity values in the short- or long-term.

5.1.5 Improved Valuation and Pricing of Environmental Resources

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 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 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 such a manner that it would:

- provide an ongoing source of material for the construction and other industries within the Bathurst Regional Local Government Area and surrounding areas;
- minimise disturbance to the extent practicable by placing all product stockpiles and processing activities within areas of existing disturbance;
- avoid impacts to native vegetation, habitat or areas with potential significant archaeological potential;
- avoid impacts to the local water resources, both surface water and groundwater; and
- rehabilitate the disturbed areas of the Quarry to create a landform that maximises its future value for agriculture and nature conservation.

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.

Aboriginal Heritage

A heritage assessment was completed by Navin Officer Heritage Consultants Pty Ltd (Navin Officer, 2018) in consultation with and with the assistance of the local Aboriginal community. That assessment identified two sites of Aboriginal heritage significance as follows (see **Figure 4.7**).

- Site SPQ1.

This site is an open scatter comprising 12 artefacts including flakes, partial flakes and cores of various materials in 8 locations. Navin Officer (2018) states that there is potential for artefacts not identified during the survey to be present, including within the shallow (<20cm) surface materials.

Navin Officer (2018) have assessed the site as having moderate to low (local) scientific significance, with the social, cultural, historical and aesthetic values a matter for the Aboriginal community to determine. Notwithstanding this, Navin Officer (2018) state that the Aboriginal parties that contributed to the assessment have not indicated that the site has any particular connection to myths and stories, events or persons of importance to the Aboriginal community.

- Site SPQ2.

This site is a potential archaeological deposit (PAD) located adjacent to Evans Plains Creek. Limited ground visibility was available during the survey, however, Navin Officer (2018), in consultation with the Registered Aboriginal Parties, determined that Aboriginal artefacts are likely to be present, including below the surface.

Given the sensitivity of this landform, the Applicant determined that it would remove the proposed “topsoil” extraction activities within this site from this Proposal.

The Proposal will directly impact on Site SPQ1. Navin Officer (2018) recommend that a salvage program be implemented prior to and during surface disturbance operations within this site. Based on implementation of this recommendation, and the fact that an AHIP will be obtained prior to surface disturbance, Proposal-related impacts on matters of Aboriginal heritage are unlikely to be unacceptable.

Surface Water

Evans Plains Creek flows through the Project Site, immediately to the north of the Extraction and Processing and Stockpile Areas. The Applicant holds Water Access Licences that permit extraction of water from Evans Plains Creek for Proposal-related use.

In addition, where required, the Applicant pumps water from the existing Dirty Water Ponds to irrigate its lucerne crop. The Applicant, would ensure that those ponds retain adequate capacity to retain a 1 in 50 year, 72-hour rainfall event. As a result, except in exceptional circumstances, no sediment-laden water is permitted to flow to Evans Plains Creek.

In light of the above, the Applicant contends that there would be no adverse surface water-related impacts associated with the Proposal.

Noise

A noise assessment was completed by Muller Acoustics Consulting (MAC, 2017). In summary, two noise scenarios representing existing and proposed operations were assessed.

That assessment determined that maximum predicted noise level at any surrounding residence would be 32dBA. This compares with the Project-specific noise assessment criterion of 48dBA and the default *Industrial Noise Policy* default criterion of 35dBA.

Similarly, MAC (2017) determined that the proposed changes to traffic levels and types from the Proposal would not increase existing noise levels by more than 2dBA.

Transportation and Traffic

A traffic impact assessment was completed by Barnson Pty Ltd (Barnson, 2018). That Assessment determined that:

- the level of service for the Mid Western Highway will remain unchanged as a result of the Proposal; and
- that a Basic Auxiliary Left/Basic Auxiliary Right intersection was required for the site entrance and that the existing entrance would appear to comply with that requirement.

Biodiversity

Two vegetation communities were identified within the Project Site, namely:

- Blakely's Red Gum – Yellow Box open woodland of the tablelands; and
- disturbed land.

The Proposal would disturb only previously disturbed land. As a result, tests of significance for threatened species and vegetation communities under both the NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* determined that the Proposal would not have a significant adverse impact on biodiversity.

Other Potential Impacts

Finally, the Applicant undertook an assessment of visual amenity, air quality, historic heritage, groundwater, land resources and hazards and determined that there would be no significant impacts associated with the Proposal.

5.2.3 Socio-Economic Considerations

The Proposal would have the following direct benefits.

- The maintenance of employment for one to two on-site personnel as well as truck drivers.
- The maintenance of the supply of a high quality, competitively priced, material for construction and related industries.

The Proposal would also provide indirect benefits to the socio-economic environment, including flow-on benefits to the economy through the expenditure of wages paid to employees and continued competition in a market critical for infrastructure development and renewal.

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.

Taking into account the above, the Proposal would have an overall positive socio-economic impact.

5.2.4 Planning Considerations

This subsection reviews the compliance of the Proposal with relevant State planning instruments and the Bathurst Regional LEP.

State Environmental Planning Policy (State and Regional Development) 2011

The Proposal is classified as “Regional Development” under this SEPP. As a result, the Proposal is to be assessed by Bathurst Regional Council and determined by the Joint Regional Planning Panel.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

This Policy specifies matters requiring consideration in the assessment of any extractive industry development, as defined in NSW legislation. **Table 3.2** presents a summary of each element requiring consideration and a reference to the section in the *Environmental Impact Statement* where each is addressed.

Bathurst Regional Local Environment Plan 2014

Project Site is situated within land zoned RU4 – Primary Production Small Lots under the *Bathurst Regional Local Environment Plan 2014*. The Bathurst Regional LEP and specifically the land zoning identified in that document, has been addressed in Section 3.3.5.1 of this document. It is noted that extractive industries are permissible with consent within this zone.

5.2.5 Section 4.15(1) Considerations

Section 4.15(1) of the EP&A Act sets out the matters for consideration by a consent authority when determining an application for development consent. The following subsections provide an evaluation of the Proposal against the provisions of that section.

5.2.5.1 Environmental Planning Instruments, Plans and Regulations (Section 4.15(1)(a))

Section 3.3 identifies the relevant State, regional, and local planning instruments relevant to the Proposal, and provides a description as to how each is relevant and how each has been addressed within the EIS.

5.2.5.2 Likely Impacts of the Development (Section 4.15(1)(b))

A detailed assessment of the environmental factors potentially impacted by the Proposal is provided throughout Section 4. A summary and evaluation of the predicted residual biophysical and socio-economic impacts of the Proposal, following the implementation of the proposed operational controls and management measures, is provided in Sections 5.1, 5.2.1 and 5.2.3.

5.2.5.3 Suitability of the Site (Section 4.15(1)(c))

The Project Site has been used for the purpose of an extractive industry for many decades, with extractive industry remaining a permissible activity within the RU1 zone of the Bathurst LEP.

Furthermore, Section 4 demonstrates that a continuation of extractive operations within the Project Site could be undertaken without unacceptable adverse impacts on the environment or surrounding land uses.

5.2.5.4 Submissions (Section 4.15(1)(d))

It is anticipated that Council will take any submissions into consideration during the assessment of this application.

5.2.5.5 The Public Interest (Section 4.15(1)(e))

Given that the Proposal would provide for the continuation of extraction operations within the Project Site for public purposes and the subsequent benefit to local employment and services, it is considered that the Proposal is in the public interest.

Furthermore, cessation of the extractive industry within the Project Site would likely require increased production or commencement of operations at an alternative site, which may not be as suitable for an extractive industry.

5.2.6 Consequences of Not Proceeding with the Proposal

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

- The identified resource would become sterilised and the Applicant's customers would be required to find alternate sources of material.
- Local construction projects may face difficulty in sourcing alternative, competitively priced sand material for construction.
- The opportunity to maintain employment for on-site personnel and truck drivers for a further 18 years would be foregone.
- The flow-on benefits through expenditure of wages and goods and services purchases would be foregone.
- The minor impacts on the local biophysical environment would not eventuate.

5.3 CONCLUSION

The Proposal is assessed to be justified as:

- the anticipated adverse impacts on the local environment would be minor and would be offset by the potential environmental and socio-economic benefits;
- it would be undertaken in accordance with the four principles of ESD;
- it would satisfy the matters for consideration under Section 4.15(1) of the EP&A Act; and
- the consequences of not proceeding significantly are heavily outweighed by the benefits of proceeding with the Proposal.

The Proposal has been designed to extract and produce sand and fill material in both an efficient and environmentally responsible manner. Furthermore, the Proposal would not result in any unacceptable adverse impact on the surrounding environment and the socio-economic benefits of the Proposal, through the provision of employment and flow-on economic effects, outweigh any minor impact that would occur. In particular, the Applicant has amended the Proposal, substantially reducing the resource to be extracted, to avoid potential Aboriginal objects adjacent to Evans Plains Creek.

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 6

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Section 7

Glossary of Technical Terms, Acronyms, Symbols and Units

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Glossary of Technical Terms

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

abs – Australian Bureau of Statistics.

acceleration lane – a lane used for increasing speed before merging with the through lanes.

acid – substance with a pH less than 7.0; the lower the pH, the higher the corrosive ability of the substance.

acid sulphate soil – common name given to sediment and soil containing iron sulphides (iron pyrite) which oxidise creating sulfuric acid.

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

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

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.

air pollution – presence of air pollutants.

alluvium – deposit of sand, mud, etc. formed by flowing water.

ambient – relating to conditions outside the active project area.

ambient air quality – the quality of the ambient air near ground level, expressed as concentrations or deposition rates of air pollutants – also expressed as existing air quality.

aquatic – living in or on water, or concerning water.

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

arboreal – tree dwelling.

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).

association – an aggregation of botanically-related types which also have similar structure.

attenuation – reduction in sound pressure levels between two locations.

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).

backfill – material used to fill created void.

basalt – fine-grained, dark volcanic igneous rock.

batter – receding slope from ground upwards.

bedrock – a general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material e.g. sand.

bench – a step in the face of a quarry which could be up to 15 m high.

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.

biophysical – relating to the biological and physical attributes of the environment.

biota – living components of a habitat.



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.

bulk density – for aggregate is the mass in the air of surface-dry particles divided by the saturated by surface-dry volume.

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.

catchment area – the area determined by topographic features within which rainfall will contribute to runoff at a particular point.

chloride – the univalent negative ion of the element chloride (Cl).

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

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.

coarse sand – sand predominantly >0.5mm.

compaction – the process of close packing of individual grains in a soil or sediment as a response to pressure.

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

conductivity – the dissolved salt content of water expressed in terms of $\mu\text{S}/\text{cm}$.

confluence – junction of streams.

conglomerate – coarse grained sedimentary rock (>2mm) consisting of subrounded fragments.

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 – any physical, chemical, biological or radiological substance or matter in water or soil that is not of natural origin.

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.

contour bank – an earth bank constructed across a slope parallel to contours.

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

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

cutter-suction dredge – a floating machine that extracts sand through mechanically cutting and then pumping the sand to a processing plant.

cyclone – a conical shaped vessel designed to separate particles from a moving stream of either air or water.

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

decibel – unit expressing difference in power between acoustic signals.

ENVIRONMENTAL IMPACT STATEMENT

Section 7 – Glossary of Technical Terms,
Acronyms, Symbols and Units

THE YARRAGROVE FAMILY TRUST

Swan Ponds Quarry
Report No. 952/02

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

Development Application – an application for approval of an activity deemed to require an approval prior to commencement.

dewatering – part removal of water from an aquifer system in excess of natural recharge so that the potentiometric surface declines appreciably in the area of extraction.

dip – the angle that rock strata make with a horizontal surface measured at right angles to the strike.

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

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

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.

electrical conductivity (EC) – the ability of a substance (either solid, liquid or gas) to transmit electricity – an indicator of salinity.

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

emission factor – an expression for the rate at which a pollutant is generated as a result of some activity, divided by the level of that activity.

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 document that describes 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 proposal. An EIS is used as a vehicle to facilitate public comment and as the basis for analysing a proposal with respect to granting approval under relevant legislation.

environmental policy – statement by the organisation of its intentions and principles, in relation to the overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets (AS ISO 14050).

ephemeral – lasting only a short time.

ephemeral creek – creek in which flow is intermittent, usually short term following rainfall.

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.

existing air quality – the quality of ambient air near ground level, expressed as concentrations or deposition rates or air pollutants – also expressed as ambient air quality.

exotic – introduced or foreign, not native.

extraction – a term synonymous with quarrying and dredging.

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

fallout – the sedimentation of dust or fine particles in the atmosphere.

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.

final void – cavity created by material extraction.

fines – material such as clay or silt sized particles.

fines return pond – excavation for placement of fine materials washed from the dredged and processed sand.

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

fluvial – pertaining to or produced by a river.

formation (or unit) – a (named) succession of sedimentary beds having some common characteristics.

fractures – any breakage of a rock mass along a direction or directions not associated with cleavage or fissility.

friable – easily crumbled as in poorly cemented rocks.

fresh rock – rock unaffected by natural weathering processes.

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

geochemical – chemical aspects of the composition of the earth's crust.

geomechanical – the materials engineering of rock properties and behaviour when forces or loads are applied to the rock mass.

geotechnical – technical or engineering aspects relating to soil, rock and other materials.

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

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

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 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.

Hawkesbury Sandstone – the prominent cliff-forming sandstone that occurs around Sydney's eastern suburbs and lies beneath the Kurnell Peninsula.

heavy metals – normally trace metals which occur in ore deposits and may be environmentally hazardous.

heritage – the things of value which are inherited.

ENVIRONMENTAL IMPACT STATEMENT

Section 7 – Glossary of Technical Terms,
Acronyms, Symbols and Units

THE YARRAGROVE FAMILY TRUST

Swan Ponds Quarry
Report No. 952/02

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

highly weathered rock – rock affected by considerable weathering to the extent that it is friable.

hydraulic conductivity (k) – the rate of flow of water in an aquifer through a cross section of unit area under a unit hydraulic gradient, at the prevailing temperature. Usually expressed in units of metres per second or metres per day.

hydraulic gradient – the direction of flow of groundwaters.

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

hydrocyclone – a cyclone specifically designed for wet applications.

hydrogeology – the study of groundwater.

hydrology – the study of water, particularly its movement in streams, rivers, or underground.

impact – the effect of human induced action on the environment (modified from Westman, 1985)

in-situ – a term used 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).

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

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

intermittent – flows periodically, irregularly.

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

inversion – weather term for surface defining boundary between two layers of air or different temperatures.

invertebrates – commonly, animals without a backbone (jellyfish, worms, molluscs, etc.).

joints – a fracture (see FRACTURE) in rock between the sides of which there is no observable relative movement.

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

lithic sandstone – sedimentary rock of sand grade in which rock fragments are proportionally more important than feldspar grains.

lithology – refers to the general characteristics of sediments.

loam – loose soil composed of clay and sand, especially a kind containing organic matter and of great fertility.

Local Environmental Plan (LEP) – a plan developed by a council to control development in part or all of its local government area.

macrophyte – vascular plant.

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

matrix – fine grained constituent of some sedimentary rocks containing coarser grains and fragments.

micro-organisms – organism such as bacteria not visible to the naked eye.

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.

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

mottling – multi-coloured effect in soils – grey and yellow-brown is common.

mulch – straw, leaves, loose earth, etc. spread on the ground or produced by tillage to protect the roots of newly planted trees, crops, etc.

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

National Park – an area set aside for the protection of flora and fauna and for public recreation.

non-perennial – refers to streams which do not flow the whole year through – also known as intermittent streams.

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

offsets – to offset an activity means to compensate for the negative impacts of that activity, by taking a separate action with positive impacts.

operational constraints – limitations upon a project by equipment or machinery.

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

oxidation – the process of combining with oxygen.

paleo channel – a former river or stream course now infilled by deposits of sand and gravel.

panaramitee – the name given to a style, tradition or method of applying motifs to a rock surface first identified by Robert Edwards in the 1960s. The motifs, which comprise mainly of circles and animal tracks, but which include human footprints, plan aspects of animals, and linear designs, were pecked into the rock surface using indirect percussion, i.e. Using a pecking-tool and a hammerstone.

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.

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

permeable – able to transmit fluids e.g. groundwater.

Permian – the geological period of time from 280 to 225 million years before present.

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acid, 7 is neutral acid, and 14 is most basic (alkaline).

photomicrograph – photograph taken through a microscope.

piezometer – a hole drilled and fitted specifically for the monitoring of groundwater levels and water quality.

podzolic – soil descriptive term for soils that are strongly acid and highly differentiated.

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.

ENVIRONMENTAL IMPACT STATEMENT

Section 7 – Glossary of Technical Terms,
Acronyms, Symbols and Units

THE YARRAGROVE FAMILY TRUST

Swan Ponds Quarry
Report No. 952/02

porous – containing voids, pores, interstices or other openings which may or may not be interconnected.

porphyritic – a textural term describing rock containing relatively large crystals set in a finer-grained “groundmass”.

potable – water suitable for human consumption.

potentiometric surface – equilibrium standing groundwater level.

powerscreen – a simple mobile item of equipment normally used to separate two sizes of material.

precautionary principle – 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.

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

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

product screen – used in the final size of the product.

product truck – a registered truck used for the delivery of products from the quarry to the customer.

production bore – a small diameter hole from which groundwater is extracted. It usually relates to a cased and screened, adequately developed and efficient bore used for groundwater removal.

progressive rehabilitation – rehabilitation of disturbed areas as soon as practicable after they are no longer required during the life of a project.

Project Site – the total area covered by the project, including extraction areas, processing plant, silt storage, overburden emplacements, stockpiles, bunds, ponds, etc.

pyrite – the most wide-spread sulphide material FeS_2 . Found in many geological settings.

quadrat – a square survey area.

quarry – incorporates one or more extraction areas from which construction materials are extracted together with associated equipment and infrastructure.

quartz – crystalline silica, an important rock-forming mineral SiO_2 .

quartz – the most common form of silica (SiO_2) usually clear or white.

Quaternary – geological period of time from 2 million years before present to present.

Ramsar listed wetlands – wetlands recognised to have considerable ecological value in accordance with the Ramsar convention.

raw feed – material from the active extraction area – of a size suitable for processing.

recent – geological time period representing the last 5 000 years.

recharge – the addition of water to an aquifer, directly from the surface, indirectly from the unsaturated zone, or by discharge from overlying or underlying aquifer systems.

recolonise – the process of animal and plant species re-establishing themselves in a disturbed area.

recovery – the difference between the observed water level during the recovery period following pumping and the maximum drawdown when pumping stops.

Regional Environmental Plan (REP) – a plan by the State Government Department responsible for planning where controls on development are considered on a regional and state-wide basis.

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

rehabilitation – the progressive formation of a landform after quarrying and its stabilisation with grasses, trees and/or shrubs.

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



reserves – refers to an estimated quantity of usable material.

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

respirable dust – dust that is capable of being breathed in.

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.

riparian – pertaining to or situated on the bank of a river or creek.

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 sizes.

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

saline – water with high salt concentration.

salinity – the dissolved content of water expressed in terms of milligrams per litre.

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

sand slurry – sand mixed with water.

sandstone – general term for sedimentary rock with grain size from 0.063mm to 2mm – grains may be minerals or rock fragments.

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

screening – a process which separates crushed rock into various 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 size apertures.

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

sedimentary rocks – rocks formed from material derived from pre-existing rocks or by chemical precipitation.

sedimentation – process or rate of depositing of sediment.

seepage – emergence of subsurface flow at the ground surface.

Shale – fine grained sedimentary rock types such as siltstone or mudstone which part readily along well-defined bedding planes.

silica – silicon dioxide (SiO₂).

siliceous – having a high silica (quartz) content.

silicified – to be converted into silica (SiO₂) or to have silica added.

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

siltstone – general term for sedimentary rock with grain sizes from 0.004mm to 0.063mm – individual grains not discernible with unaided eye.

silt stop fencing – fine mesh fencing normally installed downslope of a sediment source, designed to trap silt and sediment and allow the water to pass through.

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.

solodic – soil descriptive term for soils that are mildly leached.

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.

ENVIRONMENTAL IMPACT STATEMENT

Section 7 – Glossary of Technical Terms,
Acronyms, Symbols and Units

THE YARRAGROVE FAMILY TRUST

Swan Ponds Quarry
Report No. 952/02

specific gravity – the weight of any body or substance considered with regard to the weight of an equal bulk of pure water.

standing water – water that is pooled and still.

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.

stormwater – surface water runoff reaching stream channels immediately after rainfall.

subcatchment – a smaller area within a catchment drained by one or more tributaries of the main waterbody.

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

sulfate – a bivalent negative ion of sulphur and oxygen (SO₄).

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

surge box – part of processing plant that regulates flow from dredge.

suspended solids – solids held in suspension by the turbulent flow of a fluid.

sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development 1990).

temperature inversion – an increase in air temperature with height.

temporal – related to time.

Tertiary – geological time period, 2-60 million years ago, comprising Palaeocene and Pliocene epochs.

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.

total suspended solids – a common measure used to determine suspended solids concentrations in a waterbody and expressed in terms of mass per unit of volume (e.g. milligrams per litre).

tributary – a stream or river that flows into a larger river or lake.

turbidity – discolouration of or suspension of particles in water resulting in a reduction in clarity.

unconsolidated – loose or soft, not compacted (particularly soil or sediment).

understorey – the layer of forest vegetation between the overstorey (or canopy) and the ground layer.

vehicle movement – a one-way trip.

visual amenity – attractiveness to the eye.

volcanics – a general term applied to rock types of volcanic origin (e.g. basalt).

wash plant – a plant designed to wash unwanted sized materials from product.

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

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.

weathered rock – rock affected to any degree by the processes of chemical or physical weathering.

weathering – the group of processes (e.g. action of air, rain, water, etc.) change in character, decay and eventually crumble to soil.

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



THE YARRAGROVE FAMILY TRUST

Swan Ponds Quarry

Report No. 952/02

wet processing area – a plant designed to wash unwanted sized materials from product.

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

wildlife – non-domesticated fauna.

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.

ENVIRONMENTAL IMPACT STATEMENT

Section 7 – Glossary of Technical Terms,

Acronyms, Symbols and Units

wind erosion – wearing away of exposed soil, earth, or rock surfaces by the abrasive action of wind-blown particles (e.g. grains of sand).

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



Glossary of Acronyms

AHD – Australian Height Data (in metres).

ANZECC – Australian and New Zealand
Environment and Conservation Council.

AS – Australian Standard.

AWS – Automated Weather Station.

BAL – Basic Auxiliary Left.

BAR – Basic Auxiliary Right.

DCP – Development Control Plan.

DP – Deposited Plan.

DPE – Department of Planning & Environment.

DUAP – Department of Urban. Affairs and
Planning.

EIS – Environmental Impact Statement

ENM – excavated natural material.

EPA – Environment Protection Authority.

EP&A Regulation – Environmental
Assessment and Planning
Regulation 2000.

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

EPBC Act – Environment Protection and
Biodiversity Conservation Act 1999.

INP – Industrial Noise Policy.

LEP – Local Environmental Plan.

LGA – Local Government Area.

MAC – Muller Acoustic Consulting Pty Ltd.

NHMRC – National Health and Medical
Research Council.

NIA – Noise Impact Assessment.

NP&W Act – National Parks and Wildlife
Act 1974.

POEO Act – Protection of the Environment
Operations Act 1997.

RBL – Rating Background Level.

RMS – Roads and Maritime Services.

RNP – *Road Noise Policy*.

RWC – R.W. Corkery & Co Pty. Limited.

SEARs – Secretary's Environmental
Assessment Requirements

SEPP – State Environmental Planning Policy.

SILO – Scientific Information for Land Owners.

VENM – Virgin Excavated Natural Material.

WAL – Water Access Licence.

WM Act – *Water Management Act 2000*.

Glossary of Symbols and Units

% – percentage.

< – less than.

> – greater than.

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.

kg – kilogram (weight measure).

kL – kilolitre (thousand litre).

km – kilometre (= 1 000 metres).

L – litre.

L/s – litres per second.

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

m – metre.

m AHD – metres Australian Height Datum.

m² – square metre.

m³ – cubic metre.

mg – milligram (weight unit).

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

ML – megalitre.

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

Mtpa – million tonnes per annum.

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acidic, 7 is neutral acid, and 14 is most basic (alkaline).

PM₁₀ – particulate matter <10µm in diameter.

t – tonnes.

TDS – total dissolved solids expressed in mg/L

tpa – tonnes per annum.

µg/m³ – micrograms per cubic metre.

µS/cm – micro seimens per centimetre.