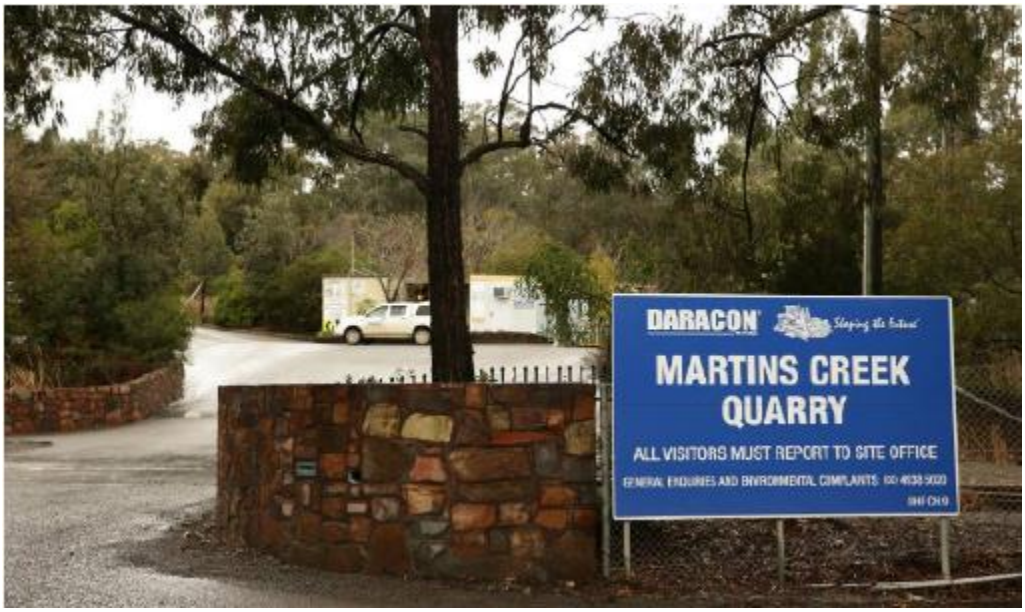
Monteath & Powys Pty Ltd

SURVEYING, PLANNING, ENGINEERING DESIGN, PROJECT MANAGEMENT



ENVIRONMENTAL IMPACT STATEMENT

MARTINS CREEK QUARRY

ENVIRONMENTAL IMPACT STATEMENT

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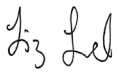
CLIENT:	Buttai Gravel Pty Ltd
OUR REFERENCE:	14/0228
REV / DATE:	September 2016
AUTHOR:	Liz Lamb BSc (Architecture), LLB, M.P.I.A Senior Planner
DECLARATION:	In accordance with clause 6(f) in Part 2 of Schedule 2 to the *Environmental Planning and Assessment Regulation 2000*, I declare that: (i) the statement has been prepared in accordance with Schedule 2 to the *Environmental Planning and Assessment Regulation 2000*, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading.
SIGNATURE:	
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Executive Summary

INTRODUCTION

This Environmental Impact Statement (**EIS**) has been prepared by Monteath and Powys Pty Ltd on behalf of Buttai Gravel Pty Ltd (**Applicant**), to accompany an application to the NSW Department of Planning and Environment. The application seeks consent for the regularisation of existing quarrying operations at Martins Creek and expansion of the quarry onto land that has previously been identified as a resource rich area.

This EIS has been prepared in accordance with the Secretaryôs Environmental Assessment Requirements (**SEARs**) (as amended and reissued on 4 August 2016).

BACKGROUND

Martins Creek Quarry has been leased and run by Buttai Gravel Pty Ltd since 2012. Prior to this, the quarry was owned and operated since its establishment in 1914 by the State Rail Authority.

During the history of the quarryôs operations, a number of consents and licence conditions have been issued, many of which contain overlapping, outdated and, in some instances, inconsistent requirements (see the Summary of existing operations and approval attached at **Appendix B**).

One of the objectives of this application is to provide a consolidated and consistent planning approval for the continued operation (and expansion) of the quarry. Should development consent be granted, it is anticipated that conditions of consent will require the surrender of the existing approvals within 12 months.

Current operations include the extraction of on average 906,000 tonnes of hard rock material per annum, with this application seeking approval for the extraction of up to 1.5 million tonnes per annum. This EIS assesses the impacts of the combined current and proposed quarry operations.

At the time of writing there is a matter before the Court relating to the current operations within the site. It should be noted that this EIS is confined to considering the impacts of the proposal as described in this application and approval is sought for the operations and extraction rates that are proposed in this EIS.

THE SUBJECT SITE

The subject site is located on Station Street, Martins Creek, and can be legally identified as:

- Lots 5 & 6 DP242210;
- Lot 1 DP204377;
- Lot 1 DP1006375;
- Lot 42 DP815628;

- Lot 21 DP773220; and

The subject site has an approximate area of 124ha, and is bound by the North Coast rail line and Martins Creek township.

Figure 1 below shows the boundary of the site and the proposed development footprint.

Figure 1 Proposed development footprint within the subject site.

THE PROPOSED DEVELOPMENT

The Applicant is seeking development approval to regularise the existing operations at the Martins Creek Quarry and to expand the quarry operations.

The proposal seeks approval for:

- Extracting up to 1.5 million tonnes of hard rock material per annum;
- Expanding into new extraction areas and clearing approx. 36.8ha existing vegetation;
- Increasing the hours of operation for:-
  - quarrying from 6am-6pm (Monday to Saturday),
  - processing from 6am-10pm (Monday to Saturday),
  - mixing and binding from 4:30am-10pm (Monday to Friday) and 4:30am-6pm (Saturdays),
  - stockpiling, loading and dispatch of road transport to 5:30am-7pm (Monday to Saturday), and

  - train loading 24 hours per day, 7 days per week;
- Consolidating existing operations and approvals;
- Construction of a new access driveway and bridge; and
- Rehabilitating the site.

The project is to continue extraction of hard rock from the site by completing the extraction of the existing operational areas, expanding the operational area, and increasing the depth of extraction.

The project seeks to continue existing operations to complete the extraction of material in existing areas, in conjunction with expansion into the proposed new areas to maximise the utilisation of the resource.

Mining methods are expected to remain the same as currently used with rock being broken by Drill and Blast techniques in the pit with Run of Mine (**ROM**) material being trucked to the crushing plant for further processing before being stockpiled and loaded on to road trucks or trains for delivery to market. The equipment and machinery used for operations will be as described in this EIS and the attached reports, however it is expected that equipment and machinery will be updated and upgraded over time.

It is noted that in emergencies the proponent may seek an exemption from the NSW Environment Protection Authority (**EPA**) under the provisions of the *Protection of the Environment Operations Act 1997* in order to assist clean up activities and emergency service organisations. Previously the EPA has granted exemptions for the quarry and associated trucks and trains to operate 24 hours a day in order to assist State authorities and during flooding events in the Hunter region. Should development consent be granted, any conditions of consent should not prevent emergency operations authorised by the EPA.

The Applicant is aware that there are a number of circumstances where the current quarry operations and the associated transport operations impact on the surrounding community. The project, including the proposed extension to the quarry, has been designed to address as many of these as is reasonably possible by including the following:

- Construction of a new access driveway to Dungog Road for product shipment;
- Discontinuation of product shipment via Station Street and Grace Avenue;
- Discontinuation of use and rehabilitation of the southern section of the existing operational area which is presently used for maintenance and product processing and stock pile;
- Onsite parking for trucks to reduce traffic impacts;
- Location of maintenance facilities behind a noise barrier;
- Construction of noise barriers along internal haul roads and around the existing quarry production floor; and
- Applying engineering noise treatments to existing quarry plant.

PURPOSE OF THE EIS

The objectives of this EIS are to:

- Provide the consent authority with sufficient information to make an informed decision with regard to the benefits of the proposal and an assessment of the potential key environmental and social impacts;
- Provide the community with information about the proposal; and
- Propose measures to enhance the positive environmental, economic and social impacts associated with the proposal, and to mitigate and manage any likely negative impacts of the proposal.

NEED FOR THE PROPOSAL

Martins Creek Quarry services the needs of the local construction industry and larger Federal and State government infrastructure projects in the Hunter, Central Coast, and Sydney regions and by processing and delivering specialised quarry products. These include course and fine aggregate, pre-coat aggregate, manufactured and modified road bases and washed coarse manufactured sand. As these resources are limited in the Hunter region, the products supplied from Martins Creek Quarry are of significant importance for both the Hunter and New South Wales economies.

Martins Creek Quarry offers the market a major independent supplier of these quality products with capacity to service significant projects demanding high volume secure supply. The quarry services the markets of Newcastle, Maitland, Cessnock, Singleton, Port Stephens, Muswellbrook, Lower Hunter, Central coast, Lower North Coast and Sydney Metropolitan regions.

The quarry has historically supplied many significant infrastructure projects in the region. Projects that would otherwise have been subject to limited market supply through quarries owned by major vertically integrated companies which would have significantly increased price pressures within the market potentially adding significantly to the infrastructure project costs.

The application is also necessary to establish a consistent and coherent approval framework for the site. The application proposes the consolidation of all existing approvals and operations on the site under a single consent. This will ensure monitoring and environmental management conditions are consistent across the site and consistent with the corresponding environment protection licence. It also provides an opportunity to ensure existing environmental monitoring and management requirements are updated to reflect modern practices.

OPTION ANALYSIS

Option 1: Take no action

This option would continue the current operations under the existing approvals.

The development approvals obtained by State Rail do not provide a coherent set of conditions under which to operate the quarry and this option does also not provide for the extraction of the entire resource available within the lease areas.

It is therefore considered that this option is not viable.

Option 2: Regularisation of existing operations

This option would involve applying for approval of the existing operations at Martins Creek Quarry which would ensure a single planning approval applies across the site. It would also facilitate the implementation of a modern monitoring regime, clarifying operations and the mitigation of impacts on the local community and environment.

This option would not provide for the extraction of the entire resource available within the lease areas and would therefore not deliver the additional social and economic benefits associated with the extending the quarrying area.

It is therefore considered that this option does not represent the most orderly or efficient use of the land.

Option 3: Regularisation of existing operations and expand future operations

This option would involve applying for approval for the existing operations at Martins Creek Quarry to provide a coherent framework that includes the implementation of a modern monitoring regime, clarifying the quarry operations and where possible reduce the impacts on the local community and environment.

Inclusion of the future resource area in the approval will also ensure the full lifespan of the quarry is assessed and approved, negating the need for further application over the subject land. Quarrying in the future resource area is an economic and orderly use of the land as the land has already been assessed as resource rich

It is considered that this option is the most appropriate.

KEY BENEFITS OF THE PROPOSAL

The benefits of the proposal include:

- Regularising and updating the environmental management controls that apply to existing quarry operations;
- Consolidating existing development rights for the quarry in a single instrument and ensuring consistency with the environment protection licence for the premises;
- Use of existing infrastructure at the quarry site to facilitate the proposed extension;

- Modification to the current access arrangements and operations that will reduce environmental impacts;
- Enabling further extraction of a significant resource as part of the proposed extension; and
- Direct and indirect economic benefits for the locality, region and the State.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The EIS has been prepared in accordance with the provisions of Schedule 2 of the *Environmental Planning and Assessment Regulations 2000* and complies with the Department of Planning and Infrastructure EIS Guidelines for Extractive Industries ï Quarries.

The potential issues associated with the proposed quarry operations were identified as part of the initial Preliminary Environmental Assessment (**PEA**). The proponent also undertook extensive consultation with the relevant stakeholders, and established the Martins Creek Quarry Community Consultative Committee (**MCQCCC**).

The issues identified in the PEA and during the stakeholder consultation were examined in detail during the preparation of the EIS. Where possible, the proposal was amended to minimise the impacts of the proposal on the local community and environment. A number of management measures were also identified to manage the potential impacts of the proposal.

A detailed discussion of the amendments made to the project and proposed management measures has been provided in Section 9 of the EIS.

The studies and reports prepared to accompany the environmental impact assessment have been prepared on the basis that the proposed extraction will be 1.5 million tonnes over an operating period of 25 years. This application seeks consent for the same extraction amount over a period of 30 years, in order to take into account any decrease in production that may occur due to fluctuating market conditions.

SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The SEARs were first issued on 11 November 2014 by the NSW Department of Planning and Environment (**DoPE**). The SEARs were later revised and reissued on 22 May 2015 and again on 4 August 2016.

The SEARs include general EIS requirements, key issues to be addressed and a list of stakeholders to be consulted during the preparation of the EIS.

The SEARs identify the following key issues to be addressed in the EIS:

- Traffic and transport
- Blasting and vibration
- Air quality
- Noise
- Water quality and quantity
- Land capacity and conflicts

- Biodiversity
- Heritage
- Visual impacts
- Greenhouse gas assessment
- Hazards including bushfire risks and handling of dangerous goods
- Social and economic assessment
- Rehabilitation

The key issues related to likely environmental impacts are summarised below and all issues are addressed in detail in **Section 8** of this EIS.

A table setting out how the application has addressed the SEARs is attached at **Appendix A**.

CONSULTATION

Prior to the issue of the SEARs for the proposed development, the proponent attended a forum held by Dungog Shire Council. This meeting took place on 17th July 2014, and comprised of the following attendees:

- Dungog Shire Council (staff and councillors);
- Maitland City Council, Port Stephens Council;
- Brandy Hill Action Group;
- Bolwarra Residents Group;
- Paterson Progress Association;
- Roads and Maritime Services; and
- Environment Protection Authority.

As a result of this meeting, the proponent established the Martins Creek Quarry Community Consultative Committee (**MCQCCC**), which is the main mechanism for information sharing between the proponent and stakeholders. This committee provides a forum for open discussion between representatives of the company, the community, the council and other stakeholders on issues relevant to the existing and proposed operations of the Quarry.

In accordance with the SEARs issued, consultation with the relevant local, State and Commonwealth Government Authorities, service providers, Aboriginal stakeholders, community groups and affected landholders was undertaken. Specifically, this included consultation with the following:

- Commonwealth Department of the Environment
- Office of the Environment and Heritage
- Environmental Protection Authority
- Division of Resource and Energy within the Department of Trade and Investment, Regional Infrastructure and Service
- Department of Primary Industries (including the NSW Office of Water, NSW Forestry, Agriculture and Fisheries sections and Crown Lands division)
- Roads and Maritime Services
- Hunter Local Land Services

- Dungog Shire Council
- Maitland City Council
- Port Stephens Council
- Community Groups (Paterson Progress Association, Bolwarra Heights Community Group and the Voice of Wallalong and Woodville)

A summary of the stakeholder consultation process and outcomes have been included in the Stakeholder Consultation Report (refer **Appendix E**). Consultation activities and outcomes are addressed in detail in Section 7 of this EIS.

KEY ENVIRONMENTAL ISSUES

The Applicant has demonstrated its commitment to minimising environmental impacts as part of the current quarry operations and proposes the implementation of similar or improved measures to further limit the potential environmental impacts associated with quarrying as part of this application.

Consolidating the existing approvals is also an opportunity to modernise and improve environmental monitoring and management across the site.

The key environmental issues are listed below. These issues are addressed in detail, along with the measures to mitigate and manage any likely impacts in Sections 8 and 9 of this EIS.

- Air quality and dust
- Traffic, parking and access
- Noise and blast vibration
- Hazards and risks
- Soils and geology
- Water quality
- Ecology and clearing of vegetation
- European heritage and Aboriginal archaeological heritage
- Erosion and sediments
- Social and economic impacts and benefits
- Visual amenity
- Groundwater

JUSTIFICATION

There are a number of planning and operational reasons to justify the consolidation of existing consents, the regularisation of current operations, and the extension of the quarry, including:

- Regularisation of the current operations and the consolidation of consents will ensure the quarry operates under a single set of consistent and coherent conditions;

- Consolidating consents provides an opportunity to update measures for environmental management and monitoring, ensuring improved outcomes for the environment and the community;

- Extending the quarry operations will make efficient use of already established infrastructure and it is likely the most economically efficient use of land that has already been identified as resource rich;

- Limiting operations will impact significantly on the supply of quarry materials in the Central Coast and Sydney regions, and, in particular, the Hunter region.

- The quarry currently employs 15 full-time and 15 part-time workers, with up to 70 employers and contractors. Based on ABS data, the flow on effects are significant in the region. The proposed extension to operations will result in additional employment opportunities (See **Appendix C** and **Appendix O**).

The proposed project is to continue extraction of hard rock from the site by completing the extraction of the existing operational areas on expanding the operational area, and then increasing the depth of extraction in the area where the current processing plant is located.

The project seeks to continue current operations to complete the extraction of material in existing areas in conjunction with expansion into the proposed new areas to maximise the utilisation of the resource.

Mining methods are expected to remain the same as currently used with rock being broken by Drill and Blast techniques in the pit with Run of Mine (**ROM**) material being trucked to the crushing plant for further processing before being stockpiled and loaded on to road trucks for delivery to market.

Specific justification for each element of the proposal is set out below:

PROPOSED	**JUSTIFICATION**
Extracting up to 1.5 million tonnes of hard rock material per annum	Resource deposits of andesite are uncommon, particularly in large deposits and are essential in the construction of infrastructure and all construction industries supplying product for a further 30 years in NSW and the Hunter region.
Expanding into new extraction areas and clearing of vegetation.	Large contiguous deposits of Andesite are exceptional and to access the deposit of the resource clearing of vegetation is necessary.
Quarrying to 6am ï 6pm (Monday to Saturday).	To ensure a supply of base material is at hand to be processed in accordance with the market demand preventing delays to the production chain of quarry products.
Processing to 6am - 10pm (Monday to Saturday).	To ensure a range of product is at hand to complement the diverse and widely spread market demand in a timely and efficient

	manner thereby preventing delays to critical infrastructure and construction projects.
Mixing and binding to 4:30am - 10pm (Monday to Friday) and 4:30am - 6pm (Saturdays).	To provide critical perishable road base product to on- site construction crews widely spread locations, at a time that is required to meet engineering standards and construction practices involved in the construction of state, regional & local infrastructure projects.
Stockpiling, loading and dispatch of road transport to 5:30am - 7pm (Monday to Saturday), up to a peak rate of 40 laden outbound trucks per hour in the mornings, and a maximum 215 laden trucks leaving the site per day.	To deliver critical product to construction sites or tertiary production plants throughout the region. Also to allow early loading and late return of parked trucks.
Train loading retained at 24 hours per day, 7 days per week.	To provide rail products via rail to the national and state lines and to provide future Sydney markets.
Maintenance works retained at 24 hours per day, 7 days per week.	Allow plant and equipment to be serviced out of production times so as to ensure contiguous supply of material to construction industries.
Allow loading & parking of trucks on site over night.	To reduce early morning traffic to the quarry and to have materials ready for dispatch to construction sites and plants.
Consolidating existing operations and approvals.	To formalise the historic and redundant consents and practices so the quarry operates in a manner contemporary to current practices and requirements.
Rehabilitating the site.	To return the quarry to a footprint similar to the existing surrounding habitat.

STRUCTURE OF THE EIS

This EIS has been prepared in accordance with the EP&A Act and Regulation, the SEARs, and other relevant legislation to support the assessment of the development application.

The EIS is structured as follows:

Section 1 – Introduction This Section provides an introduction to the proposal and the proponent. It summarises the environmental impact assessment process and the consultation undertaken. The purpose and

	structure of the environmental impact statement is also included.
Section 2 – Existing site	This Section describes the existing environment.
Section 3 – Strategic need and context	This Section describes the strategic context and need for the proposal and presents the options that were considered.
Section 4 – Alternatives	This Section provides a summary of the alternatives to the Proposal.
Section 5 – Project description	This Section provides a detailed description of the Proposal.
Section 6 – Statutory and planning context	This Section examines all relevant State and Commonwealth legislation relating to the proposal and identifies relevant licences, approvals and permits required for the development to proceed.
Section 7 – Consultation	This Section outlines the consultation activities undertaken during the EIS process. This Section also summarises the issues raised during consultation with statutory and other relevant authorities, the local community, and any other relevant stakeholders.
Section 8 – Environmental assessment	A Section is provided for each of the environmental issues raised in the Secretaryôs requirements. Each Section provides an assessment of the existing environment and potential impacts associated with the proposal, including cumulative impacts Mitigation measures are provided to ameliorate potential impacts, where required.
Section 9 – Environmental Management and monitoring	A summary of mitigation and management measures proposed to ameliorate potential impacts.
Section 10 – Justification and Conclusion	This Section summarises the key findings of the environmental impact assessment and addresses the principles of ecologically sustainable development.
Section 11 – Certification	This Section contains a declaration in accordance with clause 6(f) of Schedule 2 to the *Environmental Planning and Assessment Regulation 2000.*
Section 12 – List of abbreviations	This Section summarises abbreviations.

1. Introduction

1.1 OVERVIEW

This Environmental Impact Statement (**EIS**) has been prepared in relation to the Martins Creek quarry, located at Station Street, Martins Creek.

This EIS accompanies an application seeking to regularise the operations at the existing Martins Creek quarry and to expand the quarry into previously identified resource rich areas.

Matters relating to the current operation of the quarry under the existing approvals regime are currently before the Court. This application seeks approval for the extraction and operations as described in this EIS and it is considered that the status of the existing approvals and operations under those instruments is not a relevant matter for the purposes of the assessment and determination of this application.

1.2 BACKGROUND

The Applicant has been the owner of the long term lease of the Martins Creek Quarry since 2012.

The quarry has previously been under the control of the various organisations and corporations of the current State Rail Authority, which has controlled the quarry operations since its establishment.

During the history of the quarryôs operations a number of consents and licence conditions have been issued, none of which provide a coherent and logical chain of conditions under which the quarry is to be operated. The history of operations on the site is set out in detail in Section 2 of this EIS.

The Applicant is now seeking to extend the quarry and to consolidate all existing consents and operations on the site under a single development consent.

1.3 THE APPLICANT

The Applicant is Buttai Gravel Pty Ltd, which is a part of the Daracon Group. Any reference to ôDaraconô in this EIS and in the attached Appendices is a reference to the Applicant.

The Applicant has extensive experience in safe, effective, quality and efficient operations in the quarrying industry.

The Applicant operates five quarries across the Lower and Upper Hunter regions with deposits that range from durable Andesite to ridge gravel.

The Applicant has made a significant contribution to the local communities in which it operates and has taken a proactive approach to community liaison. The Applicant sponsors a range of community events, programs and fundraising drives and regularly donates money, goods and

services to charitable organisations and community groups. In particular, following the April 2015 floods, the Applicant donated labour and personnel to assist the Dungog Emergency Centre and the Dungog community with flood relief. A summary of the Applicantôs recent contributions to the communities in which it operates is published at http://daraconquarries.com.au/Resources/Documents/Locations/Martins-Creek/DA/Summary-of-Community-Contributions-2015-16.pdf.

The Applicantôs Corporate Social Responsibility policy is published at http://daraconquarries.com.au/Resources/Documents/Locations/Martins-Creek/DA/Corporate-Social-Responsibility-Policy.pdf.

A Corporate Capability Statement is published at http://daraconquarries.com.au/Resources/Documents/Locations/Martins-Creek/DA/Corporate-Capability-Statement.pdf

1.4 APPROVAL PATHWAY

The application is considered to be State Significant Development (SSD) under the planning legislation as clause 10 of Schedule 1 to the *State Environmental Planning Policy (State and Regional Development) 2011* declares development for the purposes of extractive industry with a resource in excess of 5 million tonnes as SSD.

The EIS has therefore been prepared to support the application for consent under Part 4 of the *Environmental Planning and Assessment Act 1979*.

2. Existing Site

2.1 LOCATION

The site is located on Station Street, Martins Creek and comprised of:

- Lots 5 & 6 DP242210;
- Lot 1 DP204377;
- Lot 1 DP1006375;
- Lot 42 DP815628;
- Lot 21 DP773220; and

The quarry covers a total area of approximately 124ha and is bound by the North Coast rail line and Martins Creek community to the south.

2.2 SITE DESCRIPTION

The subject site is located off Station Street, Martins Creek, approx. 20 km north of Maitland and 7 km north of Paterson in the Dungog Shire local government area (See Figure 2 below).

The site is bounded by the North Coast Rail line to the west, Vogeles Road to the south, and to the north and east by densely vegetated land that is part of a ridgeline that runs to the south of Merchants Road. The site slopes downward in a south west direction from this ridgeline.

The site has been operating as an existing quarry and processing area with previous and current extraction exposing two pit sites. One of the pits lies to the east of Station Street and one to the north west of Station Street. Remaining land on the site is densely vegetated.

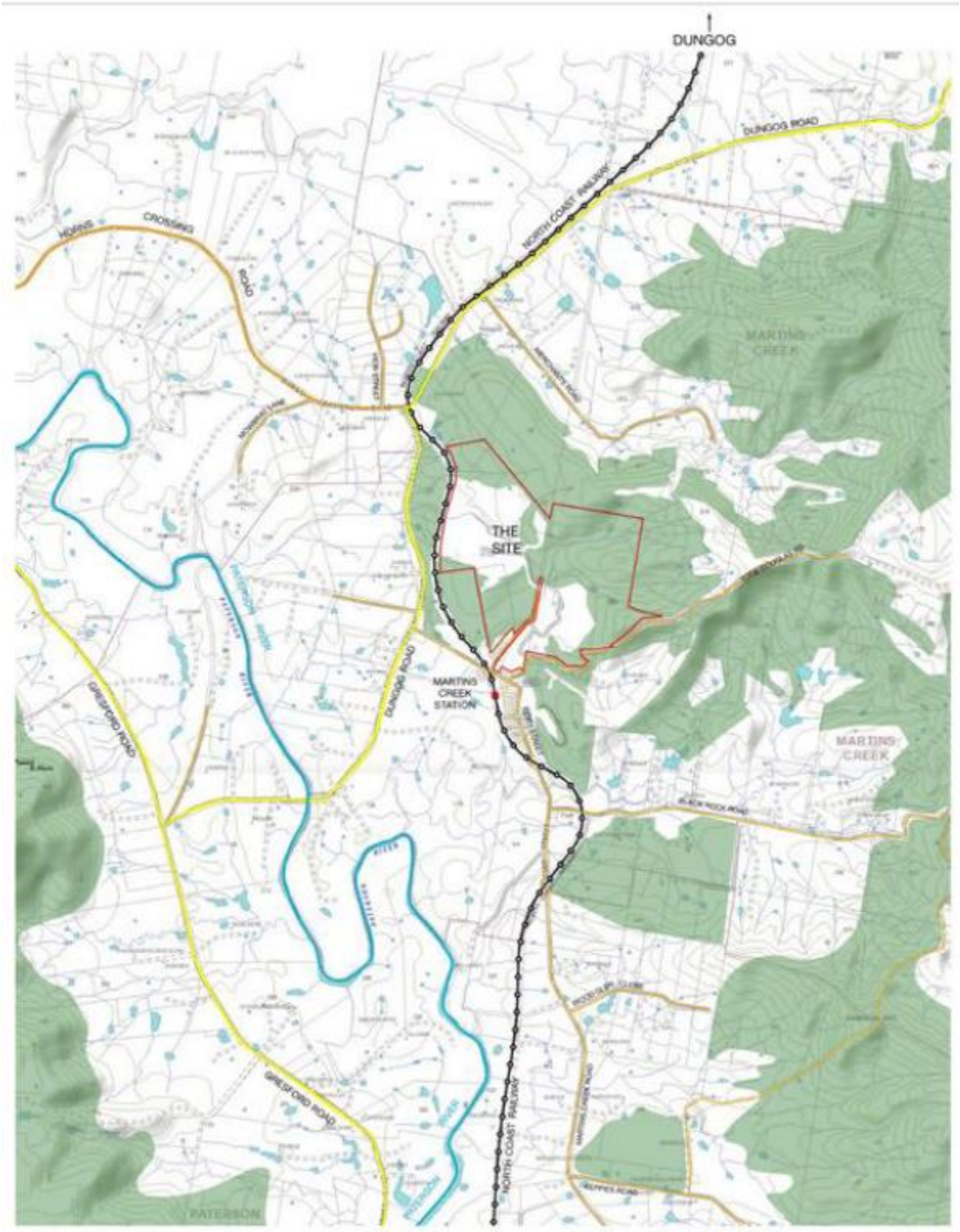

Figure 2 Site location

2.3 SITE HISTORY

Martins Creek Quarry has operated continuously since establishment in 1914. The quarry was established and operated by the New South Wales Government Railways and various subsequent NSW Government transport departments, commissions, corporations and authorities (NSW Railways) until November 2012. Buttai Gravel has been the owner of the long term lease of the Martins Creek Quarry since 2012.

During the history of the quarryôs operations a number of consents and licence conditions have been issued, none of which provide a coherent and logical chain of conditions under which the Quarry is to be operated.

The operator of the quarry has had discussions with representatives from Dungog Shire Council who, we are informed, are in agreement with Buttai Gravelôs actions (This is evidenced in the correspondence from Dungog Shire Council attached to the SEARs issued for the development).

The initial quarrying operations were established on Lot 1 DP1006375. The quarry material was depleted in the late 1980ôs. Lots 5 & 6 DP242210 and Lot 42 DP815628 were subsequently leased to extend the quarry and ensure the continuation of operations.

2.4 OWNERSHIP ARRANGEMENTS

The lots comprising the site area are shown below. Refer to Figure 3 below.

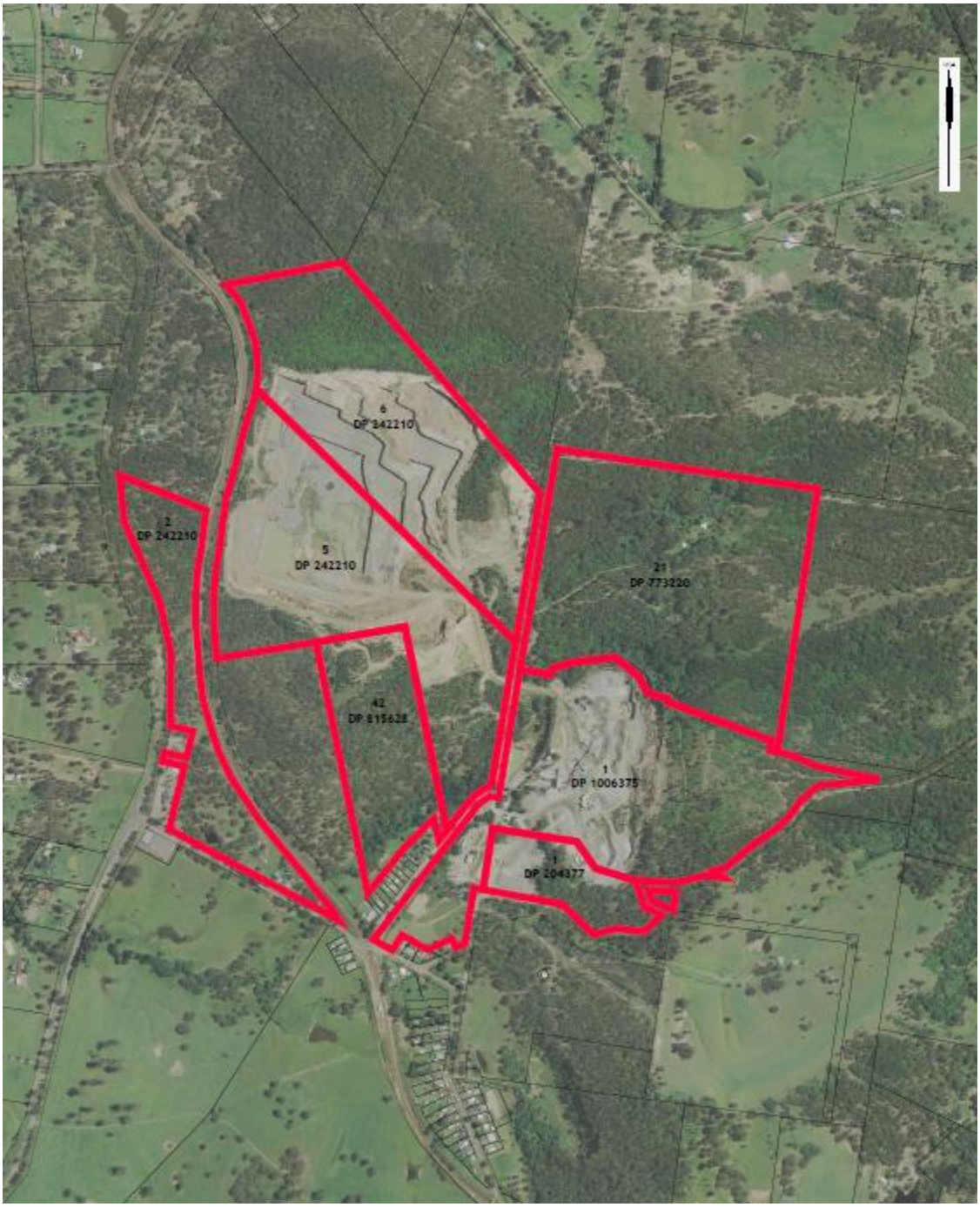

Figure 3 Lots comprising the site area

Lot 42 DP815628 and Lot 6 DP242210 is owned by Nodeka Pty Limited and is leased by Hunter Industrial Rental Equipment Pty Limited pursuant to lease AI353347L (See **Figure 3** above).

The lots listed below are owned by Noel Francis Mitchell and are leased to Hunter Industrial Rental Equipment Pty Limited pursuant to lease AH831349S (See **Figure 3** above):

- Lot 5 DP242210;

- Lot 1 DP204377;
- Lot 1 DP1006375; and
- Lot 21 DP773220.

Both leases require the operator to seek development consent for further extraction over the individual lease area.

The site area also includes a road that is partly owned by Dungog Shire Council and partly a Crown road (See **Figure 4** below). At the time of preparing this EIS, an application had been made to close the Crown road portion (marked as W554327 on **Figure 4** below) and negotiations with Dungog Shire Council in relation to the Council owned road (marked as W55327 on **Figure 4** below) are ongoing.

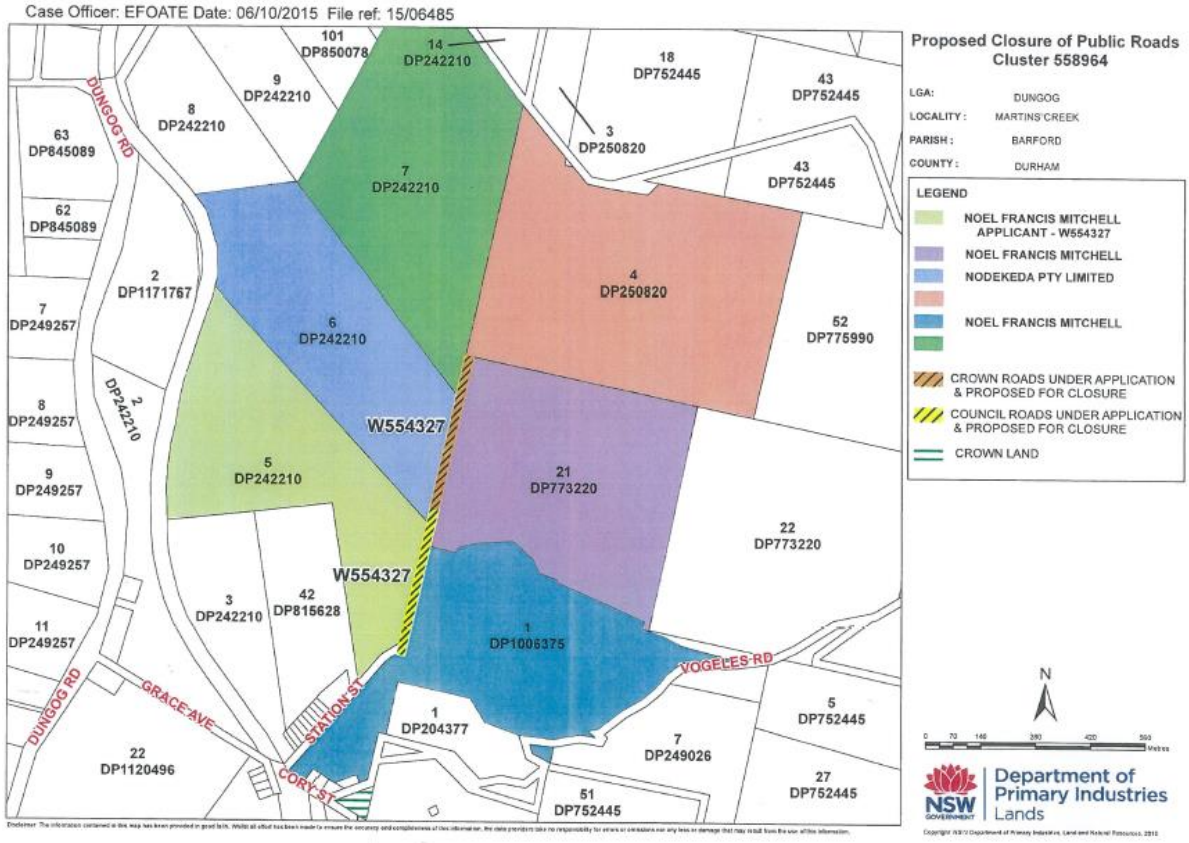

Figure 4 Landowners and proposed closure of Public Roads

It is proposed to acquire the road prior to the determination of the application; however, in the event that the administrative processes cannot be completed in time, landowners consent will be obtained before determination.

2.5 EXISTING OPERATIONS

Operations at the site have entailed stripping, drilling and blasting, extraction, crushing and grinding, screening, product blending and product distribution by both rail and road transport. Raw materials are also brought to the site for blending and manufacturing of products.

The quarry comprises of two portions:

Lot 1 DP204377 & Lot 1 DP1006375

These lots include existing facilities and operations, which comprise of*:*

- Crushing and screening;
- Rail sidings and rail loading facility;
- Site compounds;
- Transport and Sales;
- Administration building; and
- Weighbridge.

Lot 5 & 6 DP242210

- Blasting;
- Material Extraction; and
- Ancillary processing, including crushing, screening, and sandwashing.

Lot 2 DP242210 and Lot 21 DP773220 are currently undisturbed.

The area toward the northern boundary (adjacent to the existing quarry floor) of Lot 42 DP815628 has previously been disturbed.

It is a source of high quality Andesite hard rock suitable for the production of aggregates, road base, ballast, gabion and other specified materials used in the road, railway, concrete and civil construction.

2.6 EXISTING USE RIGHTS

The first environmental planning instrument to apply to the site was on 12 May 1967 when Interim Development Order No.1 ï Shire of Dungog was gazetted (NSW Government Gazette No.49, p1530).

The Department of Railways commenced operations at Martins Creek quarry (**Quarry**) on land now described as Lot 1 DP 1006375 in around 1915. The objective of the Quarry was to supply railway ballast and other quarry material to the New South Wales railway network.

Over time the Quarry expanded over the area of land which is now Lot 1 DP 1006375 and onto Lot 1 DP 204377. By 1967, quarrying and processing operations were occurring on substantial portions of these land parcels.

In February 1986, upon the introduction of section 109(2) into the EP& Act, quarrying and crushing, screening, stockpiling and processing of quarried material (including of material received from locations outside of Lot 1 DP 1006375 and Lot 1 DP 204377 and of material other

than railway ballast) was occurring upon substantial portions of land which is now Lot 1 DP 1006375 and Lot 1 DP 204377.

In May 1999, Dungog Shire Council resolved to accept that the Quarry had continuing use rights for part of Lot 1 DP 1006375 for the processing of material of up to 449,000 tonnes per annum (refer Council resolution dated 18 May 1999). The figure of 449,000 tonnes was based upon a detailed submission (together with supporting statutory declarations) made by Rail Services Australia to Dungog Shire Council which set out in detail the level of processing that was occurring in February 1986.

Although different pieces of equipment may now perform the operations as they were historically carried out - quarrying operations and the processing of quarried material continues to be carried out consistently with the activities which were lawfully and physically carried out in February 1986. These operations include the precoating of aggregate for use as a road sealing aggregate (now performed by the precoat plant) and the blending of material by bucket (an operation now performed by the pug mill plant).

Whilst no extraction of material currently occurs on Lot 1 DP 1006375 and Lot 1 DP 204377, quarrying operations have never been abandoned on this land. Quarrying operations are currently carried out and include the active rehabilitation of that land.

One of the objectives of this state significant development application is to provide a consolidated planning approval platform for the continued operation (and expansion) of the quarry. It is proposed that if development consent is granted for the proposal, all existing development consents for the quarry as described above will be surrendered within 12 months (pursuant to section 80A(1)(b) EP&A Act).

2.7 PREVIOUS AND EXISTING DEVELOPMENT APPROVALS AND RELEVANT CONDITIONS

DA 171/90/79 ï Lots 5 & 6 DP 242210

In 1990, the State Rail Authority of NSW applied for:

“An Extractive Industry (“designated development”) being a quarry, winning material primarily for railway ballast”

The Crown application was made over Lots 5 & 6 DP 242210 and Dungog Shire Council issued a Notice of Determination on 7 March 1991 approving of the development with conditions.

On 15 April 1991, correspondence from Freight Rail to Council set out its position with respect to the conditions. The letter states that the State Rail Authority is pleased to receive the consent, however, it cannot accept many of the conditions. The letter then sets out in detail various objections. With regard to Condition 6, the letter states:

“State Rail cannot accept that they contribute to road maintenance and have Council control the operation, in effect determining which customers the quarry will sell to. It is the customers, whether State Rail, private or Council, who determine the form of transport they require.”

At the time, s.91A of the Environmental Planning and Assessment Act 1979 provided that a consent authority could not impose a condition on an application made by or on behalf of the Crown without the written approval of the Minister or the applicant.

By way of letter dated 21 June 1991, the Council purported to issue revised conditions of consent for the development. It is unclear whether State Rail accepted the revised conditions.

Given that State Rail has divested its interest in the quarry, this condition makes the ongoing operation of the quarry problematic. Whilst some product is proposed to be taken from the quarry by rail, the current market drives the requirement to take the majority of product off site by road.

DA 171/94/41 ï Lot 42 DP 815628

Development consent was granted on 8 June 1995 for:

"An extractive industry (designated development) being a quarry for the extraction of hard rock for railway ballast and other purposes."

This consent operated for a period of time but has now lapsed. This lapsing is acknowledged in Lease AI353347L.

DA 162/99 ï Lot 1 DP 1006375

Lot 1 DP 1006375, that incorporates Lot 2 DP 524511, was created by subdivision registered 5 November 1999. This land was originally resumed for railway purposes in December 1914 and the first quarrying took place shortly thereafter.

On 17 September 1999, the Council issued development consent for the erection and operation of fixed tertiary crushing equipment on Lot 2 DP 524511.

DA 171/95/5 ï Lots 6 DP 242210

Consent was granted on 8 June 1995 for the crushing of hard rock utilizing crushing plant and associated infrastructure, being crusher and screens, weighbridge and site office and ablution block.

2.8 PROPOSED EXTRACTION AREAS

Figure 5 below shows the proposed stages of the development the subject of this application.

The proposed expansion area covers 28.2 ha and includes the expansion of the existing West Pit and the proposed new East Pit. The expansion of the West Pit includes 4 separate areas adjacent to the existing pit and a total of 12.4 ha. The new East Pit will cover 14.8 ha. The area for the proposed pugmill will cover approx. 1 ha.

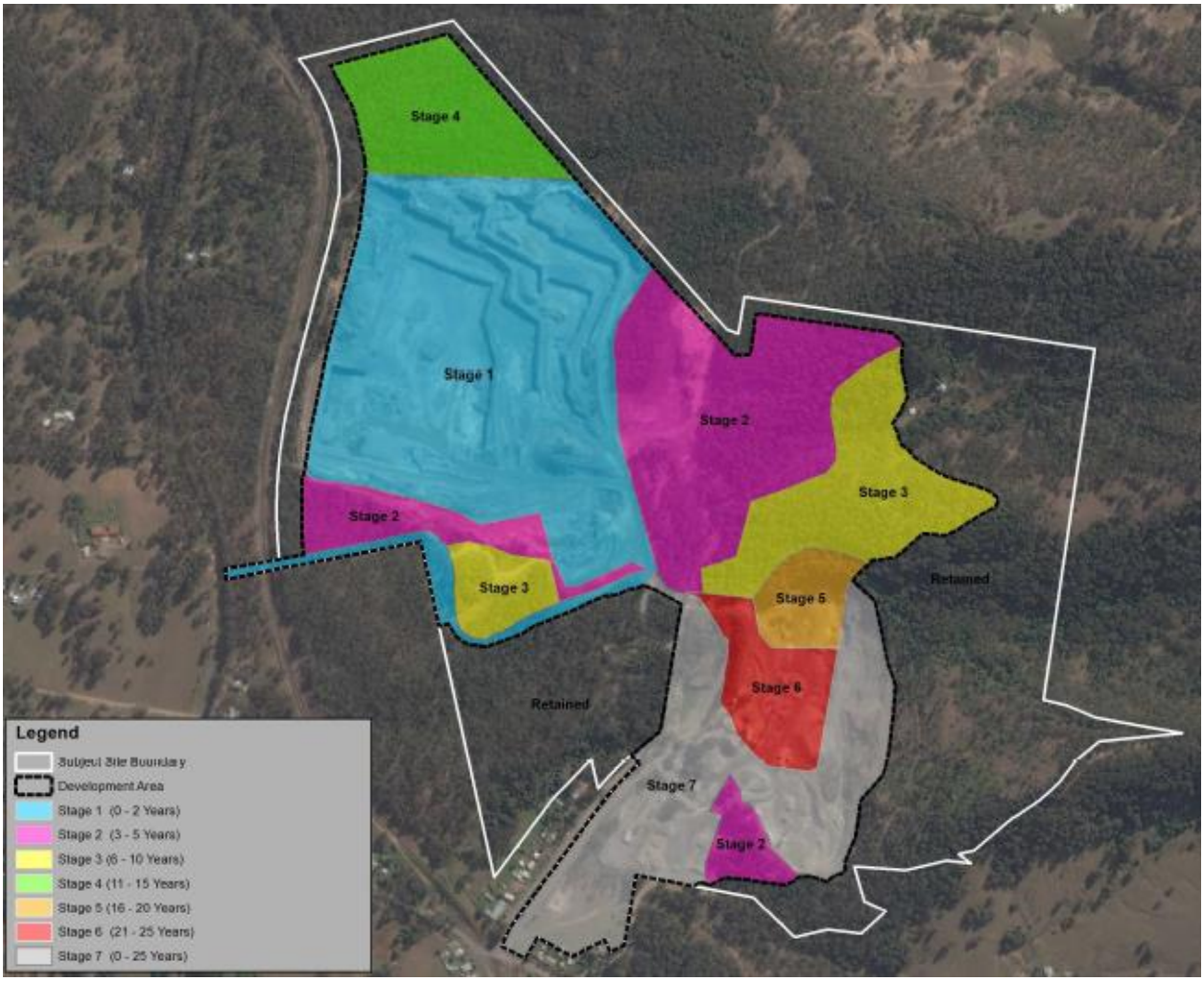

Figure 5 Proposed development stage areas

2.9 ENVIRONMENTAL PROTECTION LICENCE

The Martins Creek quarry is currently operating under Environmental Protection Licence (EPL) No. 1378. The activities permitted under the licence are described as "crushing, grinding or separating and extractive activities" up to a limit of 2,000,000 tonnes of material per annum.

The licence includes a number of conditions that regulate the quarrying activities. These include:

- Air / Water quality monitoring;
- Noise limits;
- Blasting operations;
- Hours of operation;
- Plant maintenance;
- Complaint management; and
- Reporting requirements.

It should be noted that EPL requirements have not been significantly altered since the Applicant took over the operation of the quarry and the general activities described in this EIS largely reflect the current EPL conditions. Should consent be granted, an application to revise the EPL may be necessary to ensure it is "substantially consistent with the consent" under section 89K of the EP&A Act.

3. Strategic Need and Context

Martins Creek quarry services the needs of the local construction industry and larger Federal and State government infrastructure projects in the wider Hunter region by processing and delivering specialised quarry products. These include course and fine aggregate, pre-coat aggregate, manufactured and modified road base and washed coarse manufactured sand. As these resources are limited in the Hunter region, the products supplied from Martins Creek quarry are of significant importance for both the Hunter and New South Wales economies. Further, effective and efficient transportation of quarry aggregate to local, State and Federal wide projects has been achieved by the subject sites location and supporting infrastructure.

Martins Creek quarry offers the market a major independent supplier of these quality products with capacity to service significant projects demanding high volume secure supply. The quarry services the markets of Newcastle, Maitland, Cessnock, Singleton, Port Stephens, Lower Hunter, Muswellbrook, Central Coast, Lower North Coast and Sydney Metropolitan regions.

The quarry has historically supplied many significant infrastructure projects in the region. Projects that would otherwise have been subject to limited market supply through quarries owned by major vertically integrated companies which would have significantly increased price pressures within the market potentially adding significantly to the infrastructure project costs.

Given these factors, and the demonstrated suitability of the site for the proposed development, the proposal is appropriate to meet the needs of the regional and wider markets.

The Heavy Vehicle Route and Market Assessment attached at **Appendix D** supports these conclusions.

4. Alternatives

4.1 FEASIBLE ALTERNATIVES

An analysis of feasible alternatives to the proposal was undertaken, three options were identified.

Option 1: Take no action

This option consists of continuing current operations under the existing approvals framework and relying on existing use rights as described in Section 2 of this EIS.

The development approvals obtained by State Rail do not provide a coherent set of conditions under which to operate the quarry. Previous approvals are also inconsistent with the operations authorised under the current environmental protection licence.

This option does also not provide for the extraction of the entire resource available within the lease areas.

It is therefore considered that this option is not viable.

Option 2: Regularisation of existing operations only

This option would involve applying for approval of the existing operations at Martins Creek Quarry which would ensure a single planning approval applies across the site. It would also facilitate the implementation of a modern monitoring regime, clarifying operations and the mitigation of impacts on the local community and environment.

This option would not provide for the extraction of the entire resource available within the lease areas and would therefore not deliver the additional social and economic benefits associated with the extending the quarrying area.

It is therefore considered that this option does not represent the most orderly or efficient use of the land.

Option 3: Regularisation of existing operations and extension for future operations

This option would involve applying for approval of the existing operations at Martins Creek Quarry to provide a coherent framework that includes the implementation of a modern monitoring regime, clarifying the quarry operations, and where possible reducing the impacts on the local community and environment.

Inclusion of the future resource area in the approval will also ensure the full lifespan of the quarry is assessed and approved, negating the need for further application over the subject land. Quarrying in the future resource area is an economic and orderly use of the land as the land has already been assessed as resource rich. Given the economic analysis included in this EIS, quarrying over this land will significantly contribute to the State's economy and facilitate the

delivery of State and local infrastructure. Seeking approval for operations over 30 years will ensure these benefits are realised over that time.

It is considered that this option is the most appropriate.

4.2 DESIGN OPTIONS

As part of the preparation of the design of the extension to the quarry, and as required by the SEARs, options to facilitate greater transit of aggregate by rail (instead of road) were considered. This option was considered as a means of providing an appropriate alternative to truck haulage which is considered to have comparatively greater environmental impacts.

The proponent commissioned a Rail Logistics Report prepared by Plateway Pty Ltd to consider the options and rail logistics models (Refer **Appendix D**).

4.3 CURRENT OPERATIONS

The quarry is connected to the Main North Coast railway line and there is direct access by rail from the quarry to the Australian Rail and Track Corporation (**ARTC**) Control Centre at Broadmeadow. The quarry currently supplies railway ballast on the rail network and around 10% of the quarryôs output is supplied by rail.

4.4 INCREASING RAIL HAULAGE

The design option considered involved increasing the amount of aggregates transported by rail from the Martins Creek site. The option proposed would reduce haulage by road. The Rail Logistics Report identifies the following considerations:

- The current rail facilities at Martins Creek are suitable for the usage they receive at present but will not allow for the operation of modern aggregate or ballast trains because of the shunting time involved in loading and because of the restricted train length;
- Ballast trains are given low priority in the Hunter Region, passenger trains and coal haulage trains are given higher priority on the rail networks;
- The availability of ballast train paths is severely restricted during morning and afternoon passenger peak times;
- Current restrictions on loading trains under the EPL and existing consents result in trains only being able to deliver loads every two days, rather than daily;
- To increase aggregate haulage by rail from Martins Creek, rail infrastructure would require upgrades, including sidings, locomotives and carriages;
- A high volume of aggregate is required to be transported on an annual basis to offset the costs of providing upgraded infrastructure;
- The high capital costs of the infrastructure upgrades required mean that the quarry would have to increase operations to a level of throughput that would be well in excess of the market;
- Aggregate for the construction industry is a low value product unlikely to sustain a large haulage cost;
- There are currently no suitable operating receivable terminals for aggregate in the Hunter region;

- The capital costs of constructing a receivable terminal and the inability to achieve multiple cycles of train loads in a 24 hour period (due to rail network congestion) make rail transport expensive;
- In total the cost of using the rail line haul is around 30% more expensive than the road haul routes; and
- To compete with road transport costs, output would have to be raised to four times the current production level and it is unlikely the current rail network (or the market) would be able to accommodate this volume of product.

4.5 ANTICIPATED MARKET REQUIREMENTS

The feasibility of the development options have been considered with regard for the likely market requirements.

The Martins Creek Heavy Vehicle Route and Market Assessment attached at **Appendix D** identifies that in the 12 month period between November 2013 and October 2014, the existing quarry produced some 1.1 million tonnes. During that period, the quarry serviced some of the regionôs largest infrastructure projects including Hexham Rail Upgrades, Nelson Bay Road Upgrade and the Newcastle Inner City Bypass.

The 2014-2015 State budget has identified the following infrastructure projects in the Hunter region (Source: Martins Creek Heavy Vehicle Route and Market Assessment attached at **Appendix D**):

Hunter Roads – Major Projects ▪ Cormorant Road, Industrial Drive to Stockton Bridge (planning) ▪ Nelson Bay Road, Bobs Farm to Anna Bay (Stage 3) ▪ Newcastle Inner City Bypass, Rankin Park to Jesmond (planning) ▪ New England Highway, Belford to Golden Highway duplication (planning) ▪ New England Highway, Gowrie Gates, widen Rail Underpass (planning) ▪ New England Highway, Singleton Bypass (planning) ▪ New England Highway, Scone Bypass and Rail Level Crossing removal (planning) ▪ New England Highway, Upgrade of Maitland roundabouts ▪ Pacific Motorway (M1) Extension to Raymond Terrace (planning)	$43 million (2014–15 financial year)	Planning and investment for works to address localised impact of mining related activity and population growth. A corridor study on Hillsborough Road, Warners Bay will commence in 2014–15. Some projects include Commonwealth Government funding contributions.

Martins Creek Heavy Vehicle Route and Market Assessment identifies that this commitment of funds to infrastructure projects in the region will likely increase demand for building and construction materials in excess of the volume and quality currently available locally. Materials could be sourced from outside of the region, however the proposed development will offer a more efficient supply of hard rock for these projects.

The Martins Creek Heavy Vehicle Route and Market Assessment also identifies that the proposed development will also have the capacity to service the Governmentôs funded infrastructure projects in Sydney and Northern NSW.

Given the importance of road and rail infrastructure to the Stateôs economy (the Heavy Vehicle Route and Market Assessment estimates that Sydneyôs road congestion alone costs the State $5.1 billion), the scale of the proposed extraction at Martins Creek Quarry is justified by the anticipated market demand.

As stated in the Social and Economic Assessment at **Appendix O**, hard rock extractive resources are limited in NSW, particularly those that are suitable for high strength concrete and asphalt applications. The Lower Hunter Region has five hard rock quarries considered to have the capacity to service the demand for the production of concrete/asphalt and high quality base and subbase materials for RMS applications.

Martins Creek Quarry also focuses on the design and manufacture of high quality road pavement materials. For the past 15 years (approximately) the quarry has produced one of only

two products that met RMS heavily bound specification RN73, critical to construction of road infrastructure.

The Social and Economic Assessment also identifies that the Martins Creek Quarry extension will be critical to delivering the infrastructure needed to support projected growth in NSW. The need for ongoing extractive resources will be significant considering the proposed sale of the ópoles and wiresôin NSW and the follow on investment in infrastructure projects.

In addition, there are a number of Federal infrastructure projects that are likely to require large volumes of construction materials and resources (e.g. gravel, cement, etc) including the Western Sydney Airport (and transport linkages) and the Inland Rail Project.

Other significant projects that are in the early planning stages include the M12 motorway in Sydney, as well as the final stages of the Pacific Highway upgrade between Newcastle and the QLD border.

State and Federal government strategies that identify relevant infrastructure projects over the next 30 years that will require ongoing extractive resources include:

- National Remote and Regional Transport Strategy (Draft 2015)
- National Land Freight Strategy (2012)
- Australian Infrastructure Plan (2016)
- NSW 2021 Plan
- NSW State Infrastructure Strategy (2014)
- NSW Freight and Ports Strategy (2013)

There are also a number of local strategies and Council operational plans which envisage the construction of new and upgraded infrastructure.

The market requirements considered also included availability of materials and transport operations. The proposed development includes extending the early morning operating hours.

The Martins Creek Heavy Vehicle Route and Market Assessment demonstrates that civil construction sites, including those associated with State and local government projects, rail, and mining projects rely on product deliveries in the early hours of the morning for efficient work schedules.

In particular many products that the quarry supplies to construction sites must be delivered on site early to allow sufficient time for placement, compaction and trimming. Stabilised road bases must be freshly batched in the pug mill before being sent to construction sites for immediate use. These materials cannot be stockpiled and are used on the day of delivery.

To meet these end user demands, the proposed development includes quarry production hours that will facilitate the peak of quarry materials leaving the site from the hours of 6-7am. To achieve this, relevant hours of operation are proposed:

- Pugmill mixing and binder delivery operations - 4:30am to 10pm (Monday to Friday), and 4:30am to 6pm on Saturdays;

- Sales Loading and Stockpiling for Road Transport - 5:30am to 7pm (Monday to Saturday); and

The Martins Creek Heavy Vehicle Route and Market Assessment identifies that if production and delivery operations were delayed at the quarry until 6am, productivity would decrease by 26.8%.

Delayed operating times for the quarry would also have flow on effects for the projects being serviced, in particular infrastructure and construction projects where conditions of consent limit construction hours. If the Martins Creek Quarry can deliver materials to construction sites by the time construction commences (usually regulated by a condition of consent specifying 6 or 7am), costs and delays in delivery can be minimised.

Alternate transport routes have also been considered in the Martins Creek Heavy Vehicle Route and Market Assessment. That assessment includes details on the split of market demand for the quarry product and the limited route options available. The routes outlined in the Traffic and Access Assessment at Part 8 of this EIS are considered the most efficient way for the quarry to meet market demand. Likely environmental impacts along these routes are addressed elsewhere in this EIS.

For these reasons the proposed hours of operation listed above and the preferred transport routes and road network identified are considered the preferable alternatives.

4.6 CONCLUSION

The Rail Logistics Report concludes that there would be a number of restrictions and barriers to increasing haulage by rail including the current limitation on loading times during the evening, lack of suitable rail unloading facilities, infrastructure upgrade costs, and market conditions. In order to facilitate the ongoing use of the quarry by rail networks to supply ballast to the rail network, the Report recommends that the practice of evening and night time train loading be reinstated to enable the productivity of rail ballast distribution to increase.

Given the location of sensitive receivers and potential noise impacts the practice of evening and night time train loading will have, increasing haulage by rail is not considered a viable alternative to road haulage without significant noise attenuation.

To maintain the economic viability of the quarry and enable future expansion of markets, the Report also recommends that consideration should be given to extending the rail sidings to allow for the operation of longer trains in the future.

In general, rail dominance for the transport of aggregate materials in this region has declined over time with road delivery becoming the preferred method of transport, even for rail infrastructure projects. Nevertheless, the final design of the project will incorporate elements to facilitate additional rail haulage in the future should market conditions become more favourable and, where possible, materials will be hauled by rail to limit the number of trucks on the local roads along the haul route.

The Martins Creek Quarry Business and Extraction Report attached at **Appendix B** contains a detailed description of the conditions that are necessary to make rail haulage a viable

alternative to road haulage. As discussed above, this Report demonstrates that road haulage, and the proposed extended hours of operation, are considered preferable options given the particular nature of the markets which the quarry services.

5. Project Description

This application generally seeks consent for:

- regularising the operations at the existing Martins Creek quarry; and
- expanding the quarry to areas previously identified as resource rich areas.

5.1 APPROVAL FOR EXISTING OPERATIONS

In the first instance, the Applicant is applying for fresh development consent to ensure the ongoing operation of Martins Creek quarry is clearly defined and all required mitigation measures are in place to limit the impact of the operations on the surrounding environment.

The operations are currently controlled and regulated by the previous development approvals and the EPL. It is considered that the proposed operations will generally reflect the provisions of the current EPL in many respects, with additional controls included as conditions of consent.

The capacity of the quarry will be limited to an extraction rate of approximately 1,500,000 tonnes of materials per annum. It is considered the extraction rate will provide flexibility in addressing the fluctuating nature of demand that is closely related with civil infrastructure projects.

Drawings of the existing Martins Creek Quarry plant areas, buildings and structures are set out in the Report on Engineering and Transport prepared by ACOR Consultants Pty Ltd (Refer **Appendix H**) including the aggregate precoating plant, train loading hopper, stockpile areas, crushers, major parts road lorrie servicing building water tank, dams, weighbridge and offices (see also **Appendix B** Photographs of site and surrounds).

The Environmental Management Plan (**EMP**) that currently regulates operations at the site is proposed to also apply to the expansion of the quarry (Refer **Appendix C**). The EMP is updated from time to time by the Applicant and provides for environmental controls and monitoring, including waste management. The EMP provides details of how waste will be handled and managed on site to minimise pollution and addresses the other requirements related to waste required by the SEARs.

Extraction Process

Quarry preparation

Any new quarry areas will be stripped of all vegetation prior to removal of the topsoil. The topsoil is present to a depth of approximately 0.5m. It is anticipated that another 1.0m and 2.0m of deleterious weather rock, clay and earth will need to be removed to expose the Andesite rock below.

Bench Pit Design

The existing quarry, located on Lots 5 & 6, has been quarried from the south western extent of the site towards the northwest. The quarry currently contains 5 extraction benches with a height of between 12 and 15m in height.

It is proposed that the extraction area be developed with an additional bench (Bench 6), or benches in the south western corner of the site. Extraction will then continue towards the northern western extent of the site before being extended into Lot 21.

Where possible, the bench faces will be design to ensure they are directed away from the nearest and most impacted residences to limit the impact of overpressure during blasting and noise during extraction of quarry materials.

Internal haul road design

All internal haul roads are designed to have a maximum grade of 1:8, with frequently used routes design at a grade of 1:10. The internal roadways are dressed with quarry scalps and other products from the crushing activities.

To minimise noise impacts on the surrounding environment, all haul roads will be kept trimmed.

Stormwater catchment areas

The quarry design will incorporate ongoing grading to ensure stormwater drains towards the storage and catchment basins. Haul roads will be kept clear of ponding stormwater to limit the potential water contamination.

The lowest bench on Lot 5 DP 242210 currently has a ódrop cutôthat acts as a catchment basin with a minimum capacity of 1 mega litre. All stormwater runoff from the quarry operation on Lots 5 & 6 DP 242210 are diverted to the catchment basin. Water in the basin is used continuously for dust suppression within the internal haul roads and washing plant.

Where necessary, additional storage will be created to ensure sufficient capacity is maintained.

Blasting

It is not anticipated that the frequency of blasting will be increased as a result of the current proposal.

Preparation prior to blasting operations typically involves drilling 89mm holes along the bench face. For optimal blasting, 3 rows of drill holes are drilled with a 2.8m offset. The holes are drilled with a 3.2m spacing along each hole. The depth of the holes are dictated by the height of the bench face, with an additional 600mm sub drill provided to enable effective blasting. The Maximum Instantaneous Charge (**MIC**) used during blasting operations are typically 80 ï 100kg. Where blasting operations face sensitive receivers, stemming heights will be increase and MIC lowered to 60kg to limit the over blast impacts. These parameters do and will change to suit blasting requirements.

Blast monitors have been installed at the areas most affected by blasting operations. These include properties along Dungog Road and residences within the Paterson Valley Estate. An additional monitor has also been installed at the rear entrance on Vogeles Road.

Blasting operations are usually scheduled in the middle of the day, while blasting is avoided on days of heavy cloud cover, temperature inversion and strong winds in the direction of the sensitive receivers.

Loading of Materials

On completion of the blasting operations the rock is initially crushed into manageable sizes by a hydraulic rock hammer that is equipped with hydraulic excavators.

From the resulting stockpiles, rock is loaded on quarry haul trucks by wheeled front end loaders or excavators. The haul trucks transport the quarry materials, along the haul road, to the processing area of Lot 1 DP 1006375. The existing haul road is approximately 1.2km in length.

Processing

Coarse and Fine Aggregate Production

The plant utilised in the production of coarse and fine aggregate products is currently located centrally to the processing area on Lot 1. The production cycle consists of a three stage crushing and screening process (primary, secondary and tertiary stages), with each stage producing finer aggregates.

The end products include, but are not limited to:

- Railway Ballast
- Asphalt Aggregates: 28mm, 20mm, 14mm, 10mm and 7mm
- Sealing Aggregates: 20mm, 14mm, 10mm, 7mm
- Concrete Aggregates: 20mm, 14mm, 10mm, 7mm, and blends thereof
- Drainage Aggregates: F20mm, F14mm, F10mm, F7mm
- Manufactured Sand and Fill Sand: Minus 5mm
- Fine Crushed Rock: Minus 14mm

Occasionally gabion and mattress rock production is undertaken within the extraction area. The processing and stockpiling of product is typically undertaken by mobile plant and the production quantities are dictated by the specific requirements of the orders.

Pre-coated Sealing Aggregates Production

The current quarry operation produces pre-coated sealing aggregates for use in road construction projects. The plant involved in the process consist of pre-coating oil stored in a 30kl tank, oil mixing and spray bars and a hopper, power generator and associated stockpiles.

The plant is currently located towards the western edge of the processing area on Lot 1.

Manufactured and Modified Road Base Production

The quarry produces manufactured, blended and moisture modified road bases by passing material through the pugmill located towards the eastern edge of the processing area on Lot 1.

The pugmill feeds the materials through the mixing box to blend with binding and blending agents such as hydrated lime, slag / hydrated lime blends, slag lime cement triple blends, flyash and bottom ash.

The flyash and binders are imported to the site.

Washed Coarse Manufactured Sand

Washed coarse sand is a by-product of the quarry process. The sand is produced by running this material through the sand washing plant within the extraction area.

The majority of sand is stockpiled within the processing area, while wash out material is stored within the extraction area for re-use during the rehabilitation works and utilised in road base production.

Stockpiling

Product is stored in stockpiles with sizes dependent on the type of product and height of conveyor arms. Typically ballast stockpiles can be up to a height of 16m, while secondary product stockpiles can be stockpiles up to 8m in height.

Although the quarry materials are predominantly stored within stockpiles on Lot 1, some materials will be stockpiled at the extraction face.

Vehicle Fuelling and Servicing

Fuelling Station

Fuelling is currently undertaken at the existing refuelling station located to the east of the fixed processing plant on Lot 1. The facility caters for both high speed and regular refuelling. Oil and grease is discharged via portable hand pumps or direct air powered drum pumps.

The refuelling station comprise of a 20,000 litre diesel storage tank and an grease and oil storage area for the storage of 205 litre drums (grease) and 1,000 litre intermediate bulk containers (IBC) (oil).

The area is fully bunded and fitted with an oil water separator to process any petrochemical spills. All waste product is stored within dedicated IBC that is emptied periodically by licensed waste contractors.

All fixed plant are refuelled using a portable diesel fuel tank mounted on the rear of a quarry service vehicle.

A development application for modifications to the existing refuelling station has been lodged with Dungog Council (DA/52/2016) and at the time of writing, has not been determined.

Servicing

The quarry contains two (2) maintenance and servicing areas. The main workshop is located towards the south western corner of the site, a short distance south of the administration building. The workshop is used for the general maintenance, servicing and remanufacture of the crushing and screening plant.

The second workshop is predominantly used for the maintenance and servicing of haulage trucks and consists of a large metal clad building. The building contains the servicing bays and large racked areas for the storage of larger plant parts and tools.

5.2 AMENDED ACCESS ARRANGEMENTS

Consent is sought for the construction of a new access driveway which will provide direct access from the quarry site to Dungog Road. The new access driveway will mean that the haulage route will no longer run via Station Street and Grace Avenue.

The new access driveway is proposed as a means of addressing some of the issues that were raised during stakeholder consultations (Refer to the Stakeholder Consultation Summary Report at **Appendix E**).

Related to the proposed access arrangements is the proposed closure of a road that lies west of Lot 21 DP773220 and Lot 1 DP1006375. Crown Lands has identified the road as part Crown road and part Council road (see Figure 6 below).

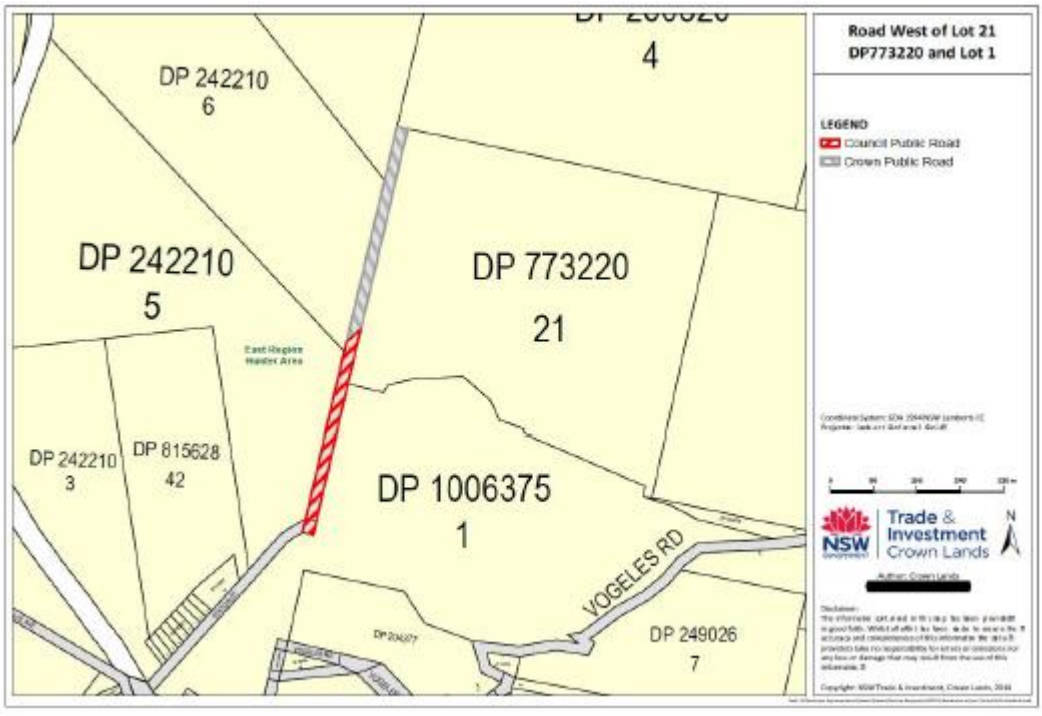

Figure 6 Road proposed for closure and acquisition

Crown Lands issued a status report in May 2015 (Refer **Appendix B**) and since then applications have been made to Crown Lands and Dungog Shire Council in respect of closing the road and acquisition.

5.3 AMENDED HOURS OF OPERATION

As referred to previously, the existing development consents are outdated and do not provide specific parameters for the operation of the quarry. The hours of operation are currently regulated by the environment protection licence.

It is proposed that the hours of operation at the quarry be amended to create efficiencies and provide flexibility in the production chain.

The hours of operation for the pugmill and binder delivery and sales loading have been proposed to meet market demand and due to the nature of the materials. Details and the reasoning for this are outlined in the Heavy Vehicle Route and Market Assessment at **Appendix D** and summarised in Part 4 of this EIS.

The main changes to the existing hours of operation involve the following operations:

- In Pit Operations - Quarrying between 6am and 6pm (Monday to Saturday)

  Processing between 6am and 10pm (Monday to Saturday);
- Pugmill mixing and binder delivery operations - 4:30am to 10pm (Monday to Friday), and 4:30am to 6pm on Saturdays;
- Sales Loading and Stockpiling for Road Transport - 5:30am to 7pm (Monday to Saturday); and
- Train Loading - 24 hours / 7 days a week.

It should be noted that the hours during which blasting operations are permitted is proposed to remain unchanged.

5.4 QUARRY EXPANSION

It is proposed to expand the quarry operations into Lot 42 DP815628 and Lot 21 DP773220 (East Pit A). The viable resource on Lot 42 DP 815628 is located to the northern section of the lot and spans over approximately 2.5ha. The entire proposed extraction area contains 38.07 million tonnes of viable resource (Refer **Appendix K**) (see Figure 7 below).

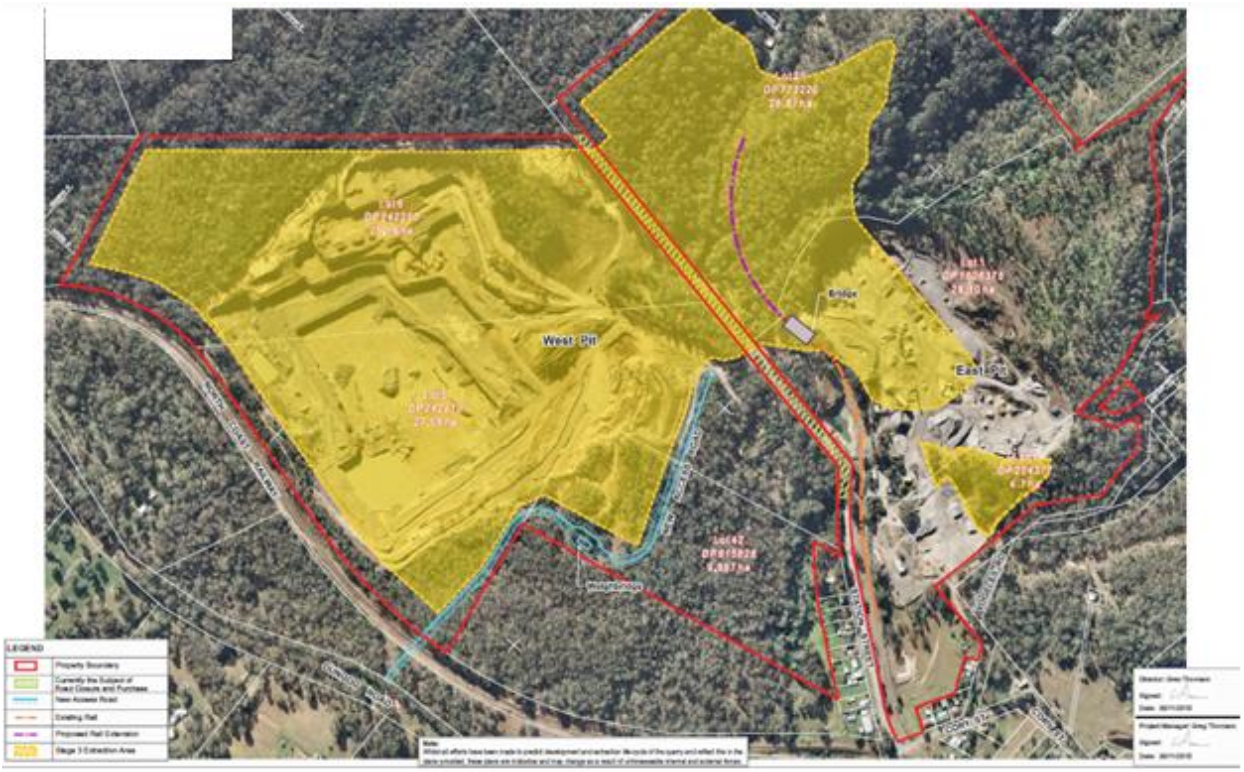

Figure 7 Site map showing proposed excavation areas at the final stage of the operations

It should be noted that the previous approvals over the site permitted that clearing of the undisturbed areas on Lots 5 & 6 DP242210 (within the West Pit). The operator is planning on utilising these areas for future extraction purposes in the short to medium term. The vegetation identified for clearing includes approximately 10ha of land.

In addition, some clearing of Lot 42 DP815628 (comprising 2.4ha) will also be included in the proposal.

The area to be cleared as part of the proposed extraction operations within East Pit A will comprise approximately 23ha.

The initial site preparation works will involve the clearing of the resource areas. Once the overburden has been removed and secured, extraction of the resource will commence in a similar manner to the existing operations.

It should be noted that the fixed plant has been designed to manage the processing of sufficient material to service current demand and no additional fixed plant will therefore be required as part of the application. However, mobile plant will be utilised during fixed plant maintenance periods and when specific materials are in high demand.

Detailed staging plans are attached at **Appendix C**.

5.5 REHABILITATION

A Site Rehabilitation Plan (**SRP**) has been prepared by Conacher Consulting Pty Ltd for the existing and future quarry areas within the Martins Creek quarry (Refer **Appendix L**). The SRP has been designed to address the long term rehabilitation of the quarried and disturbed areas within the site. In particular, the SRP relates to the areas used for quarry activities, including internal roads, loading areas, stockpile areas, processing areas, extraction pit and the quarry faces. Other areas required to be revegetated and managed are to be incorporated into a Vegetation Management Plan, and include areas alongside drainage lines, landscaping areas, and areas of retained natural vegetation.

It should be noted that this SRP should be considered a concept plan for site rehabilitation, with the extent of works required for adequate rehabilitation to be identified in a regularly updated n Site Rehabilitation Report for the subject site. The Site Rehabilitation Report will provide an ongoing detailed revision required for this SRP and the requirement for the preparation of a detailed plan for rehabilitation may be part of the consent issued for the development (see clause 17 of the Mining SEPP).

It is proposed that the rehabilitation plan be undertaken as the resource extraction areas in Lot 5 and 6 reach their extraction limits. As such, it is proposed that the rehabilitation works be implemented progressively over the next 25 years, as:

- Ancillary disturbed areas are no longer required for ancillary activities;
- Quarry benches and extraction faces reach their extraction limits.

Principles for rehabilitation plan

The SRP has been undertaken in accordance with the following rehabilitation principles and actions:

1. Identify the post quarry land use ï This principle involves determining the final land use with respect to permissibility within the current zoning.

   The final land use of the rehabilitated quarry is dependent on the final contours of the rehabilitated pit, with the following uses considered suitable for future land use of the site:

   - Stock grazing of fenced pasture paddock on flat areas;
   - Horticultural production in multi-span hydroponic facilities (greenhouses);
   - Poultry production in tunnel ventilated sheds;
   - Outdoor adventure park incorporating activities such as abseiling, rock-face climbing, archery, quad bike riding, water activities, bush survival;
   - Renewable electricity generation using solar collectors; and
   - Native plant production nursery.

   At this stage, it is considered that the most likely final land use of the site will be an agricultural activity of sustainable stock grazing once the flatter areas have revegetation to a condition to allow for controlled stock grazing. Bushland rehabilitation is proposed for quarry slopes, batters and rehabilitated access tracks within bushland areas.

Agricultural activities might be undertaken on the flatter quarry floor areas, or alternatively these areas may be naturally rehabilitated for offset areas.

It should be noted that the final landforms within the quarried areas will consist of vertical batter face slopes, horizontal benches, flat quarry floor areas, and ponded water areas retained for sediment control and hydrological balance purposes.

2. Implement progressive site rehabilitation ï This principle involves the progressive rehabilitation of ancillary areas as appropriate fill and topsoil becomes available. Rehabilitation is proposed to be undertaken as the final extraction depth of the area has been achieved and the land is no longer being used.

3. Identify a final stable and permanent landform ï This principle involves the final landform of the site, being benched battering leading to a pond at the base of the quarry pit. The overall site will comprise several different areas, including the quarry pit area, pit benches and the rehabilitated infrastructure areas.

4. Revegetate disturbed land surfaces to achieve a sustainable vegetation cover ï This principles involves the final land surfaces to be reshaped to stable landforms. Revegetation will then be undertaken using SRP specific seed and fertilizer mixes to achieve the desired revegetated outcome.

5. Incorporate appropriate erosion and sediment control and water management measures during site rehabilitation ï This principle involves the preparation of an Erosion and Sediment Control Plan and Stormwater Management Plan. This Erosion and Sediment Plan will require amendments to be made in response to the revised SRP after 3 years of operation of the expanded quarry operations. The Stormwater Management Plan is to be finalised for the proposed final landform of the area. This plan will also require amendments in response to the revised SRP.

6. Implement appropriate site maintenance procedures ï This principle requires a list of site maintenance procedures to be developed dependent on the issues and matters being addressed.

7. Develop a monitoring and reporting program ï This principle refers to the environmental monitoring and reporting of the quarry rehabilitation provided in the Preliminary Monitoring Program.

Specifically, the rehabilitation plan identifies the measures, procedures and timing of works which will be undertaken to satisfactorily rehabilitate the land. The principal objectives of the proposed site rehabilitation include:

1) *Remove unconsolidated fill material (soil, rock, roadbase etc) from around site and use this material (or other suitable fill material) to reshape areas for vegetation,*
2) *Rehabilitate/reshape the disturbed land surfaces external to the pit areas in a manner compatible with the final determined land use, in stages as areas become available for rehabilitation,*
3) *Revegetate disturbed land surfaces which have been shaped and topsoiled to create grasses, stable soil surface or other vegetation on batter slopes to prevent soil erosion and to provide a long term vegetation cover.*

The areas proposed for rehabilitation include lands disturbed for the purposes of extraction operation, processing, storage, transport and for the management of the quarry. These areas and proposed rehabilitation works include the:

- Removal of the haul roads,
- Removal or upgrading of the culverts over drainage lines,
- Removal of storage and loading areas, and
- Revegetation of disturbed areas, except the principal access/management tracks.

The rehabilitation of the site involves the retention of excavation pit batters, topsoil treatment, revegetation, surface mulching and habitat enhancement. Specifically, this will include:

1) Retention of pit batters ï it is proposed that the benched batters of the excavation put be retained in the shape achieved during extraction;
2) Topsoil treatment ï all topsoil for revegetation is to be Certified VENM or ENM. This can be either sourced from soil stored on site or from suitable material imported to the site. Soil testing of reuse samples and disturbed roads, bunds and stockpiles will be undertaken to determine any soil constraints or soil improvement requirements.
3) Revegetation ï revegetation of quarry floor areas using native trees, shrubs and groundcover species is not proposed at this stage of rehabilitation. These species in particular are suited to the ancillary areas and riparian zones identified within the Vegetation Management Plan for rehabilitation. Permanent pasture species such as Kikuyu, Rye Grass and Clover with a mix of temporary cover crop such as Oats and Japanese Millet are proposed as the mix for revegetation. Larger areas may also be subject to direct placement of soil, large rocks and logs/branches which will provide habitat enhancement opportunities for vegetation regeneration and fauna occupation over time.
4) Surface mulching ï surface protection against rainfall impact and protection for germinating seeds will be achieved by a surface of straw mulch, relocated trees, or eucalypt mulch. The breakdown of this matter will also benefit the soil structure for rehabilitation purposes.
5) Habitat enhancement ï as mentioned above, the rehabilitation program includes habitat enhancement achieved through the placement of rocks, soil, tree branches, and tree logs within the rehabilitation area suitable for fauna habitat. This will be completed stage by stage as suitable habitat resources become available from the areas proposed for future quarry expansion.

It should be noted that regular six monthly inspections are to be undertaken in accordance with the SRP. This will monitor the progression of the rehabilitation works, including inspection of vegetation growth and presence of weeds or pests within revegetation areas. The results from these inspections will be compiled into an annual monitoring report.

Refer to **Appendix L** for further details regarding the rehabilitation proposal and process.

6. Statutory and Planning Context

This chapter outlines the strategic planning polices and statutory provisions that apply to the subject site. A number of other environmental planning instruments have also been reviewed to ascertain whether they apply to the proposed development.

6.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Act 1979* (and associated Regulations) provides the basis for urban and regional planning in NSW.

The objectives of the EP&A Act are:

(a) to encourage:

- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
- *(iii) the protection, provision and co-ordination of communication and utility services,*
- *(iv) the provision of land for public purposes,*
- *(v) the provision and co-ordination of community services and facilities, and*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development, and*
- *(viii) the provision and maintenance of affordable housing, and*

The proposed regularisation of current operations at the quarry will ensure that the quarry, that has been part of the fabric of the local community and environment for the past century, is managed so as to limit the impact on the local environment to the greatest extent practicable. This EIS shows that the existing and expanded quarry operations can be undertaken in a sustainable manner and should be considered in the public interest. The expansion is also considered to be an orderly and economic use of the development site, given the proximity to the existing operations.

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

The proposal has been discussed with both local and State government authorities to ensure all levels of government has been clearly informed of the proposal. It is considered that all levels of government will be tasked with the planning and monitoring of the quarry operations.

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The proponent has undertaken ongoing community consultations through regular updates on the progress of the application at community meetings and the internet.

Section 5A of the EP&A Act lists the factors that must be taken into account in the assessment of the proposal under Part 4 of the EP&A Act, when deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats.

The Biodiversity Assessment Report includes and assessment addressing section 5A of the EP&A Act in the ôAssessment of significanceôprepared by Conacher Consulting Pty Ltd (Refer **Appendix L**).

Division 4.1 of the EP&A Act provides the specific provisions for State Significant Development (SSD) and states that this section of the Act pertains to development declared SSD under the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). This type of development will be assessed and determined by the Minister following public participation in the process.

As per Section 89H of the EP&A Act, the assessment will be undertaken against the matters for consideration provided in Section 79C of the EP&A Act. These provisions state that, in determining a development application, a consent authority must consider the following matters:

(a) the provisions of:

(ii) any environmental planning instrument, and

(iii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and

(iv) any development control plan, and

(iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and

(v) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and

(vi) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979), that apply to the land to which the development application relates,

This EIS addresses the provisions of any relevant regulations, various environmental planning instruments, development control plans and the offsets strategy and roadworks that will form part of the proposed offer to enter into a draft planning agreement. It is noted that no coastal zone management plans are applicable to the proposal.

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

This EIS provides a detailed account of the likely environmental impacts and the potential mitigating measures to ameliorate the impacts in Sections 8 and 9.

(c) the suitability of the site for the development,

This EIS addresses the site suitability in Section 2 and Section 8.

(d) any submissions made in accordance with this Act or the regulations,

The application will be exhibited as specified under the provisions of Section 89F of the EP&A Act.

(e) the public interest.

It is considered that the proposal is in the public interest for the reasons outlined in this EIS which also includes consideration of the integration of economic, social and environmental considerations and the principles of ecologically sustainable development.

Section 89J states that the following approvals do not apply to SSD:

- *concurrence under Part 3 of the Coastal Protection Act 1979 of the Minister administering that Part of that Act,*
- *a permit under section 201, 205 or 219 of the Fisheries Management Act 1994,*
- *an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977,*
- *an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974,*
- *an authorisation referred to in section 12 of the Native Vegetation Act 2003 (or under any Act repealed by that Act) to clear native vegetation or State protected land,*
- *a bush fire safety authority under section 100B of the Rural Fires Act 1997,*
- *a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000.*

6.2 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

Part 3 of Schedule 2 to the *Environmental Planning and Assessment Regulation 2000* (**Regulation**) sets out the requirements for an EIS:

a) a summary of the environmental impact statement,
b) a statement of the objectives of the development, activity or infrastructure,
c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,
d) an analysis of the development, activity or infrastructure, including:
    i. a full description of the development, activity or infrastructure, and
    ii. a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and
    iii. the likely impact on the environment of the development, activity or infrastructure, and
    iv. a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and
    v. a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,

e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),
f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development.

The summary of this EIS and the objectives and a full description of the proposal are set out in the Executive Summary and Section 5. An analysis of feasible alternatives to the development is set out in Section 4 of this EIS and the approvals that must be obtained before the development can be carried out are listed in Section 6. A description of the environment is set out in Sections 2 and 8, the likely impacts of the development are addressed in Section 8 with a summary of the proposed mitigation measures listed Section 9.

The reasons justifying the carrying out of the development, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development, are included in Sections 3 and 10.

6.3 STATE ENVIRONMENTAL PLANNING POLICIES

STATE ENVIRONMENTAL PLANNING POLICY (STATE AND REGIONAL DEVELOPMENT) 2011

In October 2011, SRD SEPP was enacted. The objectives of the SRD SEPP are:

a) To identify development that is State Significant Development;
b) To identify development that is State Significant Infrastructure and Critical State Significant Infrastructure; and
c) To confer functions on Joint Regional Planning Panels to determine development applications.

This SEPP identifies development that is considered to be State Significant Development (SSD), State Significant Infrastructure (SSI) or by virtue of Schedule 4A of the EP&A Act is considered to be classified as Regional Development. The Schedules of the SRD SEPP identify specific sites or list criteria that determine whether a proposed development is classified as SSD or SSI.

The classification of a development as SSD or SSI under this policy determines that a development is to be determined by the Minister for Planning.

Clause 8 of the Policy relates to the declaration of SSD under Section 89C of the EP&A Act 1979. Two classifications of SSD are identified in the Policy and include:

(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and
(b) the development is specified in Schedule 1 or 2.

The thresholds for *Extractive industries* are included in Schedule 1 of the Policy and state that development that exceeds 500,000 tonnes of extractive materials per year or where the total resource exceeds 5 million tonnes is considered SSD.

The Martins Creek quarry operations will have the capacity to extract up to 1,500,000 tonnes of material and the total resource is estimated at approximately 38.07 million tonnes (refer **Appendix K**). The proposal is therefore declared to be State Significant Development and the application is to be determined by the Minister (or delegate).

STATE ENVIRONMENTAL PLANNING POLICY (MINING, PETROLEUM PRODUCTION AND EXTRACTIVE INDUSTRIES) 2007

The objectives Policy are:

a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and
b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and
(b1) to promote the development of significant mineral resources, and
c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and

Part 3 of the Policy provides the matters that should be considered during the assessment of the application. These include:

- Compatibility of proposed mine, petroleum production or extractive industry with other land uses;
- Impacts on/from:
  - significant water resources;
  - threatened species and biodiversity;
  - greenhouse gas emissions;
- Resource recovery;
- Transport; and
- Rehabilitation.

The compatibility of the proposal with other land uses is addressed specifically in Part 8 of this EIS and in the Geotechnical Assessment at **Appendix K**. The quarry is considered the preferred use of the subject site, given it is the location of current quarry operations and the measures proposed in this EIS to minimise impacts on the surrounding development and any incompatibility.

The significant public benefits of the proposal are addressed in the Social and Economic Impact Assessment (Refer **Appendix O**), in particular the likely contribution to the regional and State economies and infrastructure projects. Given the public benefits associated with the existing and approved use of the site, it is considered that the proposal is comparatively the preferred use of the land rather than the other uses in the vicinity of the development.

It is noted that clause 13 of the Policy requires a corresponding assessment of the compatibility of development proposed in the vicinity of the existing quarry to be undertaken if a development application is made relating to land in the vicinity of the existing quarry. This clause would have applied to recent approved residential uses in the vicinity of the Martins Creek quarry. It is presumed that those approvals contained an assessment that concluded residential uses located in the vicinity of the existing quarry were considered acceptable and compatible with the quarry.

The proposal is considered to have similar impacts as current operations as the rate of laden truck movements per hour from the quarry will remain as per current numbers and blasting at the quarry is proposed to remain at the levels regulated under the existing EPL (See Section 8 of this EIS).

The proposal is also likely to reduce some of the current impacts on neighbouring residential properties (for example by the relocation of access to the quarry, and provision of onsite parking for trucks refer to Section 5 of this EIS).

Therefore the conclusion that the quarry and proposed extension is acceptable and compatible with surrounding residential landuses is consistent with the previous recent assessments and planning decisions made about other development in the vicinity of the subject site and existing quarry.

Clause 12A of the Policy requires consideration of the ôVoluntary Land Acquisition and Mitigation Policyõpublished by the Minister in the Government Gazette on 19 December 2014. This has been addressed in the Acoustic Assessment Report prepared by RCA Australia Pty Ltd which notes that if consent is granted for the 24 hour loading of trains, the Applicant may be able to offer voluntary land acquisition to some of the residents in Station Street and Corey Street (Refer **Appendix I**).

Clause 14 of the Policy requires a range of natural resource management and environmental management issues to be addressed. The likely impacts on significant water resources, including surface and groundwater resources are addressed in the Water Quality Impact Assessment (Refer **Appendix G**).

Consideration of threatened species and biodiversity has been addressed in Section 8 of this EIS and the Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd (Refer **Appendix L**). Biodiversity offsets have been determined by Conacher Consulting Pty Ltd in accordance with the Framework for Biodiversity Assessment (published by OEH in September 2014).

Consideration of greenhouse gas emissions is included in Section 8 of this EIS and has been assessed in the Air Quality Impact Assessment prepared by JM Environments Pty Ltd (Refer **Appendix F**) having regard to the applicable State and national policies, programs and guidelines concerning greenhouse gas emissions.

Clause 15 of the Policy requires the efficiency of the development in terms of resource recovery to be addressed. The Environmental Management Plan at **Appendix C** outlines how waste is currently minimised at the site and, where feasible, recycled. These measures are proposed to be continued at the site.

Clause 16 requires traffic and transport to be considered in respect of transport along public roads, truck movements in residential areas or near to schools. The assessment of traffic and noise impacts in this EIS address these issues (Section 8) and these matters have been addressed in detail in the Acoustic Assessment Report and Traffic Impact Assessment (Refer **Appendices I** and **H**).

Clause 17 of the Policy requires site rehabilitation to be addressed. The Rehabilitation Plan prepared by Conacher Consulting Pty Ltd (Refer **Appendix L**) and Section 8 of this EIS address rehabilitation.

STATE ENVIRONMENTAL PLANNING POLICY 44 - KOALA HABITAT PROTECTION

The State Environmental Planning Policy 44 ï Koala Habitat Protection (**SEPP 44**) applies to the site and one of the species of feed tree listed in Schedule 2 of the SEPP was observed on the site.

The Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd (**Appendix L**) contains an assessment against the provisions of SEPP 44 and concludes that the site is not likely to contain potential Koala habitat and therefore does not require further assessment under the SEPP.

STATE ENVIRONMENTAL PLANNING POLICY 33 - HAZARDOUS AND OFFENSIVE DEVELOPMENT

Under clause 12 of the SEPP a development for the purposes of a potentially hazardous industry must prepare a preliminary hazard analysis in accordance with the current circulars or guidelines published by the Department of Planning and Environment, and submit the analysis with the development application.

A preliminary hazard analysis or risk screening methodology under SEPP 33 has been prepared for the proposed works (Refer to Section 8 of this EIS).

STATE ENVIRONMENTAL PLANNING POLICY (INFRASTRUCTURE) 2007

This SEPP identifies the planning regime for selected infrastructure works in NSW, which are undertaken predominantly by public authorities.

Subdivision 15 of the SEPP contains specific provisions relating to development within or near rail corridors.

Clause 84 relates to development involving access via level crossings. Any development that will ólikely significant increase in the total number of vehicles or the number of trucks using a level crossing that is in the vicinity of the developmentômust be referred to the rail authority, being the Australian Rail Track Corporation (ARTC). The assessment also needs to take into account the implications of traffic safety and the alternative access arrangements. It is noted that the proposed construction of the bridge will reduce the number of vehicles using a level crossing in the vicinity of the development.

Clause 85 relates to development immediately adjacent to rail corridors. No works are proposed within the rail corridor during the initial stage of the proposed development. The design of the

new rail bridge crossing will be undertaken with ARTC approval and the ARTC has approved the location of the future works (Refer **Appendix C**).

Clause 86 relates to any excavation undertaken within, above or adjacent to rail corridors. Similar to clause 85 above, no works are proposed within the rail corridor during the initial stage of the proposed development. The design of any new rail crossings will be undertaken with ARTC approval and the ARTC has approved the location of the future works (Refer **Appendix C**).

Under clause 104 of the SEPP (and Schedule 3) the provisions of this SEPP apply to the proposed development as it will be traffic generating development. As such, the development will need to be referred to the RMS. As part of the preparation of this EIS, consultation has been conducted with the RMS regarding potential upgrade works to the surrounding classified roads (see Section 7 of this report and **Appendices E** and **H**).

Access and traffic impacts have been addressed in the Traffic Impact Assessment prepared by SECA Solution Pty Ltd (Refer **Appendix H**) and Section 8 of this EIS.

STATE ENVIRONMENTAL PLANNING POLICY NO. 55 – REMEDIATION OF LAND

The objectives of this SEPP are 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:

(a) By specifying when consent is required, and when it is not required, for a remediation work.
(b) By specifying certain considerations that are relevant in rezoning land and in determining Development Applications in general and Development Applications for consent to carry out a remediation work in particular.
(c) By requiring that a remediation work meet certain standards and notification requirements.

Under Clause 7(1) of the SEPP, a consent authority must not consent to the carrying out of any development on land unless:

(a) It has considered whether the land is contaminated.
(b) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out.
(c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

A Contamination Assessment has been undertaken by JM Environmental (Refer **Appendix J**) which includes a review of historical data with respect to contamination on the site. The Assessment concludes that the activity of quarrying over time has a low risk of having caused contamination on the site. The storage and use of petroleum products on the site over time and the presence of railway sleepers on site is considered to present a medium risk of contamination in those locations. The Assessment concludes that, given the proposed use of the site continues to be for quarrying activities and rail use associated with the quarry, the risks are considered low.

STATE ENVIRONMENTAL PLANNING POLICY – RURAL LANDS 2008

The subject site is located in the Dungog Shire local government area and is zoned rural under the Dungog LEP and the *State Environmental Planning Policy (Rural Lands) 2008* (SEPP Rural Lands) therefore applies to the development.

The Rural Planning Principles set out in the Policy include:

a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,
b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,
c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development, in planning for rural lands, to balance the social, economic and environmental interests of the community,
d) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,
e) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,
f) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,
g) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The proposal is considered in line with these principles as the quarry is currently an economically productive industry established on the site and development of the quarry as proposed in this EIS will likely not impact any rural and agricultural uses in the locality. The WQIA at **Appendix G** and Section 8 of this EIS assess impacts on water resources and native vegetation and biodiversity impacts have been assessed in the Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd at **Appendix L**.

6.4 DUNGOG LOCAL ENVIRONMENTAL PLAN 2014

The proposed development can be defined as ôExtractive Industriesõ under the provisions of the *Dungog Local Environmental Plan 2014* (**Dungog LEP**) (emphasis added):

> ***Extractive Industries*** *means the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or* ***quarrying****, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming.*

The majority of the subject site is zoned RU1 Primary Agriculture. Within this zone, extractive industries are permissible with consent.

A small section of land within Lot 1 DP204377, located towards the southern extent of the site, is zoned RE1 ï Public Recreation. This area does not form part of the quarryõs current operations and will not be impacted by the proposal.

The objectives of the RU1 zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To provide for recreational and tourist activities that are compatible with the agricultural, environmental and conservation value of the land.*
- *To promote the rural amenity and scenic landscape values of the area and prevent the silhouetting of unsympathetic development on ridgelines.*

The consistency with the zone objectives is presented below (Table 6.1).

Table 6.1: Consistency of the Proposal with the Zone Objectives

Zone Objective	Comment
• *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*	The quarry has operated from the subject land for well over 100 years and the surrounding land has been subdivided into smaller lifestyle lots. It is therefore considered that the area does not contain a high level of agricultural value, and the proposed continuation of the quarry operation will not impact significantly on the natural resource base.
• *To encourage diversity in primary industry enterprises and systems appropriate for the area.*	The continuation of the quarry operations will not impact on the diversity of agricultural activities in the area.
• *To minimise the fragmentation and alienation of resource lands.*	The proposal will not result in the further fragmentation of resource lands.
• *To minimise conflict between land uses within this zone and land uses within adjoining zones.*	The proposal includes measures to mitigate any existing and likely land use conflicts, these measures are set out in Section 9 of this EIS.
• *To provide for recreational and tourist activities that are compatible with the agricultural, environmental and conservation value of the land.*	Not applicable.

Given the above, it is considered that the current use and the proposal is consistent with the objectives of this zone.

The objectives of the RE1 zone are:

- *To enable land to be used for public open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*

As no works are proposed for this section of the site, the proposed development is considered consistent with the zoning objectives.

Clause 5.10 ï Heritage Conservation

The objectives of clause 5.10 are:

a) to conserve the environmental heritage of Dungog,
b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,
c) to conserve archaeological sites,
d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

Section 8 of this EIS includes an assessment of historic heritage and Aboriginal cultural heritage values.

Clause 6.12 ï Protection of rural landscapes in rural and environment protection zones

This clause applies to land in the RU1 zone and aims to protect the rural amenity and character of the land by managing visual impact. The clause requires the consideration of whether:

a) any buildings that form part of the development will blend into the landscape and not become silhouetted on a ridgeline, and
b) the design, bulk and colours of any such buildings will be compatible with the surrounding landscape.

The Visual Impact Assessment prepared by Moir Landscape and Architecture Pty Ltd (Refer **Appendix P**) and Section 8 of this EIS addresses these matters.

6.5 DUNGOG DEVELOPMENT CONTROL PLAN

The Dungog Development Control Plan (**DCP**) does not apply to State significant development under clause 11 of the *State Environmental Planning Policy (State and Regional Development) 2011*, any relevant matters in the DCP are matters for consideration under section 79C(1)(a)(iii), including:

Chapter 5 Bushfire

Bushfire risks and hazards are addressed in Section 8 of this EIS.

Chapter 9 Employment Development

This chapter requires the consent authority to give consideration to principles regarding the following:

- *Building, siting design and construction* ï the development must recognise the physical characteristics of the site and enhance the functionality of the locality;
- *Any special characteristics of the development* - special characteristics that may adversely affect the amenity of the site or surrounding areas must be identified and appropriate designs features and ameliorative measures incorporated;
- *Access, traffic and parking* ï compliance with any relevant guidelines for traffic, off-street parking etc must be considered;
- *Landscaping and appearance* - The development must enhance the appearance of the site and its surrounding area. Landscaping will be required with applications for employment development.

This EIS addresses the characteristics of the site and the functionality of the locality at Sections 2, 3 and 5); the special characteristics of the proposed development are addressed in the Sections dealing with noise, air quality, blasting and water quality impacts; and traffic impacts. Traffic and parking also addressed in the Traffic Impact Assessment attached at **Appendix H** and landscaping and appearance is addressed in Section 8 of this EIS and in the Visual Impact Assessment at **Appendix P**.

The performance standards relevant to this development include standards for parking and loading; building materials; landscaping and fencing. Parking and loading has been addressed as part of the traffic impact assessment and acoustic assessment in Section 8 of this EIS. Landscaping and fencing have been addressed in the visual impact assessment in Section 8 of this EIS.

Chapter 16 Biodiversity

Biodiversity has been assessed in Section 8 of this EIS and **Appendix L**.

Chapter 20 Off Street Parking

The DCP requires new developments to provide off-street parking and loading facilities for new developments and alterations to existing developments. The DCP requires heavy vehicles to be loaded and unloaded off street, and to enter and exit properties in a forward motion. The proposal complies with the requirements for on-site parking, and provides for additional overnight parking for trucks (Refer **Appendix H**).

6.6 UPPER HUNTER STRATEGIC REGIONAL LAND USE PLAN 2012

The Upper Hunter Strategic Regional Land Use Plan 2012 represents a framework ótoô support growth, protect the environment and respond to competing land uses, whilst preserving key regional values over the next 20 years.ô

The site is identified within this strategy as a non-energy mineral resource (Figure 8). The majority of these resources include extraction of materials ósuchô as hard rock aggregate, sand.ô

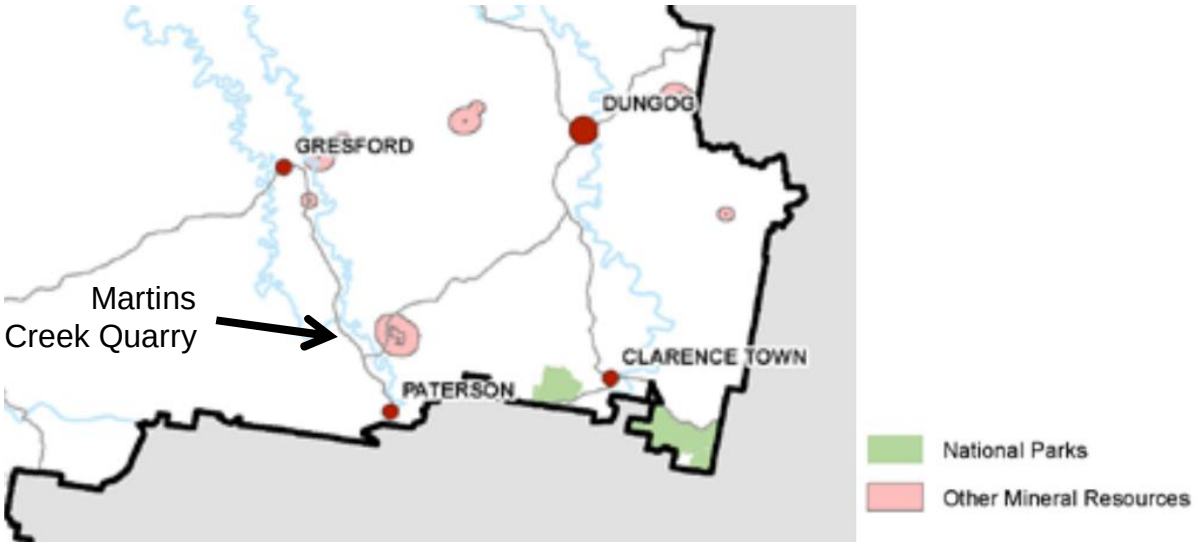

Figure 8 Extract from the Upper Hunter Strategic Regional Land Use Plan 2012

Martins Creek Quarry therefore plays an important role in the local community through the supply of a wide variety of quarry materials, while also employing up to 100 workers as a result of the quarry activities and in the distribution of materials.

The surrounding areas are not identified as Strategic Agricultural Land and it is considered that the ongoing quarrying activities will not impact on any strategic rural activities.

6.7 DRAFT HUNTER REGIONAL PLAN 2015

The draft Hunter Regional Plan 2015 (**draft Plan**) was exhibited for community consultation in November 2015. When finalised, the Plan will replace the Upper Hunter Strategic Regional Land Use Plan and other strategic plans applying to the Lower Hunter and NSW Mid-North Coast.

The subject site falls within the landscape subregion identified in the draft Plan as ôNorthern Topsô Relevant to the proposed development, the draft Plan notes that the Northern Tops subregion ñwill continue to be important to the future growth of the Hunter, with its natural features and rural communities supportingé a range of minerals supplies, supporting regional manufacturing and construction industries.ò

The draft Plan also identifies existing and potential mineral resource lands and recognises that ñmany of these (mineral resources) also provide affordable supply sources for other industries operating within the region, including, for exampleé construction industries, which use fine aggregates to make concrete and asphalt and coarse aggregates as road and rail ballast.ò

Martins Creek Quarry is identified in the draft Plan on a map showing the areas where mining and quarrying operations are ongoing or proposed, where additional resources have been identified but not yet developed, and where further exploration is anticipated, which may lead to mining activities in future (Figure 9):

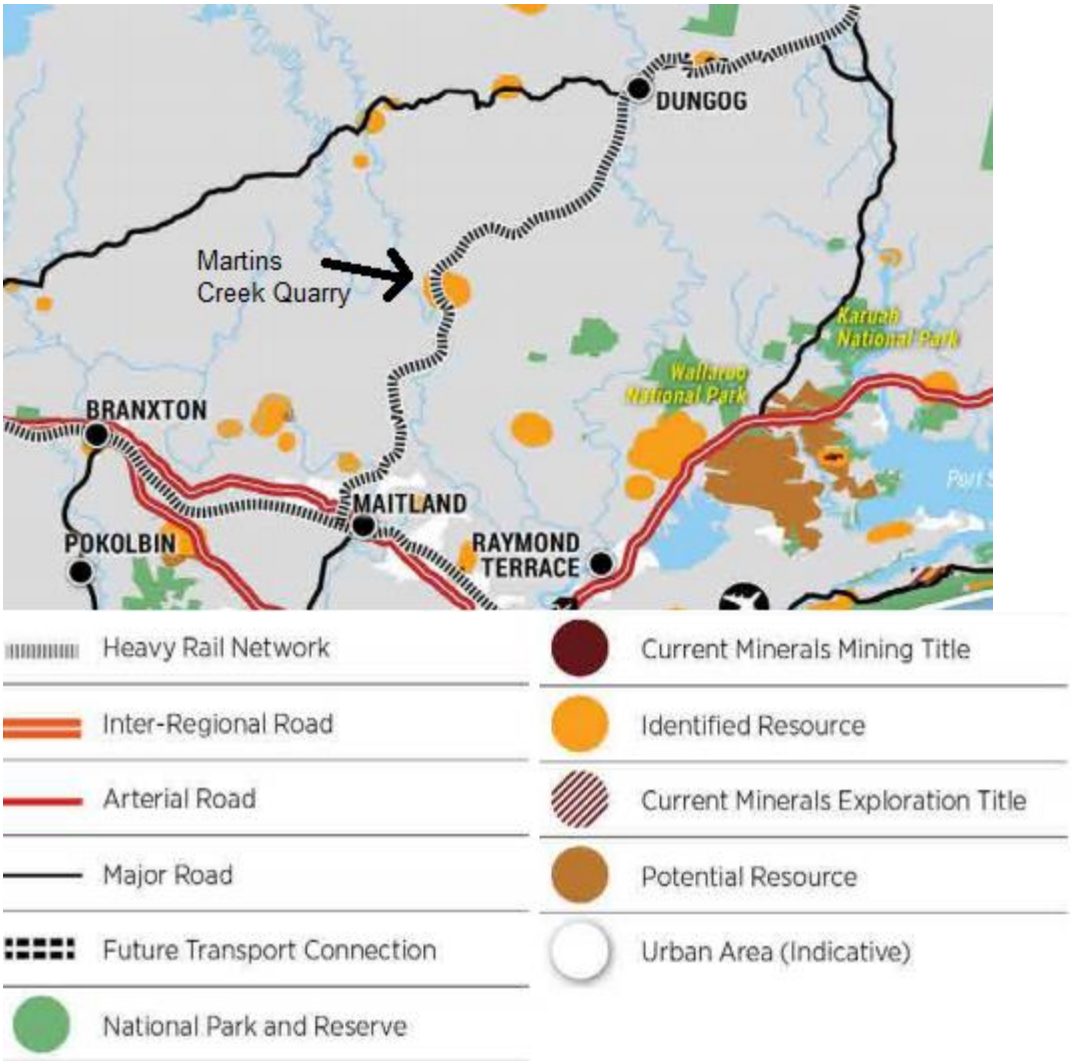

Figure 9 Extract from the draft Hunter Regional Plan 2015

The proposal to regularise and extend quarrying operations at Martins Creek is consistent with the draft Plan, given that Martins Creek Quarry is identified as an existing resource area where quarrying operations are ongoing and proposed, and the proposal is consistent with the aim of supporting manufacturing and construction industries in the Hunter.

6.8 OTHER LEGISLATION

PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The *Protection of the Environment Operations Act 1997* (**POEO Act**) aims to *'protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development'* and *'reduce risks to human health and prevent the degradation of the environment'.*

Schedule 1 of the Act contains the activities that require licencing under the provisions of the Act. Part 19 identifies the specific types of *Extractive Activities* that require licencing and states that land based extractive activities in excess of 30,000 tonnes of extractive materials per annum would trigger the need for an EPL.

As stated above, the Martins Creek quarry currently operates under the provision of EPL No. 1378. No further licencing under the POEO Act is therefore required however an amendment to the current licence may be required following determination so that is substantially consistent with the consent.

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (CTH)

The objectives of the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) are to:

- *provide for the protection of the environment, especially matters of national environmental significance*
- *conserve Australian biodiversity*
- *provide a streamlined national environmental assessment and approvals process*
- *enhance the protection and management of important natural and cultural places*
- *control the international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife*
- *promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources*
- *recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity*
- *promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.*

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage placesð defined in the EPBC Act as matters of national environmental significance.

The Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd contains the results of the search of the Protected Matters Tool (AGDE 2016) for EPBC Act listed threatened and migratory species recorded within 10km of the site (Refer **Appendix L**).

The Commonwealth Department of the Environment and Energy (**DoEE**) declared the proposed development a controlled action on 21 July 2016.

The SEARs were amended and reissued on 4 August 2016 to include additional environmental assessment requirements that need to be addressed so that the proposal can be assessed in accordance with the Bilateral Agreement between the NSW and Commonwealth Governments.

DoEE has determined that the proposed action is likely to have a significant impact on:

- Slaty Red Gum (*Eucalyptus glaucina*) ï Vulnerable;
- Koala (*Phascolarctos cinereus*) combined populations of Qld, NSW and the ACT ï Vulnerable;
- Regent Honeyeater (*Anthochaera phrygia*) ï Critically Endangered;

- Swift Parrot (*Lathamus discolour*) ï Critically Endangered; and
- Spot-tailed Quoll (*Dasyurus maculatus maculatus*) SE mainland population ï Endangered.

The migratory fauna species, Rufous Fantail and Black-faced Monarch were observed on the site during surveys conducted. No threatened ecological communities listed under the EPBC Act were observed on the site during surveys.

Section 8 of this EIS and **Appendix L** detail the assessment undertaken in accordance with the DoEE assessment requirements.

THREATENED SPECIES CONSERVATION ACT 1995

The principle legislation relating to the protection and management of biodiversity and threatened species in NSW is the Threatened Species Conservation Act 1995 (TSC Act).

The main objectives of the TSC Act are to:

(a) to conserve biological diversity and promote ecologically sustainable development, and
(b) to prevent the extinction and promote the recovery of threatened species, populations and ecological communities, and
(c) to protect the critical habitat of those threatened species, populations and ecological communities that are endangered, and
(d) to eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities, and
(e) to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed, and
(f) to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

Consultation and concurrence in respect of threatened species does not apply to State significant development (Section 79B(2A) of the EP&A Act) and the likely impacts on biodiversity and species, populations, ecological communities, and habitats listed under the TSC Act have been addressed in the Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd (**Appendix L**) and in Section 8 of this EIS.

NATIVE VEGETATION ACT 2003

The objects of this Act are:

(a) to provide for, encourage and promote the management of native vegetation on a regional basis in the social, economic and environmental interests of the State, and
(b) to prevent broadscale clearing unless it improves or maintains environmental outcomes, and
(c) to protect native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation, and
(d) to improve the condition of existing native vegetation, particularly where it has high conservation value, and

(e) to encourage the revegetation of land, and the rehabilitation of land, with appropriate native vegetation,

in accordance with the principles of ecologically sustainable development.

The Act defines the clearing native vegetation to means:

(a) cutting down, felling, thinning, logging or removing native vegetation,
(b) killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation.

The proposed development involves clearing of approx. 36.8ha of vegetation, including native vegetation. Under section 89J(1)(e) of the EP&A Act, authorisation for clearing under the *Native Vegetation Act 1993* is not required for State significant development.

The likely impacts of the clearing of native vegetation associated with the proposal have been addressed in in the Biodiversity Assessment Report prepared by Conacher Consulting Pty Ltd (**Appendix L**) and in Section 8 of this EIS.

NATIONAL PARKS & WILDLIFE ACT 1974

The *National Parks & Wildlife Act 1974* (**NPW Act**) aims to conserve objects, places or features of cultural value. These include (but no limited) to:

(i) places, objects and features of significance to Aboriginal people, and
(ii) places of social value to the people of New South Wales, and
(iii) places of historic, architectural or scientific significance

Section 90 of the NPW, relating to the issuing of an Aboriginal Heritage Impact Permit (AHIP), does not apply to State significant development (section 89J(1)(d) of the EP&A Act).

The Aboriginal Heritage Assessment undertaken by Niche Environmental and Heritage (Refer **Appendix N**) and Section 8 of this EIS addresses the potential impact on these and provides an impact assessment.

HERITAGE ACT 1977

The main aim of the *Heritage Act 1997* is to conserve environmental heritage in New South Wales, by regulating the development impacts on the Stateôs historical assets.

Heritage Items are defined as *'a place, building, work, relic, movable object or precinct'*. These items are divided into two Categories, being items of Local and State significance.

Heritage assessments are guided by the NSW Heritage Manual (1996) that provides guidelines to manage heritage items. These are the investigation, assessment and management of the significance.

Heritage approvals and excavation permits under the *Heritage Act 1997* do not apply to State significant development (section 89J(1)(c) of the EP&A Act).

An assessment heritage significance of the Martins Creek Quarry has been undertaken by Niche Environmental and Heritage (Refer **Appendix M**) and Section 8 of this EIS addresses potential impacts.

RURAL FIRE ACT 1997

Section 100B of the *Rural Fires Act 1997* relates to development within bushfire prone land. The provisions state that a bush fire safety authority is required for:

(a) a subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes, or
(b) development of bush fire prone land for a special fire protection purpose.

This requirement does not apply to State significant development (Section 89J(1)(f) of the EP&A Act) and the development does not involve subdivision of residential land or any special fire protection purposes.

Bushfire risks and hazards have been addressed in Section 8 of this EIS and the Bushfire Assessment Report prepared by Conacher Consulting Pty Ltd (Refer **Appendix J**).

WATER MANAGEMENT ACT 2000

The objectives of the Act are *'to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.'*

Approvals under the *Water Management Act 2000* are not required for State significant development (Section 89J(1)(g) of the EP&A Act). A water access license for surface water capture is not required for the proposal as water is to be retained for pollution control.

The site is located within the Water Sharing Plan for the Paterson River Water Source that was established in 2007. Although no water is drawn from the river system, some ephemeral streams on the site will be interrupted. These issues and water quality has been addressed in the Water Quality Impact Assessment (WQIA) prepared by JM Environmental (Refer **Appendix G**) and in Section 8 of this EIS.

It is not proposed that groundwater be used as part of the quarry operation. However, the interception of groundwater has been assessed in the WQIA (Refer **Appendix G**) and in Section 8 of this EIS. There is a current bore licence applying to the existing operations under the *Water Act 1912*.

ROADS ACT 1993

The objects of this Act are:

(a) to set out the rights of members of the public to pass along public roads, and
(b) to set out the rights of persons who own land adjoining a public road to have access to the public road, and
(c) to establish the procedures for the opening and closing of a public road, and
(d) to provide for the classification of roads, and
(e) to provide for the declaration of RMS and other public authorities as roads authorities for both classified and unclassified roads, and

(f) to confer certain functions (in particular, the function of carrying out road work) on RMS and on other roads authorities, and
(g) to provide for the distribution of the functions conferred by this Act between RMS and other roads authorities, and
(h) to regulate the carrying out of various activities on public roads.

Section 138 provides a list of works that require separate approval under the Act. This includes *'carry out a work in, on or over a public road'*ô

Any road works will therefore require separate approval from the relevant road authority.

6.9 OTHER APPROVALS AND LICENSES

The following list of approvals and licenses are likely required under other legislation in order to carry out the proposed extension to the Martins Creek Quarry:

- Approval under section 138 of the *Roads Act 1993*; and
- Approval under *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Amendments to the existing environment protection licence under the *Protection of the Environment Operations Act 1997* will likely also be required to ensure it remains substantially consistent with any consent.

7. Consultation

As part of this EIS, the proponent has undertaken a comprehensive stakeholder and community consultation process for the proposed development at Martins Creek Quarry. This section details how the consultation team carried out the consultation in accordance with the SEARs.

7.1 OVERVIEW OF METHODOLOGY

Prior to the issue of SEARs for the proposed development, the proponent attended a forum held by Dungog Shire Council. This meeting took place on 17th July 2014, and comprised of the following attendees:

- Dungog Shire Council (staff and councillors);
- Maitland City Council, Port Stephens Council;
- Brandy Hill Action Group;
- Bolwarra Residents Group;
- Paterson Progress Association;
- Roads and Maritime Services; and
- Environment Protection Authority.

As a result of this meeting, the proponent established the Martins Creek Quarry Community Consultative Committee (**MCQCCC**). The purpose of this committee is to provide a forum for open discussion between representatives of the company, the community, the council and other stakeholders on issues relating to the development application.

The consultation methodology followed by the proponent includes:

- Initial contact with all relevant stakeholders identified in the SEARs ï this included the opportunity for stakeholders to provide comment and raise issues regarding the proposal.
- Further correspondence and meetings, where necessary, were held to clarify the stakeholder concerns and provide the opportunity for discussion regarding any concerns raised.
- Consultation outcomes shared among the project team to incorporate the comments into the design of the proposal.
- Ongoing discussions with the MCQCCC.

The SEARs that were issued regarding the proposed development identified that consultation with the following stakeholders was required:

- Commonwealth Department of the Environment;
- Office of Environment and Heritage (including the Heritage Branch);
- Environment Protection Authority;
- Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services;
- Department of Primary Industries (including the NSW Office of Water, NSW Forestry, Agriculture and Fisheries sections and Crown Lands division);
- Roads and Maritime Services;

- Hunter Local Land Services;
- Dungog Shire Council;
- Maitland City Council;
- Port Stephens Council; and
- Relevant community groups including, but not limited to:
    - Paterson Progress Association,
    - Bolwarra Heights Community Group, and
    - the Voice of Wallalong and Woodville.

The initial contact with the relevant government agencies, councils, and service providers was made in December 2014, with details and outcomes of the consultation provided within the body of this report and **Appendix E.**

In addition to the aforementioned community consultation activities, the proponent also:

- Established an 1800 community information line for enquiries regarding the proposal;
- Published the information and meeting minutes on the established MC Quarry website as well as placing them at Patterson IGA supermarket and Post Office; and
- Provided availability of consultants to meet and discuss various technical aspects of the EIS with stakeholders.

7.2 CONSULTATION

Key issues associated with the proposed development were identified during consultation with relevant local, State and Commonwealth Government Authorities, service providers, Aboriginal stakeholders, community groups and affected landowners. Key issues were also identified by the proponent, who has a significant history with the operations of the subject quarry, and experience with numerous other similar quarry operations. The following consultation was undertaken in accordance with the issued SEARs, and identifies the key issues relating to the proposal:

7.3 COMMONWEALTH/STATE GOVERNMENT AUTHORITIES CONSULTATION

Commonwealth Department of the Environment

The Commonwealth Department of the Environment has been consulted as part of the stakeholder consultation process during the preparation of the EIS. The details of those consultations are set out in **Appendix E**.

Office of Environment and Heritage

Initial contact was made with the Office of Environment and Heritage (**OEH**) on 24 December 2014.

A meeting with OEH officers was then held on 19 February 2015 to discuss the project and to clarify the assessment framework required by OEH. This meeting was attended by Steve Lewer (OEH), Ziggy Andersons (OEH), Col Phillips (DoPE), Brett Peterkin (Peterkin Consulting) and Phil Conacher (Conacher Consulting).

The discussion primarily revolved around the recently published Framework for Biodiversity Assessment (FBA) process, with which the proponent opted to follow throughout the EIS process.

Comment: Refer to **Appendix E** for further detail.

Office of Environment and Heritage (Heritage Division)

Initial contact was made with the Office of Environment and Heritage (OEH) on 24 December 2014.

A response from the Heritage Division was received on 2 February 2015. The correspondence provided further clarification on the processes to be employed in this preparation of the EIS.

Comment: Refer to **Appendix E** for further detail.

Environment Protection Authority

Initial contact was made with the Environmental Protection Authority (EPA) on 24 December 2014.

The EPA responded on 2 March 2015 and stated that no further comment was necessary at that stage and that the authority would liaise with DoPE directly on any issues.

Comment: No further consultation was required.

Department of Trade and Investment, Regional Infrastructure and Services

A meeting was held with Cameron Ricketts, Cressida Gilmore and Rob McLaughlin from Division of Resource and Energy on 15 December 2014. The officers requested that specific details of the quality and quantity of resource should be provided as part of the application.

Comment: Refer to Section 8 of this EIS and **Appendix K** for further detail.

Office of Water

Initial contact was made with the Office of Water (OW) on 24 December 2014.

An initial meeting with OW officers was held on 28 January 2015 to discuss the project. This meeting was attended by Rowan MacDonald (OW), Alison Collaros (OW), Brett Peterkin (Peterkin Consulting), Bob Staniland (ACOR) and Phil Conacher (Conacher Consulting).

Overall, there were three (3) meetings with the OW, with the following issues and comments discussed:

- Current approvals ï specifically, these were to be identified and operational aspects identified.

- Water Management Plan/Water Balance is to be developed as part of the EIS, and needs to clearly identify the existing and proposed development.
- Any offsets that impact on creeks are to be addressed.
- Any groundwater impacts are to be considered, with reference made to Draft North Coast Ground Plan and/or the Water Act 1912.
- The impact assessment of diversion/interception is to be included in the EIS, with the assessment to include any downstream impacts.
- Regeneration of the riparian corridor. This concerned related to the inlets and outlets, which are not to be constructed of rock gabions.
- A staging plan is to be prepared detailing construction and stabilization details of channel prior to water flow.
- Details of the channel being appropriately vegetated and details of buffers; Whilst the vegetation management plan for water courses will be required as part of the management plans post EIS; it is suggested as much detail be included in the EIS as possible
- Aquifer interference Policy (2012) must be addressed in EIS; licensing and ñtakingò of water also must be addressed & impact on the aquifer assessed
- Modelling of groundwater - predicated take of groundwater (i.e. how much water taken from aquifer) must be included in EIS
- If only one option (re diversion of streams) the constraints need to be highlighted; the reasoning needs to be articulated clearly

Comment: Refer to Section 8 within this EIS, and **Appendix G** for further detail.

<u>Department of Primary Industries (including NSW Office of Water, NSW Forestry, Agriculture and Fisheries sections and Crown Land Division)</u>

Initial contact was made with the Department of Primary Industries (DPI) on 30 February 2015, which was followed up with a telephone conversation to clarify the SEARs.

Official correspondence was received from DPI on 3 February 2015 to confirm that the requirements of those SEARs are to be addressed in the EIS to state what land uses are in the vicinity of the quarry and the likely impacts from the project.

Comment: The correspondence concluded that there is no need to meet at this stage, unless any unforeseen issue should arise in the future.

<u>Roads and Maritime Services</u>

Initial contact was made with the NSW Roads and Maritime Service (RMS) on 24 December 2014.

A meeting was held on 4 February 2015, which included Kellee McGilvray (RMS), Tim Browne (RMS), Brett Peterkin (Peterkin Consulting), Bob Staniland (ACOR) and Sean Morgan (Seca Solution).

The following issues were discussed at the meeting:

- Clarification on the study area which RMS considers appropriate.
- Roads or infrastructure for which RMS is the roads authority.
- Any traffic volume measurements undertaken by or available to RMS.
- Road classifications and design traffic volumes.
- Expected growth in the area.
- Design traffic volume and design life for Gostwyck Bridge, including any proposals for bridge maintenance, rehabilitation and or improvement.
- Any road upgrades proposed or identified in relation to the project and haulage routes.
- Any particular traffic issues in relation to the project and haulage routes.
- Any restrictions in place within the area for heavy vehicles in relation to the project and haulage routes.
- Confirmation of RMS advice and requirements.

The actions agreed at the conclusion of the meeting included:

- Provisions of truck numbers and dispersion details to be provided to RMS.
- The RMS to confirm any blackspot / funding areas on current haulage routes.
- The RMS to confirm status of speed review carried out on Tocal Road, Bolwarra.

Daracon held a meeting with RMS, Maitland, Port Stephens and Dungog Councils on 16th November and provided a presentation to RMS and Councils on the road and traffic studies completed for the EIS.

Comment: The above matters are addressed in Section 8 of the EIS and **Appendix H**.

Hunter Local Land Services

A meeting was held on 7 January 2015 that included Steve Eccles (HLLS), Brett Peterkin (Peterkin Consulting) and Phil Conacher (Conacher Environmental).

The following issues were discussed:

- Native Vegetation Act (2003) issues surrounding "maintain and improve vegetation" and "like for like offsets".
- Hunter Central Rivers Catchment Management Action Plan 2013 - 2023.
- SEPP 44 and Threatened Species. Sediment and Erosion control and soil management - including stabilizing topsoil, access driveway and tracks and maintenance and monitoring of the sediment and erosion control plan
- Ground water impacts - with reference to any ground water sharing plan. Surface water management and proposed quarry rehabilitation plan.
- Management of dust.

- LLS noted that some of these issues may well be covered by other agencies and are not specific to LLS.

The following five key issues were identified by Hunter Local Land Services:

- Soils
- Surface Water
- Ground water
- Vegetation
- Quarry rehabilitation plan

Comment: These issues have been addressed in Section 8 of this EIS and in relevant Appendices.

Rural Fire Service

Initial contact was made with the NSW Rural Fire Service (RFS) on 30 January 2015.

The RFS responded on 16 March 2015 and stated that, *'as you will be engaging in a suitably qualified bush fire consultant, there is no need to discuss the matter further with the Rural Fire Service for the preparation of the EIS.*ô

Comment: No further action required.

Australian Rail Track Corporation

The Australian Rail Track Corporation (ARTC) was initially contacted on 5 March 2015.

ARTC responded to the request for comment on 9 April 2015 and identified a number of issues associated with the existing level crossing on Station Street. The response also identified potential upgrades to the level crossing to ensure its continued safe operation.

Key issues identified included safety and potential impacts to level crossing located in Grace Avenue.

Comment: The proponent has proposed a new entrance to the quarry, avoiding the need for quarry traffic to enter the village of Martins Creek and Grace Avenue/Station Street. Refer to Section 8 of this EIS and **Appendix C**.

Land and Property Information

The proponent applied to Land and Property Information to ascertain the road status and the proposed closure of the northern section of Station Street.

The Proponent has lodged an application to close the relevant Crown road as discussed previously in this EIS (See also correspondence attached at **Appendix B**).

Comment: No further action required.

7.4 LOCAL GOVERNMENT

Dungog Shire Council

Initial contact was made with Council on 22 December 2014 to commence the dialogue with Council officers at Dungog Shire Council.

A meeting was held with Council staff on 25 February 2015 and was attended by Jacqui Tupper (Development Services Manager) and Steve Hitchens (Infrastructure Engineer).

This meeting primarily related to clarifying Councilôs submission to DoPE as part of the SEARs, and to ascertain the level of data and analysis Council has available in regards to the local road network.

Key issues discussed focussed on:

- traffic volumes,
- haulage routes,
- road classification,
- design traffic volumes,
- capital works program,
- road condition/alignment,
- proposed works,
- proposed developments,
- particular traffic issues, and
- restrictions/limits.

Daracon provided a presentation to Dungog, Maitland and Port Stephens Councils and RMS on 16th November 2015 which outlined the Roads, Traffic and Transport sections of this EIS.

Comment: Issues have been addressed in Section 8 of this EIS and in relevant Appendices.

Maitland City Council

Initial contact was made with Council on 22 December 2014 to commence the dialogue with Council officers at Maitland City Council.

A meeting was held with Council staff on 20 February 2015 and was attended by Stephen Howes, Kevin Stein and Chris McGrath.

This meeting primarily related to clarifying Councilôs submission to DoPE as part of the SEARs and to ascertain the level of data and analysis Council has available in regards to the local road network.

During the meeting, Council provided data in regards to the traffic numbers and road conditions along the main haul routes. A request for further information was sent to Kevin McGrath subsequent to the meeting.

Key issues discussed focussed on:

- traffic volumes,
- haulage routes,

- road classification,
- design traffic volumes,
- capital works program,
- road condition/alignment,
- proposed works,
- proposed developments,
- particular traffic issues, and
- restrictions/limits.

Daracon provided a presentation to Dungog, Maitland and Port Stephens Councils and RMS on 16th November 2015 which outlined the Roads, Traffic and Transport sections of this EIS.

Comment: Issues have been addressed in Section 8 of this EIS and in relevant Appendices.

Port Stephens Council

Initial contact was made with Council on 22 December 2014 to commence the dialogue with Council officers at Port Stephens Council.

A meeting was held with Council and it was agreed that Council would provide data in regards to the traffic and road conditions along the main haul routes.

Key issues discussed included:

- traffic volumes,
- haulage routes,
- road classification,
- design traffic volumes,
- capital works program,
- road condition/alignment,
- proposed works,
- proposed developments,
- particular traffic issues, and
- restrictions/limits.

Daracon provided a presentation to Dungog, Maitland and Port Stephens Councils and RMS on 16th November 2015 which outlined the Roads, Traffic and Transport sections of this EIS.

Comment: Issues have been addressed in Section 8 of this EIS and in relevant Appendices.

7.5 UTILITIES AND SERVICE PROVIDERS

Hunter Water

Hunter Water Corporation (HWC) was asked to provide comment on the potential impact of the proposal on the water catchment and local infrastructure.

A response was received from HWC on 5 December 2014.

The response confirmed that the project is not located within the Hunter Water drinking water catchment. Although existing water mains and reservoirs are located in the vicinity of the subject land, *'these are not directly adjacent to the site'.*

Comment No further action required.

Essential Energy

The applicant requested feedback from Essential Energy regarding the potential impact on the local electricity infrastructure.

A response was received from Essential Energy on 12 December 2014.

The response confirmed that the project will not *'affect on existing assets in the proposed quarry expansion area.'*

Comment: No further action required.

Telstra & National Broadband Network Company

Responses from both Telstra and NBN Co stated that no essential infrastructure is located on or in close proximity of the quarry site.

Comment: No further action required.

7.6 COMMUNITY GROUPS & OTHER STAKEHOLDERS

Hanson Construction Materials

Hanson Construction Materials (HCM) operates the Brandy Hill hard rock quarry located approximately 12km to the south of Martins Creek.

HCM is currently in the process of applying for an increase in the resource recovery rates and will be lodging an EIS in the near future with the State Government.

As some of the haul routes intersect, it was considered that consultation with HCM will be required to inform the areas that will be impacted by the shared haul routes.

Initial discussions commenced with Hanson in December 2014 and subsequent meetings/teleconferences arranged in February 2015, and July 2015 to discuss cumulative impacts of both projects. Key issues discussed focussed upon traffic and traffic volumes and haulage routes.

Comment: Issues have been addressed in Section 8 of this EIS and in relevant Appendices.

7.7 SUMMARY OF OUTCOMES OF CONSULTATION

The key amendments to the project as a result of the consultation include:

1) **Traffic & Transport:**
   - Entrance to Dungog Road avoiding Martins Creek village- The current entrance to the quarry is via Station Street Martins Creek. The proposed entrance has been located to directly join Dungog Road, avoiding Station Street and Martins Creek village following feedback being received from;
   - On site truck parking;
   - Avoidance of Lorn;
   - Internal policy development and code of conduct for drivers- inclusive of Sub Contractors;
   - Proposed VPA for road assets e.g. safety;
   - Extend the rail line should demand create a viable market.

2) **Noise mitigation:**
   - Construction of noise attenuation barriers to the boundaries;
   - Refurbishment of fixed plant to decrease noise;
   - Relocation of noise sources within the Quarry footprint;
   - New access road and internal haul road to reduce noise for Martins Creek;
   - Engineering treatments for Rail Loading facilities.

3) **Quarry Design:**
   - Physical construction of infrastructure for noise attenuation and traffic/ transport management;
   - Pit design to minimise off site impacts;
   - Maintenance and stockpile relocation;
   - Limited quarry expansion into a smaller area of Lot 21.

As a result of the aforementioned stakeholder consultation undertaken in accordance with the SEARs, an inclusive list of the key issues has been included within **Appendix C**.

8. Environmental Assessment

8.1 AIR QUALITY, ODOUR AND GREENHOUSE GAS

Air Quality and Odour

Assessment Approach

An Air Quality Impact Assessment (**AQIA**) has been prepared by JM Environments (Refer **Appendix F**) to assess the current air quality, potential impacts on air quality by the proposed extension to the quarry, and to propose management and mitigation measures if necessary.

The AQIA addresses the SEARs in detail and provides a summary of legislative requirements. The impact assessment was conducted based on data gathered from monitoring stations and site specific data collected. Reference has been made to the Environment Protection Authority's (**EPA**) air quality criteria and meteorological data sourced from a weather station in close proximity to the site. Data has also been sourced from air quality monitoring stations already established by the proponent in the locality and the Environment Protection Authority's station at Singleton.

Modelling scenarios were selected to represent the maximum material extraction rate and movement of material, maximum geographical extent of emission sources and maximum quantities of materials processing (Refer **Appendix F** for specific parameters).

The nearest 22 dwellings to the project site have been identified as sensitive receptor locations and were taken into account during the air quality assessment (See **Figure 10** below).

Figure 10 Location of Sensitive Air Quality Receptors

Due to the proximity of residences in the villages of Paterson and Bolwarra to the main road proposed to be used as a haulage route, the likely impacts of dust from truck movements have also been considered in the AQIA.

Existing Environment

The quarry is located in a rural area where surrounding agricultural activities are not considered to have impacts on air quality that would be substantial enough to contribute to any cumulative impacts. The AQIA does however identify that there are unsealed roads and driveways in the vicinity of the quarry which, depending on how often they are used, may contribute in some locations.

Regional sources of adverse air quality impacts can include bushfires, dust storms or other weather conditions.

Dust pollution is currently produced by the quarry during the blasting activities, processing of quarry materials and transportation to end users.

Under the existing environment protection licence for the current operations, the proponent is required to maintain monitoring stations at a number of locations (see **Figure 11** below).

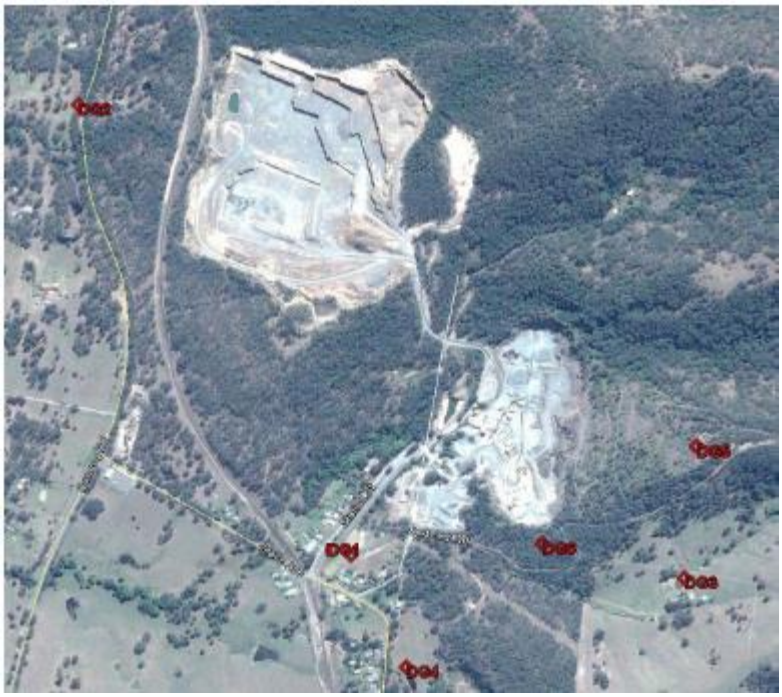

Figure 11 Locations of existing air quality monitoring stations near the quarry

To measure and compare background air quality, data from the Environment Protection Authority's monitoring station in Singleton was chosen as reasonably representative of the environment at the quarry, given the comparable rural location.

Meteorological data sourced from a weather station in Tocal was used to establish existing wind, temperature and rainfall conditions. A 3D meteorological data file for the site and surrounds was prepared by PDS Consultancy Service Pty Ltd (Refer **Appendix F**).

Impact Assessment

The project has been assessed against the EPA's air quality criteria which sets goals for pollutants and dust deposition averaged over 24 hours, monthly or annually (Refer **Appendix F**).

In all instances, the concentrations of particulate matter associated with the project are predicted to be below the EPA's specified assessment criterion at the receptors modelled. The modelling for dust deposition from the quarry at the identified sensitive receptors indicates that the cumulative mean monthly deposition associated with the quarry is predicted to be less than 3.8g/m^2/month at all nearest non-project related receptors.

The Air Quality Assessment Report considers that there are no privately owned vacant lands predicted to experience an exceedance of the DP&E mitigation or acquisition criteria.

Potential emissions from blasting were assessed based on a typical production blast of approx. 30,000 tonnes of rock and with reference to initial concentrations in accordance with the following guidelines:

- ó*Management of oxides of nitrogen in open cut blasting*ô Queensland Guidance Note QGN 20v3, Department of Employment, Economic Development and Innovation, 2011; and
- ó*NOx Emissions from Blasting in Open Cut Coal Mining in the Hunter Valley*ô, CDIROS Energy and Technology, 2011.

Blast emissions were modelled based on a 10 minute emission release period and a rate of 0.98gNOx/s. The modelling showed no exceedances of 1 hour average and annual average NO2 concentrations at the sensitive receivers in Figure 10 above.

Potential diesel emissions were assessed based on a very worst case scenario of the quarry extension using 1,500,000L of diesel per year. The assessment relies on the conversion factors in Table 4 of the National Greenhouse Accounts Factors (August 2015) which estimates that this amount of diesel usage would generate some 29 tonnes of equivalent CO_2 greenhouse effect of nitrous oxide. Based on this, the Air Quality Assessment Report concludes that approx.203kg/year of $N0_2$ could be produced in a very worst case scenario. This is assessed as equating to an emission of 0.015g/s across the mobile plant which is considered insignificant.

Mitigation Measures

The modelling in the AQIA has been prepared based on the emission controls and mitigations practices set out in **Appendix F**, including watering of unpaved internal haul roads and enclosed crushers. In particular the noise barriers along portions of the haul road recommended in the Acoustic Assessment Report prepared by RCA Acoustics Pty Ltd (Refer **Appendix I**) have been considered for its potential properties as a windbreak.

Measures to minimise or avoid imperfect blast will be implemented in accordance with the ó*Code of Good Practice: Prevention and Management of Blast Generated NOx gases in Surface Blasting*ô (Australian Explosives Industry and Safety Group Inc. 2011) and the measures outlined in the Blast and Vibration Report attached at **Appendix I**.

To minimise diesel fumes from motor vehicle emissions (the main source of diesel emissions from the proposed development), all plant, vehicles and machinery will be maintained in proper and efficient condition. In addition, any haul roads to be constructed will be designed to ensure the most direct route from the quarry face to production and stockpile areas in order to minimise diesel fumes from vehicles.

The AQIA concludes that these measures, including the proposed noise barriers, are considered appropriate means of managing air quality as, based on the modelling, pollutant concentrations and dust deposition levels are predicted to meet the requisite criteria levels.

Conclusion

The AQIA concludes that the proposed mitigation measures, including the proposed noise barrier, are considered appropriate means of managing air quality as, based on the modelling, pollutant concentrations and dust deposition levels are predicted to meet the requisite criteria levels at the surrounding receptor locations.

Greenhouse Gas

Assessment Approach

The AQIA prepared by JM Environments (Refer **Appendix F**) contains an assessment of greenhouse gas emissions as required by the SEARs and having regard for the relevant provisions of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

The AQIA contains an assessment using the Greenhouse Gas Protocol, the National Greenhouse and Energy Reporting Guidelines, the National Greenhouse Accounts Factors, the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, and the reporting requirements for corporations under the *National Greenhouse and Energy Reporting Act 2007* (Cth).

Assessment

Direct Emissions

Direct emissions are classified as ósscope 1ôemissions under the Greenhouse Gas Protocol.

The project will use diesel for the operation of vehicles, plant and equipment on the site. In 2014, some 596,800L of diesel was used at the quarry.

The AQIA estimates that at full capacity, and as a worst case scenario, maximum diesel usage on the site taking into account the proposed extension could be up to approx. 1,500,000L of diesel per year.

The project will also generate direct emissions for the use of explosives on the site. The current National Greenhouse Accounts Factors do not include emissions factors for likely emissions as a result of the explosives likely to be used at the quarry so the assessment has relied on the February 2008 edition of the National Greenhouse Accounts Factors which does address this.

The proponent has estimated that approx.14.4 tonnes of explosives will be used each year for the quarry (and extension) operating at full capacity.

The AQIA estimates approx. 4043 t CO2-e/year of direct emissions will be produced from the proposal. The AQIA identifies that this represents 0.0012% of total Australian emissions recorded for 2008.

Indirect emissions

Indirect emissions are classified as ósscope 2ôemissions under the under the Greenhouse Gas Protocol if they relate to the generation of purchased electricity consumed in owned or controlled equipment or operations.

All other indirect emissions, including downstream emissions, are classified as ósscope 3ô emissions under the Greenhouse Gas Protocol.

Scope 2 emissions relating to the project will be generated from the electricity consumption to power plant and equipment on the site. The AQIA estimates approx. 1608 t CO2-e/year will be produced from these sources.

Scope 3 emissions related to the project are likely to include the estimated emissions attributable to the extraction, production and transport of diesel consumed at the site; the extraction, production and transport of fuel burned for the generation of electricity consumed at the site and the electricity lost in delivery in the transmission and distribution network; the combustion of petrol consumed by staff travelling to and from the site; and emissions from the solid waste sent to landfill from the site.

Greenhouse gas emissions associated with the travel of employees to and from the site are likely to be a source of scope 3 emissions. The average number of likely employees travelling to and from the site may be around 36 if the extended quarry is operating at full capacity.

Other potential sources of scope 3 emissions are identified in the AQIA as the truck movements used to bring the quarry products to market, the extraction, production and transport of fuel burned for the generation of electricity consumed, the extraction, production and transport of diesel consumed at the quarry, and the emissions attributable to the extraction, production and transport of waste sent to landfill from the site.

In total is estimated in the AQIA that these sources are likely to contribute approx. 1,214 t CO2-e/year.

Mitigation Measures

The AQIA recommends the following mitigation measures to address greenhouse gas emissions:

- Optimisation of incline/decline haul routes to reduce transport distances from the the extraction area;
- Reduce vehicle idling time;
- Maintain optimum tyre pressure on trucks;
- Consider use of alternative fuels such as biodiesel for mobile plant;
- Consider renewable energy technologies such as wind or solar;
- Install energy efficient crusher and other plant equipment;
- Regulate daily operation of lighting;
- Implement solar-powered lighting where possible.

Conclusion

As the greenhouse gas assessment for both direct and indirect emissions form the project predict that the proposal is likely to represent an increase in direct emissions of 0.0012% per annum on total Australian greenhouse emissions, it is considered that the proposal, incorporating the proposed mitigation measures where feasible, would be suitable in terms of greenhouse gas emissions.

8.2 TRAFFIC AND ACCESS

Assessment Approach

A Traffic Impact Assessment (**TIA**) has been prepared by SECA Solution Pty Ltd to identify the traffic flows in the area, evaluate and address the impacts likely to result from the quarry proposal (Refer **Appendix H**).

The TIA has been prepared following:

- Review of historic and current quarry operations
- Review of quarry transport operations based on historic data
- Collection of traffic data along primary traffic routes associated with the transport of quarry products
- Consultation with relevant road authorities
- Site visits to the quarry and surrounds, including surrounding road network analysis

The TIA has been prepared in accordance with the Austroads Guidelines and the ñRTA Guide to Traffic Generating Developmentsò published by the Roads and Maritime Serves (**RMS**). Other guides and publications referred to during assessment are listed in the TIA (Refer **Appendix H**).

The TIA has been prepared to address the SEARs as well as separate details which have been specified by RMS. Tables of how the TIA has addressed these items are set out in the TIA.

Traffic data along the key routes associated with the haulage of quarry products was collected at mid-block locations and at the key intersections likely to be impacted by the project.

A report on engineering and transport has been undertaken by Acor Consultants (NSW) Pty Ltd (**Engineering Report**) which includes an assessment of site access arrangements, road transport and infrastructure (**Appendix H**).

A Pavement Condition Survey Assessment (**Pavement Condition Assessment**) was prepared by Qualtest Laboratory (NSW) Pty Ltd for road sections in Martins Creek, Vacy, Paterson and Largs which form part of the road network travelled by haul trucks from Martins Creek Quarry (**Appendix H**). These surveys and subsequent mapping were prepared in accordance with the Austroads Guidelines.

An analysis of future pavement maintenance requirements likely to result from a proposed increase in quarry traffic along the Martins Creek Quarry haul routes was prepared by the SMEC Group Pty Ltd (**SMEC Pavement Report**) (**Appendix H**). The assessment has been carried out to determine the increased maintenance requirements and maintenance costs associated with the proposal. The assessment models the performance of the road pavements over 25 years with and without the additional vehicle movements likely to result from the proposal. The assessment utilises the World Bankôs 4Highway Design and Maintenance Standards Modelôto predict the future deterioration of road pavements and the effects of traffic loading.

The assessments have been undertaken assuming the typical quarry truck and trailer combination or semi-trailer is loaded to carry approx. 32.5 tonnes of material. However it is noted that, as the technology of vehicles improves over the life of the quarry, this load capacity

may increase as applicable. This is likely to reduce numbers of truck movements over the life of the quarry. For example, there are currently schemes in place such as the Performance-Based Standards (**PBS**) Scheme run by the National Heavy Vehicle Regulator which offers the heavy vehicle industry the potential to achieve higher productivity and safety through innovative and optimised vehicle design. PBS vehicles are designed to perform their tasks as productively, safely and sustainably as possible, and to operate on networks that are appropriate for their level of performance. This trend may see the load capacity increase and therefore may facilitate a reduction in the number of vehicles required to transport the same volume of material.

Existing Environment

The main traffic currently generated by the quarry is associated with the haulage of quarry products to the wider lower Hunter region. Some traffic flows can also be attributed to employees travelling to and from the site.

The main haulage route is by Dungog Road via the townships of Paterson and Bolwarra Heights to either the New England Highway or Hunter Expressway (See Figure 12 below).

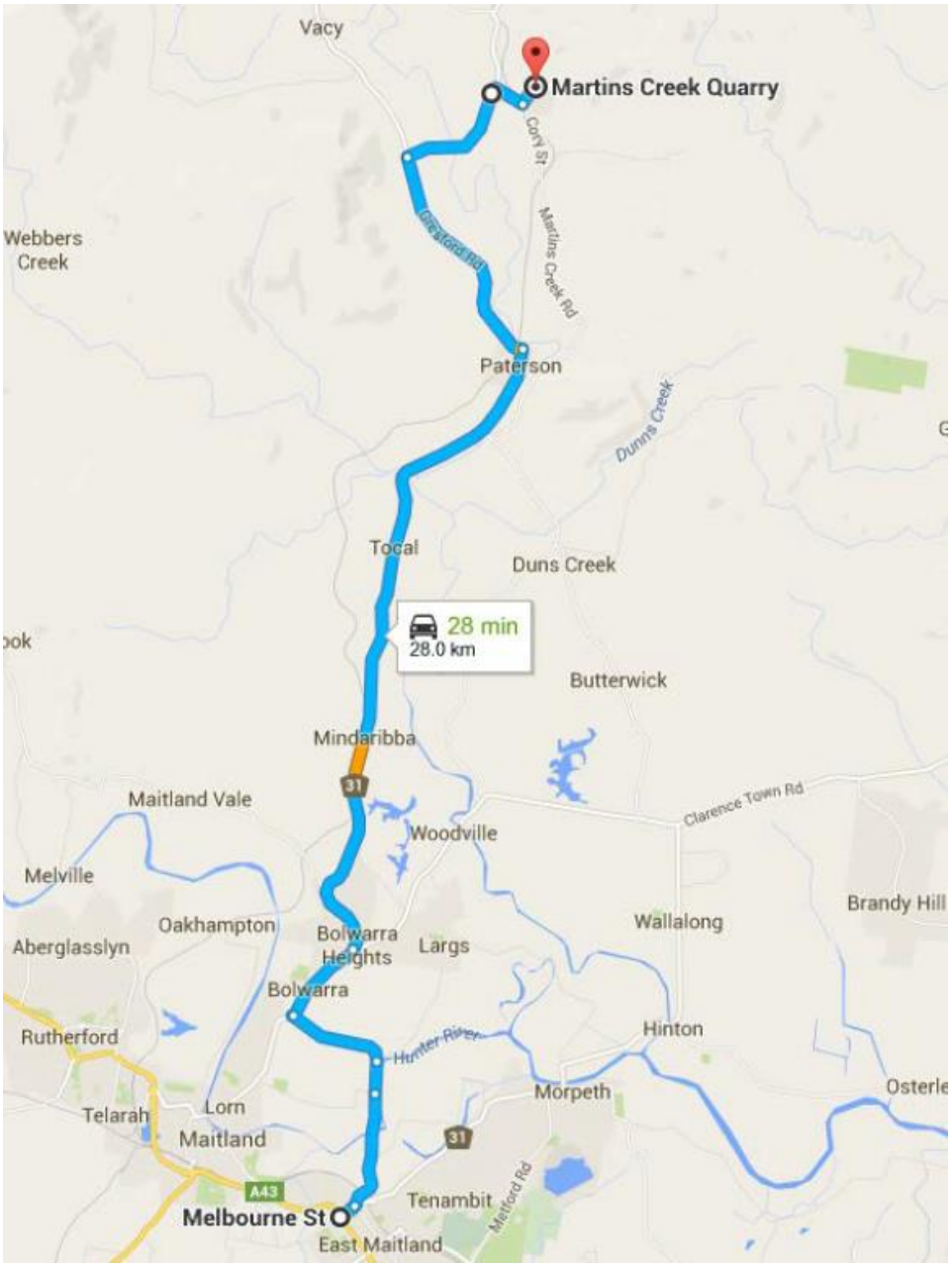

Figure 12 Current main haulage route

An alternatively route is used to access markets to the north east of the quarry. The route deviates from the above by utilising Paterson Road, Butterwick Road and Clarence Town Road to connect to the Pacific Highway (See Figure 13 below).

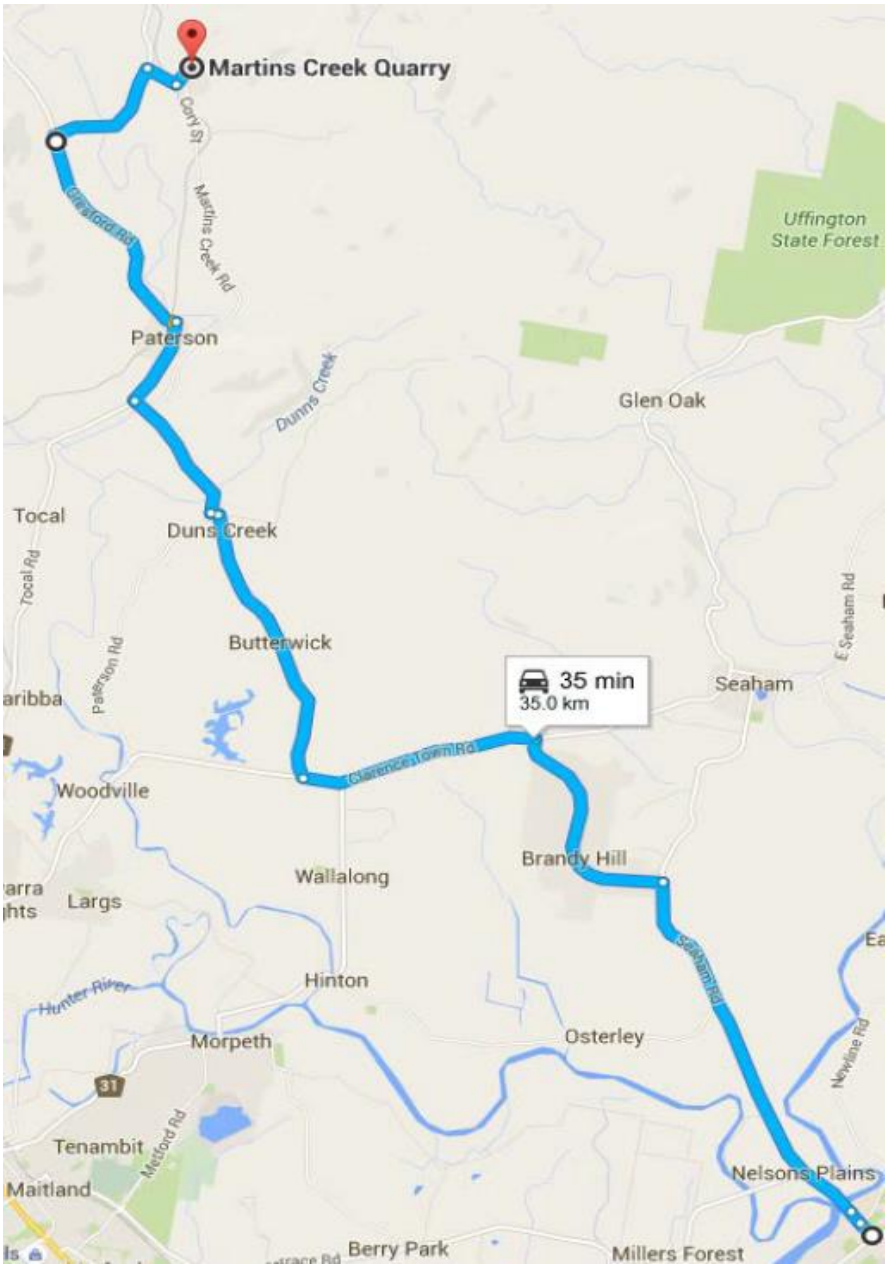

Figure 13 Current alternative haulage route

Details of the characteristics of both current haulage routes are specified in the TIA (Refer **Appendix H**).

Current vehicular access to the site is primarily via Station Street through Martins Creek and along Grace Ave, to connect with the external road network described above (See Figure 14 below).

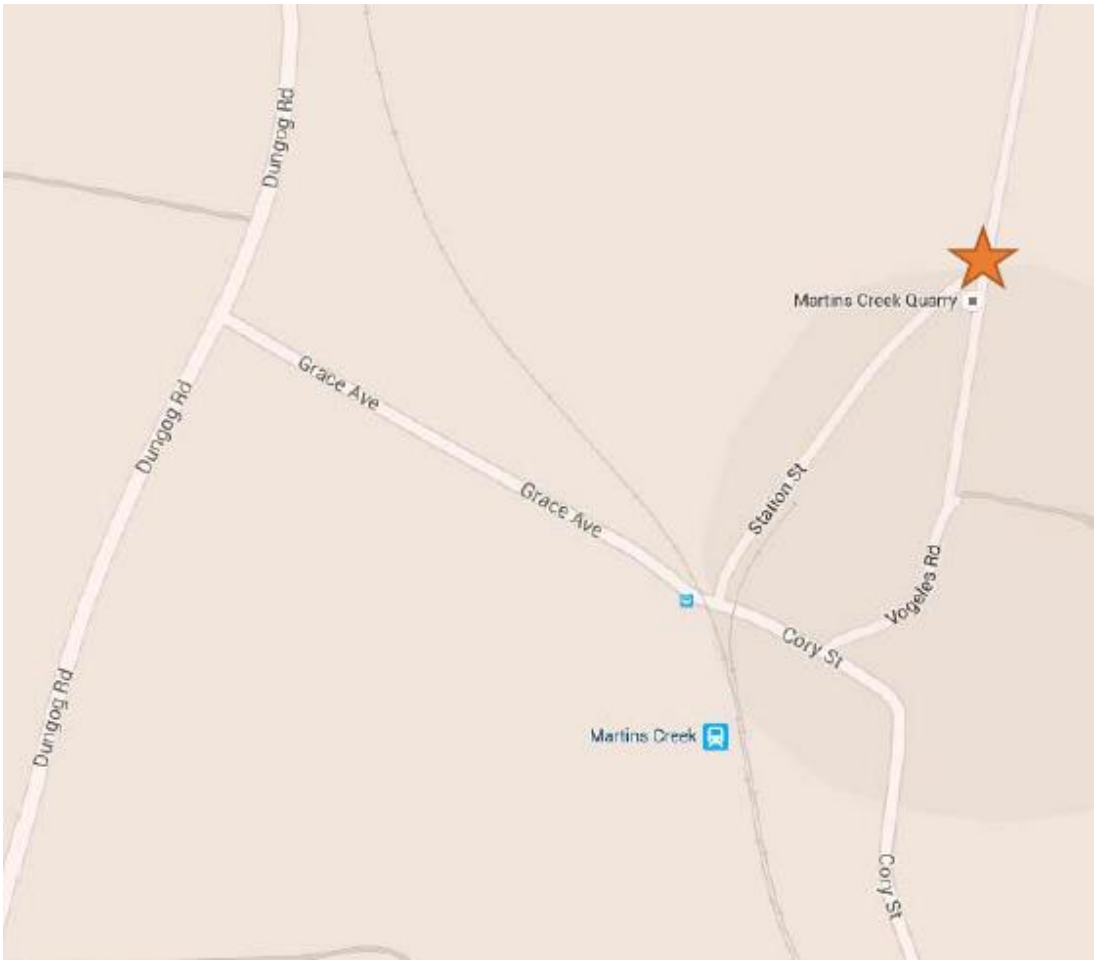

Figure 14 Existing access and road network

A second vehicular access route from the site is also available via Vogeles Road to the east of Station St.

An existing railway line currently prevents direct vehicular access to Dungog Road from the site.

Discussions with the relevant road authorities have indicated that there are no proposed road network changes, or other roadworks and upgrades planned (other than routine maintenance) in the vicinity of the quarry and current road network.

Dungog Shire Council has previously considered constructing an alternate vehicular route through the outskirts of Paterson, however the proponent was advised on 7 January 2014 that Council no longer supported the proposal (See correspondence from Dungog Shire Council attached at **Appendix H**).

RMS is currently upgrading the intersection of the New England Highway and Cessnock Road. This intersection is used by haulage trucks from the quarry to link with the Hunter Expressway.

RMS has been consulted in relation to the heritage listed wooden bridge on Dungog Road over the Paterson River and has indicated that the bridge is approved for ongoing use by the quarry

and the heavy vehicles associated with the quarry operations (Refer to the TIA attached at **Appendix H**).

There are currently no traffic management works underway in the vicinity of the quarry or on the existing road network.

The recently completed Hunter Expressway has significantly altered traffic patterns on the New England Highway by reducing traffic movements along the Highway. This has also improved the capacity of side roads; in particular Melbourne Street is the most relevant side road for this proposal.

Typical for the rural setting of the site, there are no pedestrian or cycling facilities along the majority of the relevant local roads and major haulage routes. Pavements and footpaths are however provided for pedestrians where the routes go through town centres.

A Pavement Condition Assessment was prepared during assessment (Refer **Appendix H**). Approximately 48km of road pavement along the main haulage routes were surveyed and pavement defect mapping sheets prepared.

The Pavement Condition Assessment found the existing conditions:

- Included typical defects of a severity consistent with those generally encountered on regional roads of variable construction and quality;
- Did not present a significant difference in terms of pavement distress and severity between the loaded and unloaded lanes along the haulage routes surveyed;
- Consisted of localised areas where the severity of the defects were much worse in one lane than the other, however these variable were assessed to be as a result of design variables and key features of the roadway itself (such as bends; variable fill embankments; road intersections or entry to properties and areas of poor drainage); and
- A number of side roads off the road network travelled by the trucks from Martins Creek Quarry had similar pavement conditions despite not being utilised by the haul trucks.

It is noted that pavements in Bolwarra and along other parts of the haulage route have since been upgraded. **Appendix H** contains correspondence from relevant local councils detailing these upgrade works.

The TIA contains comprehensive data on current traffic flows and vehicle speeds on both haulage routes. The data was gathered by counters collecting data in July 2015 over a 24 hour period for a minimum 7 days. The TIA contains breakdown of average traffic speeds for different vehicle classes, which has been extrapolated from the collected data.

The data in the TIA demonstrates that average truck movements to and from the quarry vary considerably day by day and according to market conditions or weather conditions.

Onsite observations detailed in the TIA conclude that during peak periods, the road network associated with the quarry operations functions well with minimal delay or congestion. The only exceptions identified include delays and congestion at the intersection between Melbourne St and the New England Highway during peak morning periods and delays occurred in Lorn and through intersections in Maitland at High St. The proponent has indicated that, as part of the quarry extension, the New England Highway will be accessed via Flat Road and Melbourne St

rather than Belmore Road through Lorn. The route through Lorn will only be used to service local markets in Maitland.

The TIA contains a summary of available accident and crash data along the existing haulage routes. Generally crashes have involved light vehicles and 30 % were considered the result of speed or fatigue.

A road safety review was undertaken as part of the TIA for both of the main haulage routes and reveals existing safety issues on the road network and instances of non-compliance with current standards (Refer **Appendix H**). These concerns are summarised in the TIA, including where the appropriate road authority has been consulted, and where upgrades are recommended.

The main concerns related to safety consist of the lack of sheltered right-hand turns at a number of intersections. Despite this, the TIA concludes that overall, the existing road network is generally satisfactory for road safety issues.

The TIA identifies that there is currently adequate off-street and on-street parking available to satisfy local demands.

The site is close to public transport facilities at Martins Creek, although local bus services are limited. The Martins Creek rail station some 500m from the site offers north and south bound services.

Other traffic generating development in the area includes the Brandy Hill Quarry which is currently seeking to extend their operations. There has been limited information provided with regard to the Brandy Hill quarry expansion. It is understood the current weighbridge truck counts have been provided, however proposed haulage routes, split of demand for end products, or details on any increased truck movements have not been available to inform a cumulative impact assessment as part of this EIS.

Proposal

Relevant to assessing the traffic impacts, the proposal includes:

- Increased extraction
- Increased operating hours
- Increased employees
- Phasing and timing of the project reliant on market conditions
- Light and heavy vehicles entering and leaving the site
- Onsite overnight truck parking area

Vehicular access will be initially via the existing Station Street access route; however the proposal also includes a new access driveway, intersecting directly with Dungog Rd and involving the construction of a bridge over the rail line (See Figure 15 below).

Figure 15 Proposed new access driveway and bridge

The Engineering Report contains the design and detailed drawings for the proposed new access driveway and bridge (Refer **Appendix H**).

Once the new internal driveway is constructed, all heavy vehicles will utilise this route which will include heavy vehicle storage to remove parked trucks from public roads. The driveway intersection will be built to council standards and will include a sheltered right hand turn lane on to Dungog Road to ensure safety. The new bridge will be constructed in accordance with Australian Track and Rail Corporation (**ARTC**) standards. Correspondence with ARTC agreeing in principle to the location of the proposed bridge and detailed requirements for the design and construction is attached at **Appendix C**.

Following construction of the new bridge, the existing Station Street access will only be used for light vehicles and emergency access.

Associated with the construction of the new bridge will be relocation of the existing wheel wash and weighbridge at the quarry exit. The wheel wash will prevent the tracking of mud and debris onto roadways as a result of trucking movements.

The Engineering Report (**Appendix H**) also identifies that on occasions access is achieved via Vogeles Road for equipment low loader haulage and truck product haulage during rail wagon loading, when the rail wagons queue across the Station Street road access.

Unless market conditions are favourable and the associated issues with the operation of increased rail haulage can be resolved (refer to Section 4 of this EIS) it is proposed that the majority of material will be removed from the site via road haulage, with the rate of haulage by rail to remain as per current.

At maximum capacity during peak times (proposed to be morning hours only) the TIA identifies that the development could generate some 40 outbound laden trucks per hour.

Peak periods throughout the year will also depend on market conditions and the infrastructure projects the quarry is servicing.

Daily truck movements to and from and the quarry will peak in the mornings, as identified in the Heavy Vehicle Route and Market Assessment prepared by Daracon (**Appendix D**). This is because the quarry delivers materials for processes that must be carried out on construction sites in the early morning and because some of the quarry products are perishable (e.g. stabilised pavements).

As part of the supply of the broad range of construction materials and the ongoing operation of the quarry other deliveries to the quarry are required. These will include but are not limited to fuel, parts, materials such as fly ash. Lime and cements for blending, and other quarry materials for blending with Martins Creek product to produce saleable products. These delivery trucks are separate to the quarryôs haulage operation and whilst these inbound truck deliveries would be considered quarry related, the actual frequency is expected to be no more than that of livestock trucks or such that deliver to and carry from the farms and other industrial sites on the same roads.

It is proposed that the vast majority of loads will travel via the haulage routes depicted above, although haulage routes will fluctuate depending on end user demands. The proponent proposes to no longer use the route via Lorn discussed previously and will instead access the New England Highway via Flat Road.

Impact Assessment

New access driveway

The proposed new access driveway will provide a safer intersection for vehicles turning on to Dungog Road as there will be a sheltered right turn lane provided. Nevertheless, the existing intersection of Grace Avenue and Station Street has been assessed in the TIA as acceptable, given the slower vehicle speeds due to the at-grade train level crossing.

The Engineering Report (**Appendix H**) contains a table of site access options and the disadvantages and advantages of each proposal. The Report concludes that the proposed new access driveway and bridge is preferred as it will avoid Station Street and existing residential development and the rail crossing.

The TIA has also assessed the potential for traffic to queue at the entrances to the site. The TIA concludes that there will be minimal queuing associated with the traffic movements to and from the site. It is considered that the delays are often caused at the current access point due to the rail crossing and the proposed bridge to be constructed as part of the new access driveway will minimise these delays.

Increased employees and service vehicles
The expansion will create a number of new jobs and increase the number of employees (See Section 4 of this EIS). This may mean an increase of light vehicles accessing the site, however given the projected figures, and that the staffing levels are likely to fluctuate as the extension is progressed incrementally, any likely impacts on local traffic are considered to be minimal.

The extension and expansion of the quarry may result in increased service vehicles accessing the site. Given that access to the site for these vehicles will be via the new access route and connection onto Dungog Road, the TIA considers that the design and capacity of the proposed new access driveway would be able to accommodate any increases.

Public transport
The TIA identifies that there will be no need for public transport services to access the site. Therefore there are unlikely to be any impacts. Minimal, if any, demand for public transport will be generated by the proposal. No specific pedestrian access to any bus stops has been identified as relevant or necessary.

Internal site traffic and circulation
The TIA describes how all vehicles will be able to enter and exit the quarry in a forward direction and states that the internal roads allow for two way traffic movements as appropriate. Internal traffic movements are subject to other rules and regulation and the Applicantôs code of conduct for employees. There is no public access onto the quarry site and no requirements for internal bus movements as buses will not be entering the quarry.

Servicing is completed on site adjacent to the relevant equipment and plant. Vehicles associated with servicing are also parked adjacent to the relevant equipment. A separate vehicle maintenance shed is also provided.

Parking
All parking associated with the development will be provided for onsite, including additional parking for staff and overnight parking for trucks. Parking areas may include a stand over area for the trucks and will be located onsite on an ôas-needsô basis as the quarry expands over time. The TIA notes that the development is not regulated by Dungog Shire Councilôs specific parking codes.

Pedestrian and bicycle facilities
There are currently no pedestrian or bicycle facilities included as part of the current development and there are no facilities proposed as part of the extension to the quarry. Pedestrian access to the site will be available via the local road network, however given the location, it is anticipated that any pedestrian movements will be low.

Traffic generation assessment
The TIA contains a comprehensive analysis of the likely traffic generated by the development, taking into account the extraction rate, the types of vehicles used, hours of operation and daily fluctuations in loading rates, likely peak demands based on data from previous years, seasonal fluctuations due to weather or infrastructure projects in the region coming online that will likely require products from the quarry. Based on this data and analysis, the TIA estimates that at maximum capacity (for example if the quarry is servicing several concurrent infrastructure projects in the region) some 40 laden outbound trucks per hour could be generated. The TIA

identifies that this is the same as the current rate of truck movements during the morning peak period.

At an absolute peak capacity, the TIA calculates that the impacts of some 320 laden trucks exiting the site per day would be considered acceptable under current guidelines and it would be an appropriate volume for the existing road network.

However, in response to strong community feedback, and given the current condition of the road network, it is proposed to reduce the proposed number of trucks to a maximum of 215 laden trucks leaving the site per day, with a maximum peak rate of 40 laden trucks leaving the site per hour in the mornings. The proposed number of daily outbound laden trucks is only 2/3 of the number assessed as acceptable in the TIA. As evidenced by the analysis in the TIA, this lower number of truck movements is well below the number considered to have acceptable impacts.

The TIA also concludes that traffic flows will only be minimally impacted as a result of the proposal, given the average number of truck movements associated with the quarry will remain at the current peak rate of 40 laden trucks per hour outbound in the morning.

Traffic distribution and assignment

The TIA identifies that, as the quarry services the construction industry, morning hours will be peak times for truck movements to and from the site. End user demands will influence the flow of trucks and the impact on traffic flows throughout the day.

Similarly, the TIA identifies that end user demands will also dictate the distribution of traffic flows emanating from the quarry. Based on previous data, the TIA ranks the local government areas that the quarry services (See Figure 16 below).

Market By Local Government Area	% of total volume
Newcastle	40.2%
Port Stephens	18.2%
Lake Macquarie	15.4%
Maitland	12.6%
Cessnock	3.6%
Singleton	1.7%
Gosford / Wyong	1.6%
Dungog	0.7%
Muswellbrook	0.6%
Upper Hunter	0.1%
Gloucester	0.1%
Sydney (Botany)	0.1%
Other	
Ex Bin / COD's with no Address	2.6%
Ballast Trains	2.5%

Figure 16 Local government areas and percentage distribution of product (Data captured from November 2014-October 2014)

The TIA details a number of studies and analysis of the sales volume and destination of haulage loads over recent months to estimate the volume of traffic generated on particular roads and routes (Refer **Appendix H**). Based on the data captured during the preparation of the TIA, the split of traffic volumes are detailed in Figure 17 taken from the TIA and reproduced below.

- 61.1% via Flat Road
- 25.1% via Brandy Hill
- 6.6% via train
- 2.4% local market
- 4.8% north

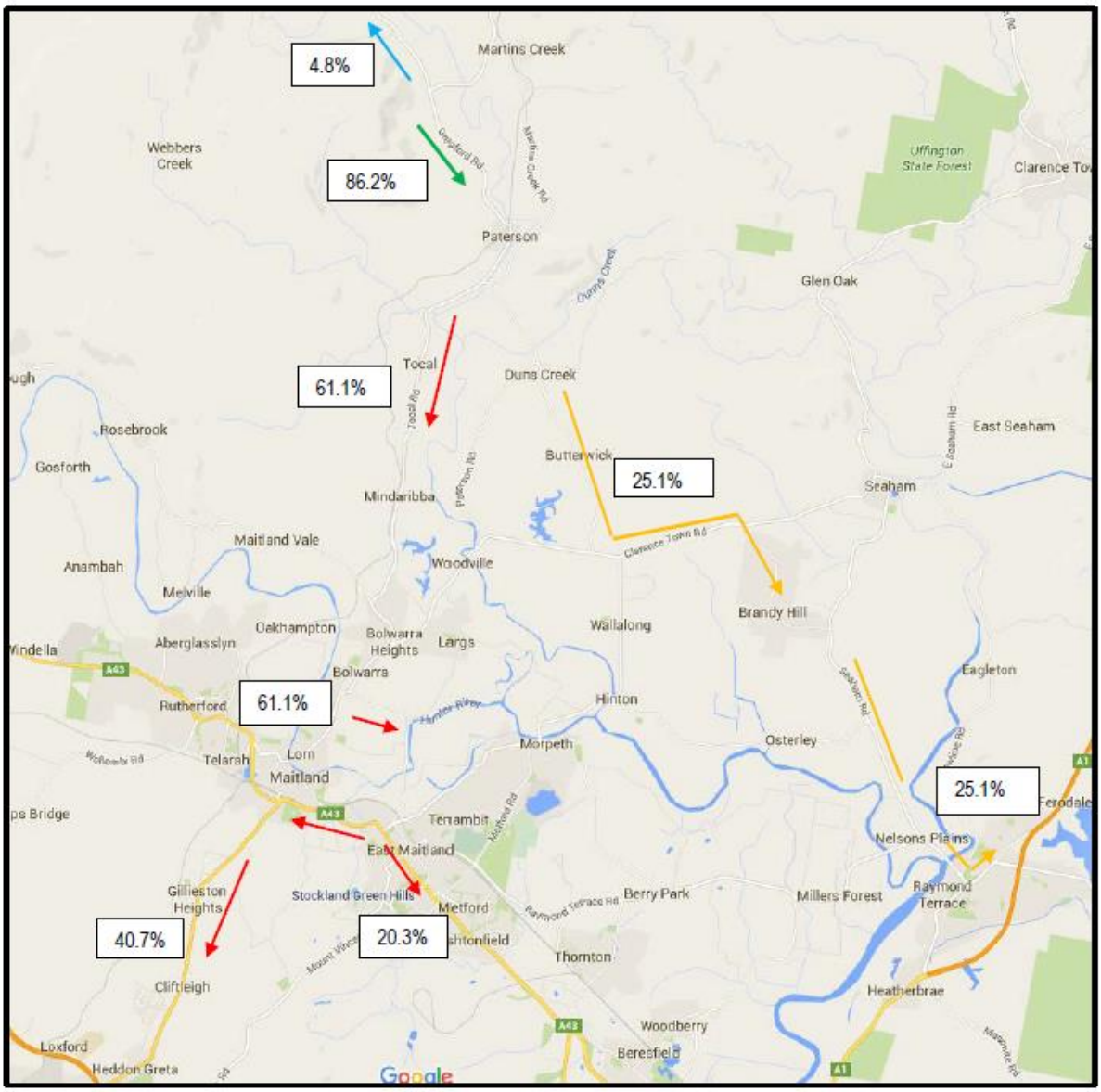

Figure 17 Distribution of material from Martins Creek Quarry (Data captured during the preparation of the TIA)

The TIA assess that the quarry operating at 1.5 million tonnes per annum will have the following impact on traffic volumes based on existing distribution demands (See Figure 18 below).

Route	Percentage %	Average daily one way truck movements	Average hourly one way truck movements
Gresford Road via Paterson	86.2	145	18-19
Route via Flat Road	61.1	103	13
West along New England Highway towards Hunter Expressway	40.7	69	8-9
East along New England Highway from Melbourne Street	20.3	34	4-5
Route via Brandy Hill	25.1	42	5-6
Route north	4.8	8	1

Figure 18 Estimated volume of traffic based on existing distribution demands

Figure 18 shows one way truck movements only and a corresponding inbound truck movement would be expected per loaded truck leaving the site. The TIA notes that inbound truck movements can be more than the outbound numbers due to drivers arriving early on site and as described above, additional infrequent deliveries related to the processing of materials on the site.

The impact of the development on traffic flows has been assessed in the TIA against the requirements of the relevant road authorities, the road capacities for hourly and daily flows, surveys which collected traffic data during peak times, and modelling using the ôSidraôprogram to review key intersections in the regional road network.

The TIA identifies that outside of morning and afternoon peak hours, there is significant spare capacity in the existing road network which can cater for additional traffic demands without creating issues.

The TIA contains a breakdown of likely impacts on daily and hourly traffic flows at Gresford Road, north of Peterson; Tocal Road, south of Paterson, Paterson Road, Bolwarra and Flat Road (Refer **Appendix H**).

The likely impact of the generated traffic at the key intersections of Pitnacree Road / Melbourne Street and Melbourne Street / New England Highway has been assessed using the ôSidraô modelling program.

The TIA concludes that the delays and congestion currently experienced at the Melbourne Street / New England Highway intersection cannot be directly linked to Martins Creek Quarry operations as trucks associated from the quarry made up 1.9% of morning peak traffic flows and 1.8% of afternoon peak flows.

Similarly, at the Pitnacree Road / Melbourne Street intersection, the TIA concludes that the delays and congestion currently experienced cannot be directly linked to Martins Creek Quarry operations as trucks associated from the quarry made up 3.6% of morning peak traffic flows and 3.5% of afternoon peak flows.

It is noted that the modelling in the TIA identifies that by 2026, the Melbourne Street / New England Highway intersection may have reduced performance service levels, increased delays and congestion. The modelling has been calculated using predicted normal background traffic growth in the locality.

Importantly, the TIA notes that during the peak periods when the performance service level at this intersection will be lowest, the traffic movements associated with the Martins Creek Quarry will be minimal. It is also noted that the traffic patterns of the Brandy Hill Quarry will also have a minimal impact during these peak afternoon/evening hours.

The TIA demonstrates that the predicted deterioration in service levels for this intersection over time will be due to continual traffic growth that will occur regardless of the operation and expansion of the Martins Creek Quarry. Therefore this impact is not a direct result of the proposed development and the RMS will be responsible for upgrading the intersection as required to accommodate the continual traffic growth.

Results of the modelling in the TIA conclude that, should the proposed development proceed, both intersections are likely to continue to operate to levels of delay and congestion at the critical times that the traffic generated by the quarry will occur, as the current scenario.

The TIA concludes that the existing road networks would be likely to manage traffic flows associated with the proposal, given that the hourly rate of truck movements will not increase compared to existing peak operations (i.e. 40 outbound laden trucks per hour in the mornings).

Safety

As described above, the available accident and crash data along the existing haulage routes show that traffic related to the quarry has not significantly contributed to any increased safety risks. The TIA identifies that generally crashes along the haul routes have involved light vehicles and 30% were considered the result of speed or fatigue.

However the TIA lists a number of safety issues with the current road network and identifies that they are due to the road system being built to outdated design and safety standards (See recommendations below for full list of issues identified).

Safety issues connected to the railway crossing at Station Street will be addressed by providing the new access route and bridge over the rail line. The TIA notes that a review of RMS accident data shows the existing intersection operating well and therefore the intersection will continue to be used until the new road is built and thereafter by light vehicles and emergency services vehicles.

The TIA includes an assessment of queuing traffic at the Gresford Road, Paterson rail crossing and concludes that the provision of warning lights would not be warranted to address any likely impacts resulting from the proposed development.

The Engineering Report specifies that sections of public road along the relevant haulage routes have been identified as flood prone, however it is considered that the flood liability is not impacted by traffic, and will not be impacted by traffic resulting from the proposed development. The Engineering Report specifies that the Martins Creek Quarry ceases to operate during high rainfall and when public roads are flooded (except in cases of providing emergency materials for those floods).

The TIA does not identify the impacts of heavy vehicle traffic on Paterson Road through Bolwarra in the vicinity of the public school as a safety issue.

It is noted that the current speed limit on Tocal Road through Bolwarra Heights is 60kmph and the Engineering Report notes that the Roads and Maritime Services has previously declined a request made by Maitland City Council for the speed limit to be lowered. Heavy vehicles from Martins Creek Quarry nevertheless adhere to a self-imposed speed limit of 40kmph through this section of Tocal Road (Refer to the Engineering Report at **Appendix H**), as well as the 40kmph township of Paterson.

An upgrade to the intersection of Gresford Road for drivers turning right into Dungog Road to provide a sheltered right turn lane is proposed (see Figure 19 below).

Figure 19 Proposed upgrade to the Gresford and Dungog Road intersection

Upgrades to the intersection of Gresford Road / Duke Street in Paterson have also been identified to reduce the potential for collusions and to provide a pedestrian crossing.

Upgrades identified in the TIA have been included in the draft voluntary planning agreement offer prepared to accompany this proposal.

Construction traffic
The TIA notes that there will be negligible noise impacts during the construction work associated with the proposal.

Background traffic and other developments
Dungog Shire Council have advised the Applicant that there is limited development growth expected in the study area north of Bolwarra and through Brandy Hill. Development that is expected around Morpeth is identified in the TIA as mainly aged care / retirement village development which generates little traffic flow.

The main development in the locality that is likely to contribute to traffic flows is the Brandy Hill Quarry and proposed expansion. The proposed expansion to the Brandy Hill Quarry seeks consent for production of around 1.5 million tonnes per annum. There has been limited information available with regard to the Brandy Hill quarry expansion. It is understood the current weighbridge truck counts have been provided to the Applicant, however proposed haulage routes, split of demand for end products, or details on any increased truck movements have not been available to inform a cumulative impact assessment as part of this EIS. The cumulative impact assessment in the TIA has extrapolated from the figures provided in the Preliminary Environmental Assessment submitted for the Brandy Hill Quarry extension.

The assessment in the TIA concludes that traffic movements associated with Martins Creek Quarry will continue to have a minimal and acceptable impact on the overall operation of the key intersections used by both Martins Creek quarry and Brandy Hill Quarry.

Pavements and future maintenance
The SMEC Pavement Report (**Appendix H**) considers the effects of the increased traffic loading on the road pavements along the two main haul routes used to carry materials from Martins Creek Quarry (See Figure 20 below).

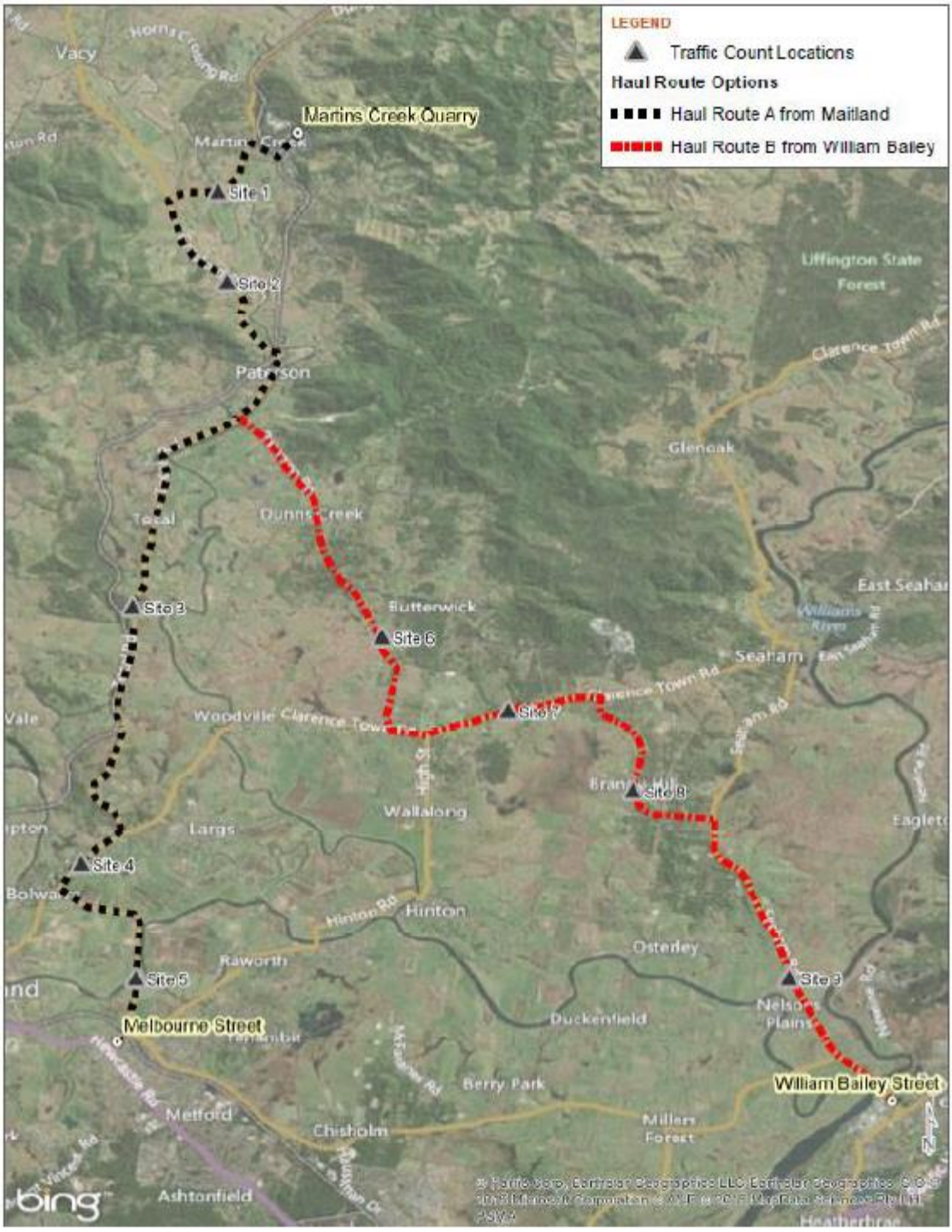

Figure 20 Haul routes surveyed for future pavement and road maintenance

Based on the data collected at the traffic count locations identified above and the proposed increased extraction rate, the TIA considers that 320 laden trucks exiting the site per day would be considered acceptable and an appropriate volume for the capacity of the existing road network and identified haul routes. However, in response to strong community feedback, and given the current condition of the road network, it is proposed to reduce the proposed number of

trucks to a maximum of 215 laden trucks leaving the site per day, with a maximum peak rate of 40 laden trucks leaving the site per hour in the mornings. The proposed number of daily outbound laden trucks is only 2/3 of the number considered acceptable in the TIA. As evidenced by the analysis in the TIA, this lower number of truck movements is well below the number considered to have acceptable impacts.

Generally the road sections in the Maitland local government area were assessed as needing the least increase in maintenance due to their current condition levels. The road sections in the Dungog local government area were assessed as likely to need the highest amount of additional funding to be maintained at their current condition.

Figure 21 below shows the estimated funding requirements to maintain the haul routes over the next 25 years (including both north and southbound lanes):

Modelling scenario	Dungog Roads	Maitland Roads	Port Stephens Roads
Length of roads	13.22 km	15.56 km	22.91 km
Average increase in the number of Loaded trucks per day	42.7 / 30.4	30.4	12.3
Predicted 25 year funding requirements based on current traffic levels	$5,522,398	$5,737,960	$5,897,454
Predicted 25 year funding requirements based on increased truck traffic	$6,427,014	$5,792,692	$6,243,218
Increase in funding required over 25 years	$904,616	$54,732	$345,764
Average annual funding increase	$36,185	$2,189	$13,830
Annual funding increase per km of road	$2,737	$140	$604
Increase required per tonne carried	$0.07144	$0.00607	$0.09479

Figure 21 Table of estimated future funding requirements for north and southbound pavements along the proposed haul routes

Mitigation and other measures

Recommendations to accommodate existing traffic

The TIA identifies the following issues with the existing roads which will need to be addressed to bring the network up to current design standards, address identified road safety concerns, and to adequately accommodate existing traffic flows along the two key haulage routes associated with the proposal:

- Lack of space between intersection of Station Street and the railway crossing and road alignment across the rail crossing;
- One way bridge operation on Dungog Road;
- Lack of sheltered right turn lane on Gresford Road for drivers turning right into Dungog Road;
- Tight road alignment on 90 degree bend at Gresford Road / Duke Street in Paterson;
- Lack of pavement width on Tocal Road at Bolwarra Road;
- Lack of sheltered right turn lane on Clarence Town Road for drivers turning right into Butterwick Road; and
- Lack of sheltered right turn lane on Clarence Town Road for drivers turning right into Brandy Hill Drive.

Following consultation with the relevant road authorities in relation to the above, the following responses have been provided:

- The railways crossing at Grace Avenue has been reviewed by ARTC and is considered acceptable at this time. There are no plans to upgrade this crossing (Refer **Appendix C and Appendix E**);
- RMS has advised that the one way bridge at Dungog Road is adequate and there are no plans to upgrade the bridge at this time (Refer **Appendix E**);
- RMS have indicated they will continue to monitor the performance of signal controlled intersections on Melbourne Street and will address capacity issues with upgrades if necessary (Refer **Appendix E**); and
- Maitland City Council has identified and constructed upgrades to the alignment of Tocal Road at Bolwarra Heights to improve the delineation and have upgraded the road surface.

The TIA notes that these issues relate to existing traffic issues along the relevant road network.

Recommendations to accommodate background traffic

During the preparation of the TIA, Dungog Shire Council provided advice that there is no expected increase in traffic along key routes due to other proposed development in the locality (Refer **Appendix E**).

It is acknowledged that there is a proposed expansion of the Brandy Hill Quarry that may result in future increases in background traffic. There has been limited information provided with regard to the Brandy Hill quarry expansion. It is understood the current weighbridge truck counts have been provided, however proposed haulage routes, split of demand for end products, or details on any increased truck movements have not been available to inform impact assessment as part of this EIS. It is understood that any trucks from the Brandy Hill Quarry are only likely to be background traffic from Bolwarra.

Recommendations for upgrades to accommodate traffic generated by the proposal

The TIA lists the following potential upgrade works and recommends they be put forward for discussion with the relevant road authorities in order to cater for the continued use of the key haulage routes by the quarry:

- Upgrade intersection to provide a dedicated sheltered right turn lane at Dungog Road and Gresford Road;
- Provide physical guidance for vehicles to manoeuvre around the 90 degree bend in Paterson;
- Upgrade intersection to provide a dedicated sheltered right turn lane at Butterwick Road and Clarence Town Road; and
- Upgrade intersection to provide a dedicated sheltered right turn lane at Clarence Town Road and Brandy Hill Drive (this may need to take into account future upgrades associated with the proposed Brandy Hill quarry expansion with appropriate cost sharing).

Drawings of these upgrade works are set out in the Engineering Report (**Appendix H**).

The SMEC Pavement Report estimates that the average annual maintenance required to maintain the pavements and roads along the haulage routes at the current conditions will cost approx. $52,000, given proposed increased rate of extraction.

The Applicant has indicated that funding for these items has been addressed in a draft voluntary planning agreement to be negotiated with the relevant authority.

It is also recommended that the heavy vehicles from Martins Creek Quarry continue to adhere to the self-imposed speed limit of 40kmph on the section of Tocal Road through Bolwarra Heights and Paterson (Refer to the Engineering Report at **Appendix H**).

Pavement upgrades at Bolwarra

It is noted that pavements in Bolwarra and along other parts of the haulage route have been upgraded since the monitoring was undertaken for the TIA and the assessment in the SMEC Pavement Report. **Appendix H** contains correspondence from relevant local councils detailing these upgrade works.

It is likely that the improvements to the infrastructure along the haul route in these locations will result in a reduction of impacts overall, including noise and pavement conditions.

Conclusion

The TIA identifies that whilst the hours of operation and the extraction rate for the quarry are proposed to increase, the peak hourly number of truck movements associated with the quarry will remain at the current peak rate of 40 laden trucks per hour outbound in the mornings. This peak rate will only ever be reached in the mornings, with the rate of truck movements dramatically falling in the afternoon.

The TIA concludes that the data collected from the relevant road networks demonstrates that these networks currently carry traffic flows well within their capacity. Because the hourly rate of truck movements will not increase as a result of the proposal, the existing road network will continue to operate within acceptable limits.

At an absolute peak capacity, the TIA calculates that the impacts of some 320 laden trucks exiting the site per day would be considered acceptable and it would be an appropriate volume for the capacity of the existing road network.

However, in response to strong community feedback, and given the current condition of the road network, it is proposed to reduce the proposed number of trucks to a maximum of 215 laden trucks leaving the site per day, with a maximum peak rate of 40 laden trucks leaving the site per hour in the mornings. The proposed number of daily outbound laden trucks is only 2/3 of the number considered acceptable in the TIA. As evidenced by the analysis in the TIA, this lower number of truck movements is well below the number considered to have acceptable impacts.

The proposal to divert trucks away from the Lorn haulage route and instead access the New England Highway via Flat Road and Melbourne Street will significantly improve the traffic environment through Lorn. The traffic analysis in the TIA determines that the potential impacts on the intersection of Pitnacree Road and Melbourne Street as well as the New England

Highway intersection with Melbourne Street are likely to be minimal, with both intersections remaining at similar levels to existing operations.

The TIA identifies that accident rates along the haulage routes are reasonably low and relevant road authorities have not noted any particular areas of concern with regard to road safety. The road authority did however provide some comments regarding the lack of shoulders in some locations along haul routes as well as intersection controls. Whilst the TIA identifies that upgrades would be required to bring the relevant road networks up to current design standards, it is noted that relevant road authorities have not identified any plans to upgrade the existing networks in the vicinity of the quarry or the haul roads. The TIA lists a number of road upgrade works for discussion or possible inclusion in a voluntary planning agreement offer.

The mitigation measures described in this assessment are adequate to address issues such as safety and to ensure the network can easily accommodate traffic generated by the proposal.

The TIA concludes that the proposal will have an acceptable level of impacts on the local road networks, as maximum hourly traffic volumes will remain similar to existing levels. The proposed increased output will also be market driven and it is considered that traffic flows from the site may also be able to be better managed over time by gains in efficiency of transportation and logistics.

8.3 NOISE AND VIBRATION

Noise

Assessment Approach

RCA Australia has completed acoustic monitoring and modelling of the existing quarry and has prepared an acoustic assessment (**Acoustics Report**) (Refer **Appendix I**) in accordance with the requirements of the NSW Industrial Noise Policy and other relevant guidelines (e.g. NSW Road Traffic Noise Policy).

Worst case meteorological conditions have been used in the assessment of noise impacts rather than the cumulative distribution method and as a result the estimations in the Acoustics Report are considered conservative.

As part of the assessment, a calibrated sound emission model was developed for the existing operations. This was informed by taking measurements of individual plant items on site and at nearby residences.

Sound level measurements of emissions from the quarry have been taken at residences in Station Street, Martins Creek in accordance with the NSW Industrial Noise Policy.

Road traffic noise impacts have been assessed at specific locations on the identified haulage routes for the quarry. This assessment has considered the impact of the proposed extension to the quarry and extended operating hours.

The Acoustic Report has been prepared with regard for the quarry plans (**Appendix C**) and as such, six noise scenarios have been modelled to correspond with the stages in the Business and Extraction Report (**Appendix B**). These scenarios are described below.

The Acoustics Report has been prepared with regard to the following policies and guidelines as are relevant: NSW Industrial Noise Policy; Draft NSW Industrial Noise Policy; Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments; NSW Road Noise Policy; Rail Infrastructure Noise Guideline.

Project Specific Noise Goals (**PSNG**) have been derived for the project in accordance with the NSW Industrial Noise Policy and are set out in a table in the Acoustics Report. A separate table is presented in the Acoustics Report with proposed limits/licence conditions based on the PSNGs and taking into account all reasonable and feasible mitigation measures.

The Acoustics Report has considered the immediately surrounding areas of Martins Creek and Vacy in respect of industrial noise impacts and road traffic noise impacts; and the townships of Paterson and Bolwarra in respect of road traffic noise impacts associated with the additional road truck movements that are proposed as part of the quarry expansion.

Impact assessment for industrial noise has been conducted for individual receiver locations and the assessment for road traffic noise has been conducted for assessment areas that represent a group of related receivers.

Industrial noise levels have been predicted and assessed at receivers using modelling tools described in the Acoustics Report and historical wind and weather information from the Bureau of Meteorology.

Rail noise has been assessed to take into account an increase in operating hours for rail loading without extending the siding and also the scenario where consent is granted for 24 hour rail operating hours and the rail siding is extended has also been assessed. The assessment has been done in accordance with the Rail Infrastructure Noise Guideline which requires the rail siding to be assessed as an Industrial Noise Source that is part of the premises. The assessment has not considered impacts from the small section of connecting rail line from the property boundary across Corey Street as the Acoustics Report identifies that the impacts would likely be negligible compared with the operation of trains on the siding.

Road traffic noise has been assessed using baseline data from loggers placed at various locations to determine noise levels as well as traffic counters to determine traffic flow and vehicle types.

Information has been provided in the Acoustics Report for all individual receivers for each operational scenario modelled.

Existing Environment

The existing quarry operations consist of a number of acoustic emitters that include drilling and blasting operations, initial crushing within the quarry floor, secondary and tertiary crushing and sorting, transportation of materials within the quarry areas, and truck and rail loading. Haulage of materials through the townships of Paterson and Bolwarra Heights has also been identified as an issue by local residents.

The area surrounding Martins Creek Quarry consists of rural residential development with large lot subdivisions and the township of Martins Creek itself. Other noise sources identified include the North Coast Rail Line and Dungog Road.

The quarry is located immediately adjacent to residences in Station Street and Corey Street in Martins Creek (see Figure 22 below).

Figure 22 Location of Martins Creek Quarry and proposed extension

The acoustic environment of the township of Martins Creek is dominated by the quarry and traffic associated with the quarry during the day. Residences on Merchants Road are considered to be largely unaffected by the quarry and natural sounds and some sound from agricultural activity dominates. The residences on Dungog Road in Vacy are described in the Acoustic Report has experiencing some noise from the existing quarry, particularly crushing activities in the west pit, but is otherwise largely unaffected by the operations at the quarry.

Evening and night assessments periods are described in the Acoustic Report as rural and dominated by natural sounds.

Conditions of the haul roads and the haulage route network through Paterson and Bolwarra Heights are described in the traffic impact assessment in Section 8 of this EIS.

The Martins Creek Quarry currently operates under an Environmental Protection Licence that controls evening noise emissions by requiring that night time maintenance not be audible from the nearby residences.

Current background noise levels were determined from a background noise monitoring survey over seven days and results are set out in the Acoustic Reports.

Short term, attended noise surveys were also undertaken to determine existing noise emissions from the quarry at the closest and likely worst affected receivers including residences at Station Street. Traffic noise was also surveyed along the haulage routes including Bolwarra, Paterson (Refer **Appendix I**).

Additional background sound level logging was undertaken outside 46 Merchants Road to verify the deemed background for sensitive receivers along Merchants Road (Refer to **Appendix I**).

The potentially affected receiver locations are identified in detail in the Acoustics Report, including the boundaries of each Noise Assessment Group (**NAG**). The boundaries reflect the topography of the terrain and exposure to noise from the rail line and Dungog Road.

The surveys demonstrate that Martins Creek Quarry is currently generating sound levels above the target noise goals recommended in the NSW Industrial Noise Policy at some of the locations surveyed.

Road traffic noise was generally found to be in accordance with the NSW Road Traffic Noise Policy at the residential locations surveyed and noise from the North Coast Rail Line was found to make a contribution to the overall daytime acoustic climate.

Current rail operations are described in the Acoustic Report as a maximum of one train per week day, given the time it takes to load a train and the current restrictions on operating hours and access to train paths.

The Acoustics Report contains models of six staged operational noise scenarios representing the progression of the quarry over 25 years from the commencement of the expansion project. Each scenario has been modelled to represent worst case operating conditions and the application of reasonable and feasible mitigation measures (the specified noise treatments identified for each stage of the project).

Proposal

The Acoustics Report has been prepared having regard for the proposed quarry plans which detail the stages of the proposed extension over time (**Appendix C**).

This application is an opportunity to seek approval for a number of new engineering treatments and a quarry plan that will be designed to minimise noise impacts.

The Acoustics Report specifies that existing plant and equipment will most likely be used for crushing and processing for the majority of the life of the quarry, until the final years of the project when the material will be extracted from beneath the existing plant. Modular equipment will be used on the floor of the quarry to accommodate this. It is considered that any upgrades of equipment that do occur during the life of the quarry will be to install modernised equipment with lower impacts as a result.

In the early stages of the quarry plan the Acoustics Report identifies that some of the existing infrastructure that is currently located near the residences in Station Street and Corey Street will be relocated and those areas will be rehabilitated.

The following measures are proposed in the design to address impacts from noise:

- Construction of a new internal driveway and bridge to Dungog Road for haulage;
- Discontinuation of product shipment via Station Street and Grace Avenue;
- Discontinuation of use and rehabilitation of the southern section of the existing operational area which is presently used for maintenance and product processing and stockpiling;
- Relocation of maintenance facilities to within the existing processing area behind a noise barrier;

- Construction of noise barriers along internal haul roads and around the existing quarry production floor;
- Applying engineering noise treatments to the existing plants; and
- Rail spur noise control treatments to be applied to the rail loader screen and bin.

Should extended rail operating hours be approved, construction of a noise attenuation wall along the rail corridor is proposed in the design to address impacts from noise and the corresponding increase in using rail shipping methods. The plans and drawings for the proposed acoustic wall are set out in **Appendix I**.

Details of these measures are set out in the Acoustics Report.

The proposal includes the following stages of extraction which have informed the Acoustics Report:

Stage 1	Continued extraction within the existing quarry footprint and extension of the west pit. Engineering noise control elements will include noise barriers around processing screens and noise bunds along the haul road. The use of the southern portion of the existing processing area is discontinued.
Stage 2	Continued extraction within the existing quarry footprint and further extension of the west pit. Complete engineering noise controls to the reminder of the processing equipment and construct the noise bund to the south of the processing area.
Stage 3	Continued extraction in the existing footprint plus further extension of the west pit to the north, east, and south.
Stage 4	Continued extraction expanded footprint.
Stage 5	Continued extraction expanded footprint.
Stage 6	Continued extraction expanded footprint plus expansion into existing processing area. Decommissioning of fixed processing plant in favour of modulated plant located on quarry floor.

Impact Assessment

The Acoustics Report contains an assessment of the likely impacts from industrial noise, operational noise, road traffic noise, and rail associated noise.

The Acoustics Report considers that any noise impacts associated with construction activities would not be likely to generate additional noise impacts over and above the existing quarry operations and so no assessment of these activities is necessary.

Industrial Noise and Operational Noise
The proposal has been assessed against the relevant criteria in the NSW Industrial Noise Policy for intrusive noise and criteria protecting aimed at protecting specific land uses. The project-specific noise levels have been determined taking into account that the premises are an existing quarry with a legacy noise issue and is the only source of industrial noise in the area.

Various operational scenarios were modelled including daytime operations, rail loading at night, daytime operations and rail loading, daytime operations and crushing, evening operations with tertiary plant equipment, evening processing with all plant equipment operating, early morning truck loading and product dispatching, and overburden stripping in conjunction with daytime operations. The Acoustics Report sets out the results of the modelling.

Predicted sound levels were also modelled for various receiver areas and for noise enhancing wind conditions (Refer **Appendix I**).

At the monitoring location identified as NAG1 in Figure 23 below (residences at Station Street and Corey Street), the Acoustic Report concludes that the proposed installation of noise control works and the relocation of quarry activities will result in a reduction of operational noise to 37 dB(A) under noise enhancing wind conditions at the most sensitive receiver.

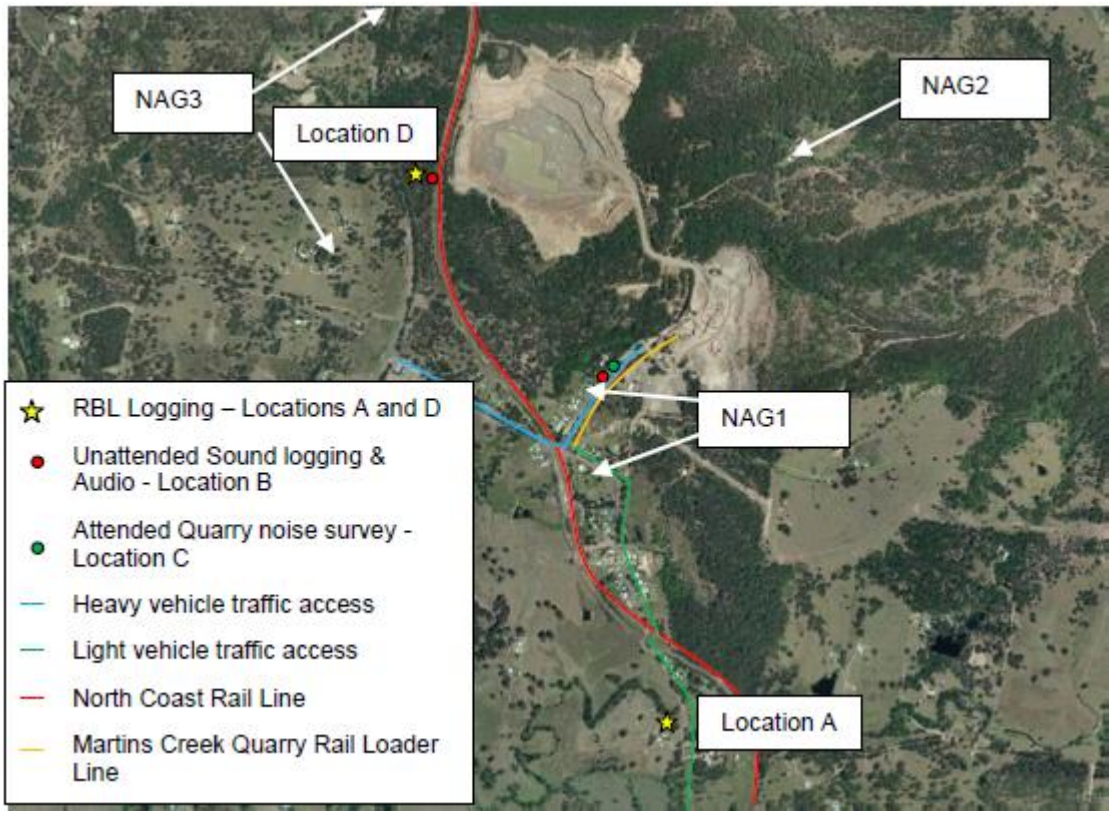

Figure 23 Acoustics logging and survey locations around Martins Creek Quarry

Noise from stripping at the NAG 1 location is predicted to range from 33dB(A) to 44dB(A) depending on wind conditions and the elevation of the dozer. The Acoustics Report notes that noise from stripping will be intermittent depending on production and impacts will depend on weather conditions, the direction of the dozer and the working location.

Rock breaking and crushing is predicted in the Acoustic Report to result in sound levels of between 38 and 42 dB(A) at the nearby residences in Dungog Road. This is considered consistent with existing operations although it is noted that as the location of the crusher shifts from time to time the impacts will be lessened, in particular when located behind the base high wall which has sound attenuation properties. The Report predicts that in years 20-25 of quarry operations, the impacts will be further reduced as the crusher will be relocated to the floor of the quarry.

Overall the Acoustic Report finds a reduction of between 15 and 20 dB(A) for daytime quarry operations for residents at the NAG 1 monitoring location and predicts that the impacts of daytime operations will remain generally below the Project-Specific Noise Criteria in the NSW Industrial Noise Policy at all residences near monitoring locations at NAG 2 and NAG 1 for all activities.

The Acoustic Report identifies that commencement of evening processing activities will require specific noise control works for the tertiary crusher and screening plant, however concludes that should the measures outlined below be implemented, the tertiary processing plant should be able to operate without significant changes to the evening acoustic environment.

For primary and secondary processing proposed to be carried out in the evening, the Acoustic Report finds that ambient sound levels at the northern end of Station Street is likely to increase to between 30 dB(A) and 36 dB(A) depending on wind conditions. The Acoustic Report finds there will be little to no increase along the southern end of Station Street and Corey Street. Sound levels are predicted to be well below the Acceptable Noise Level for the area and to remain consistent with the Project-Specific Noise Criteria specified in the NSW Industrial Noise Policy.

The Report concludes there will be little to no impact as a result of evening processing for residents near monitoring locations at NAG 2 and NAG 3. Similarly, the Acoustics Report finds that the operations connected with early morning loading and dispatch are unlikely to cause more than minimal increases in the ambient sound level and will be consistent with the Project-Specific Noise Criteria.

The Acoustics Report has assessed the likely impacts of maintenance activities at the quarry and concludes that as it is proposed that all maintenance activities are to be moved to the northern part of the processing area, where they will be conducted behind the noise barrier on the southern side of the processing area, noise from maintenance is likely to be below 25dB at the closest residences and unlikely to cause offensive noise or sleep disturbance.

Traffic

The proposal has been assessed against the NSW Road Noise Policy and criteria for residences affected by traffic noise.

The existing heavy vehicle traffic along Station Street will be removed completely by the proposal to construct a new access driveway to Dungog Road, however the extended operating hours associated with the expansion of the quarry is likely to result in an increase in heavy traffic through the townships of Paterson and Bolwarra. It is noted that the maximum hourly frequency of traffic from the quarry will nevertheless remain as per current (40 laden trucks an hour exiting the quarry in the mornings, with a significant decrease in the afternoons).

The Acoustic Report identifies three areas where changes in traffic flow are likely to result from the proposal:

- Traffic noise will likely be significantly reduced along Station Street / Grace Avenue due to the new access driveway;
- Traffic noise levels may increase on Dungog Road between the junction with the new access driveway and the intersection with Grace Avenue as a result of diversion of traffic via the new access driveway; and
- Traffic noise levels may increase on Gresford Road as a result of increases in overall traffic volumes as a result of increases in quarry output and extended operating hours.

The NSW Road Noise Policy provides a relative increase criterion for an increase in daytime road traffic noise as a result of additional traffic generated by the development. The criterion is to be applied if existing noise levels are 12dB or more below the criteria values specified and where the existing noise is already above the criteria, a 2db increase is allowable if the criteria cannot be achieved. The Acoustic Report sets out the criteria values that will apply, given the existing traffic noise survey results.

Traffic noise for residences at monitoring location NAG1 will be significantly reduced by the construction of the new access driveway. The Acoustic Report notes there will be a moderate increase in traffic at monitoring location NAG3, however the Report notes it will remain within the limits of the NSW Road Noise Policy. The Acoustics Report also concludes that residences at monitoring location NAG2 will similarly experience noise levels that are within the limits in the Policy.

The modelling in the Acoustic Report concludes that the predicted changes in noise level at the most affected location in Paterson as a result of doubling the number of truck and trailer combinations in the traffic stream is likely to be less than 1 dB in all cases and accordingly the NSW Road Noise Policy considers this a negligible increase in traffic noise as a result of the proposal.

The likely noise impacts residences in Dungog Road will experience as a result of the new access driveway are considered in the Acoustic Report to be compliant with the assessment criteria in the NSW Road Noise Policy and would be likely to be less than the traffic noise levels currently experienced by residents of Station Street.

Rail

The Acoustic Report has included an assessment of the proposed extension to the rail spur which may proceed. The increase in product shipment by rail may create additional rail traffic on the North Coast Rail Line between Martins Creek Quarry and market destinations. The Acoustic Report notes that the amount of additional Rail traffic is currently unknown, but concludes that the changes to rail noise impacts compared to operating the proposal without the

extended rail siding will likely be minimal given the existing volume of other rail traffic on the North Coast Rail Line.

The Acoustic Report identifies that, should market conditions and access arrangements make increased transportation by rail feasible, it is likely that the quarry would only be capable of loading and despatching four trains in a 24 hour period. Therefore the Report concludes that this scenario would only generate a maximum of six additional train movements per day.

The Acoustic Report identifies that these additional rail movements would not increase the noise level from trains on the network by more than 2dB since there would not be a sufficient number of new train movements that could be generated by the quarry to effect the existing daytime or night time noise levels recorded. The Acoustics Report sets out in detail the methodology for assessing the impact of the potential additional trains.

Noise likely to be generated from the trains and loading activities on the rail spur has been assessed against the Rail Infrastructure Noise Guide which the Acoustic Report identifies as corresponding with the Acceptable Noise Levels for rural areas specified in the NSW Industrial Noise Policy.

The Acoustic Report identifies that the measurements from the on site rail operations and train loading activities exceed the target noise goals and proposes mitigation measures to address this. The Report identifies a reduction of 10dB for rail loading for residents near the NAG1 monitoring location and that residences near monitoring locations at NAG2 and NAG 3 will experience noise levels that comply with the requirements of the Rail Infrastructure Noise Guide.

The Acoustics Report identifies a number of mitigation measures that are predicted to significantly reduce noise emissions, in particular to deal with likely impacts if the hours of operation for rail loading are extended to 24 hours a day, seven days a week, and the rail siding is extended (see below).

The Acoustics Report identifies that noise emissions not related to the proposed extension of rail loading hours of operation are likely to arise as a result of train operations such as braking, and noise from operating crews. This noise has been measured at 62 dB(A) with a maximum reading of 84 dB(A). The Acoustics Report notes that, in the absence of a noise attenuation wall, these emissions could be addressed by the measures identified below.

Vacant Land

Detailed noise contours have been provided for the vacant land located in NAG1 showing the worst case noise effects. The Acoustics Report concludes that there is no likely exceedance of the relevant INP noise levels over vacant land adjacent to the proposed development.

Early morning loading and dispatch

After the construction of Stage 2 noise controls, the operation of trucks and loaders on the site from 5:30am is assessed to produce sound levels at nearby residences in the range of 25 to 30dB(A). The Acoustics Report identifies that this is consistent with the Project Specific Noise Goals and the overall impacts are considered minimal.

Mitigation Measures

The Acoustics Report proposes a range of operational measures and controls to reduce noise impacts:

- Minimise the exposure of equipment to surrounding residences when carrying out topsoil stripping;
- Engineering noise control elements including an 8m high noise barrier to the southern area of the processing area and a 3m high noise barrier to the southern section of the haul road and dump area;
- Engineering noise control treatments to plant equipment including the primary and secondary crusher, fixed screens, rail loading screen and hopper;
- Relocation of maintenance functions on the site;
- Discontinuation of the use of the southern part of the site for stockpile and ancillary support functions;
- New access driveway and product dispatch;
- Discontinuation of heavy vehicles using Station Street for dispatch of material; and
- Construction of a noise barrier to the rail siding in conjunction with the extension of the rail siding to facilitate 24 hours/7days a week rail loading (Refer **Appendix I**).

Operational noise monitoring will be carried out quarterly at Station Street (location NGA1) and near residences on Dungog Road (location NGA3). The Acoustic Report considers monitoring at location NGA2 along Merchants Road unnecessary given the predicted noise levels in that location would be low.

Voluntary Land Acquisition and Mitigation Policy

The Acoustic Report sets out consideration of the ôVoluntary Land Acquisition and Mitigation Policy For State Significant Mining, Petroleum and Extractive Industry Developmentsôpublished by the now Department of Planning and Environment (**VLAMP**). The VLAMP is also required to be considered under clause 12A of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

The VLAMP recognises that for existing developments with noise legacy issues, it may not always be possible to comply with assessment criteria despite the implementation of reasonable and feasible measures. In these circumstances, the VLAMP provides that a consent authority cannot grant voluntary mitigation and acquisition rights for modification of an existing development with legacy noise issues, where the modification to the existing development would have beneficial or negligible noise impacts. In these instances, the VLAMP provides that the legacy noise issues should be addressed through site-specific pollution reduction programs under the *Protection of the Environmental Operations Act 1997*.

The Acoustic Report concludes that as the proposal is for the expansion of an existing development with legacy noise issues, and as the predictive noise models which incorporate the recommended mitigation measures would be likely to produce at least a 10dB reduction in most of the existing noise levels, the consent authority cannot grant voluntary mitigation and acquisition rights.

The Acoustic Report notes that, should approval be granted for 24 hour, seven days a week of rail operations, land acquisition may be appropriate to consider for some residences in Station Street.

Conclusion

The Acoustics Report has identified that there will be exceedance of certain Project-Specific Noise Criteria for some aspects of operations at the monitoring location near Station Street (NGA1) however; assessed as a whole, the impacts on those receivers are considered to be reduced as a result of the proposal.

Overall noise impacts experienced at other monitoring locations (NGA2 and NGA3) are considered to change very little as a result of the proposal and reductions in operating noise will be experienced over time.

The introduction of topsoil stripping will increase operational noise compared to current operations, however the Acoustics Report concludes that it would not be feasible to reduce impacts from these activities below what is predicted.

The Acoustics Report lists the proposed achievable noise criteria that are recommended to apply to the proposal and quarry operations and considers all reasonable and feasible measures to control noise impacts.

Given that the quarry has been long established in the locality and that the proposed expansion is likely to reduce existing overall noise impacts, including a significant reduction in traffic noise for residents of Station Street, the proposal is considered to facilitate positive outcomes.

Blasting and vibration

Assessment Approach

A Blasting and Vibration Report (**Blast Report**) has been prepared for the proposal by Peter Bellairs Consulting Pty Ltd (Refer **Appendix I**).

The Blast Report has been prepared with regard for the quarry plans; the ANZECC ï ôTechnical Basis for guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibrationô1990; óAssessing Vibration: A Technical Guideline ï Department of Environment and Conservation NSWô2006; monitoring data collected from the Martins Creek Quarry on the vibration and air overpressure results for the last 2 years and 8 months; and current techniques in use at the quarry to minimise air overpressure and flyrock.

A report on the geology of the site and surrounds has been prepared by VGT Pty Ltd to assess whether there are any geological linkages with the quarry site and the neighbouring residences and if there would be any other causes of potential damage to residences due to vibrations (**Geology and Blast Vibration Assessment**))(Refer **Appendix I**.

To prepare the Geology and Blast Vibration Assessment, a site visit was conducted to an óaffectedô surrounding region and a community meeting was held. A geological mapping exercise was undertaken and samples taken for testing.

An assessment has also been prepared by Peter Bellairs Consulting Pty Ltd evaluating the potential for blasting at Martins Creek Quarry to have damaged neighboring residences in Martins Creek (**Blast Damage Report**)(Refer **Appendix I**).

To prepare the Blast Damage Report, all blasting induced ground vibration and air overpressure data collected since Daracon took over operations at the Martins Creek Quarry was reviewed. The data was collected from monitoring sites on the quarry and within the neighbouring residential area in Martins Creek and reviewed against the relevant Australian Standards, current EPL conditions and other relevant sources of information. Data was also collected from the closest weather station to the neighbouring residential premises at Paterson (Tocal). A community meeting was held with residents of the neighbouring properties, which included experiencing a quarry blast event from the location of the residences.

Existing Environment

The Geological Report identifies that the quarry is situated on Martins Creek Andesite rock and that there are significant geological differences between the quarry geology and the geology of the surrounding residences such that there is no direct geological linkage between them.
Blasting approaches within 270 metres of residences in Station Street which is the closest that blasting approaches any residences in any direction from the quarry.

The data reviewed as part of the preparation of the above reports indicates that all blasts that have occurred at the quarry as part of current operations have been under the lower limit set in the existing EPL and below the air overpressure limit set in the EPL.

The monitor installed in the neighbouring residential area recorded data that showed a maximum ground vibration of 3.7mm/s and air overpressure of 114.8dBL, with the average figures recorded being well below this at 1.05mm/s and 95dBL respectively.

The Blast Report identifies that 1 blast during current operations exceeded the lower environmental licence limit at 330 Dungog Road with a 116.8dBL due to wind concentration of the blast induced air overpressure down a natural gully. Remedial actions were taken to minimise the potential for this to occur again even though it is 1 lower environmental exceedance in 68 blasts which represents a 1.47% exceedance rate and 5% are allowed between 115dBL and 120 dBL. The remedial action included:

- not firing if the wind is greater than 2m/s towards 330 Dungog road
- use of 76mm diameter face holes
- decking of these holes
- the use of a 67ms delays in the control row with 42ms delays back through the shot to slow the shot down and separate the movements of the face
- not firing a shot if the wind speed and/or direction are unfavourable and sleeping of the shots overnight with a guard and firing the next day when the wind direction and/or speed are more favourable.

Figure 24 below shows the current quarry floor, faces and benches.

Figure 24 Martins Creek Quarry floor and faces

Proposal

Figure 25 below shows the current extraction areas and the proposed extraction area and the proximity to residences on Station Street, Martins Creek.

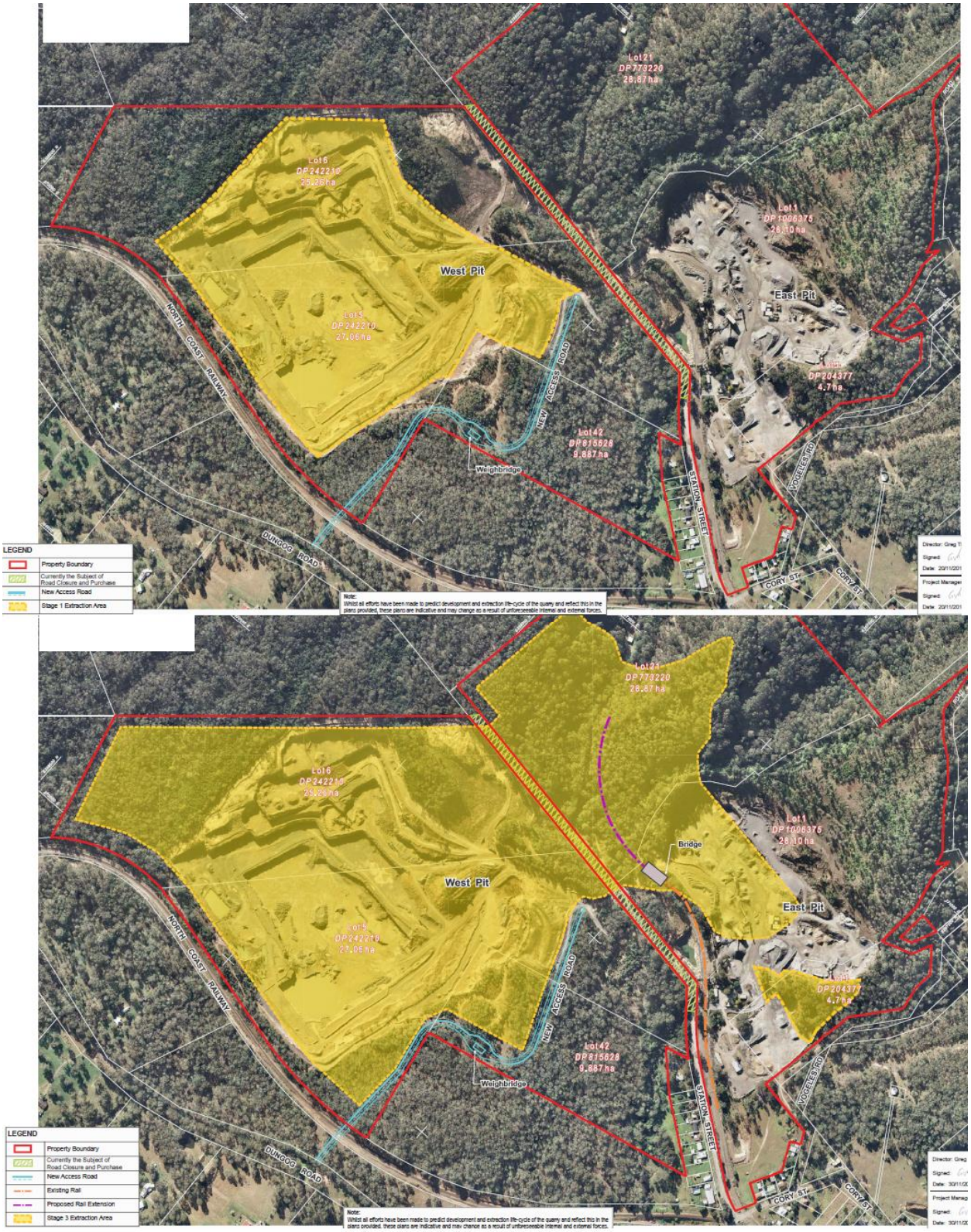

Figure 25 Current and proposed extraction areas (Extracts from the Mine Plans at **Appendix C**)

The Blast Report details a bench design for the proposed quarry extension based on a 12 metre bench height. The Blast Report notes that the actual bench height for the extension is likely to be approx. 11 metres, however operational requirements may see this vary.

The proposed bench design includes 89mm diameter holes for the main body of the blast while the 76mm diameter holes are for the front or face of the blast. The smaller diameter holes are required for control of flyrock as well as air overpressure.

The Blast Report outlines that 76mm diameter holes using 2 decked charges will need to be used when blasting occurs from distances from 270m to 300m from residences. 89mm diameter patterns using two decks will be used from 301m to 340m then fully charged 76mm diameter holes from 341m to 400m and fully charged 89mm diameter holes at distances greater than 400m from residences.

The Blast Report also details how the current measures in place will manage flyrock, including the use of 76mm diameter face holes with smaller charge weights so it is less likely to generate flyrock. These parameters for blasting may change over time.

Impact Assessment

The Blast Report contains a calculation of the estimated ground vibration based on free face blasting (the front of the blast has no rock in front of it) for the vast majority of blasts.

Relying on the data gathered over 32 months, the Blast Report contains an assessment of whether current blasting has resulted in problematic blast induced ground vibration and if the extension and future blasting is likely to have additional impacts.

The Blast Report considers data from monitoring stations at the Patterson Valley Estate, the Gully residence monitor at 336 Dungog Road, and a station at the back gate of the quarry which is considered to provide the best indication of how the residences at Station Street are likely to be affected by blast induced ground vibration given that this is the closest monitor and is the direction of Station Street from the Quarry.

This data demonstrates that the lowest level of blast induced ground vibration specified in the EPL has not been recorded at any of the monitoring sites.

The bench design and measures proposed in the Blast Report are estimated to achieve blast induced vibration levels of less than the lower limit specified in the existing EPL.

The Blast Report notes that achieving the achieving the vibration limits for the residences automatically means that the vibration limits on the adjacent infrastructure like, roads, bridges (10mm/s PPV), powerlines (100mm/s PPV) and the rail line (300mm/s PPV) are achieved.

Previous blast induced ground vibration results confirm no blast induced ground vibration licence limit exceedances using the current standard drill and blast design in the quarry over the past 32 months since Daracon began operations at the site. The highest recorded vibration in that time has been only 3.72mm/s PPV which is well under the likely lower limit environmental limit of 5mm/s PPV as per ANZEEC Guidelines 1990 and AS2187.2-2006. Martins Creek Quarry has a proven track record of meeting the ANZEEC Guidelines on blast vibration.

At the community meeting, residents living nearby the quarry reported that the following impacts have been experienced as a result of the current blasting from the Martins Creek Quarry:

- Cracking of a concrete pathway;
- Mortar falling out between bricks;
- Cracked cornices;
- Nails being exposed in plasterboard; and
- Crockery rattling and moving.

As part of the assessment undertaken during the preparation of the Blast Damage Report, rock samples were taken from the area surrounding the nearby residences. Large cracks were observed on the ground around the residences; in some instances over 4 metres long (see Figure 26 below).

Figure 26 Large cracks observed near residences

The Geological Report details the testing of samples taken from the quarry and near the residences at Martins Creek (**Appendix I**) (Figures 27 and 28 below).

Figure 27 Samples taken from the quarry and near residences at Martins Creek

Figure 28 Locations near residences where samples were taken

The samples taken from near the residences in View Street are volcanic in nature and different to the Martins Creek Andesite found in the quarry. The Geological Report also identifies that a significant geological boundary is evident, paralleling the rail line and Horns Crossing Road,

between the quarry and the residences in View Street. The Report concludes that as a result there is likely to be no direct geological linkage between the quarry and the residences which may create a direct pathway for ground vibration.

A sample from near the residence at 27 View Street near where the cracks were observed was also taken for testing. The clay sample was found to have moderate to high potential to crack when dry (Refer **Appendix I**).

It is proposed in the Blast Damage Report that the shrinkage and swelling of the clay soils over time could be the cause of the reported damage to some of the nearby residences.

The Blast Damage Report identifies that crockery rattling is likely due to air overpressure and notes that similar conditions and impacts can occur naturally from large gusts of wind. The Blast Damage Report considers meteorological conditions and data and concludes that it is likely that any damage has been caused by overpressure has been generated from high winds at the residences as weather conditions for the area have generated far higher air overpressures than the quarry and for a far longer period.

The Blast Damage Report identifies that none of the other damage reported could have been caused by blast induced ground vibrations during the time the Applicant has operated the quarry as operations have been recorded as well under the lower environmental blasting limits.

The Blast Damage Report considers the data collected from the quarry and monitoring stations located near the residences over 32 months and concludes that the lower level figures for blasting frequencies would not have caused even the onset of damage to houses. The Blast Damage Report notes that the British Standard BS7385 and the United States Bureau of Mines Safe Blasting Limitations indicate that the frequencies at which cosmetic or threshold damage in buildings are seven times greater than the maximum measured blast induced ground vibration generated from the Martins Creek Quarry.

For blast induced air overpressure, the Blast Report estimates that the blasting will be equal to the 115dBL likely lower EPL limit as recommended by ANZEEC 1990. However the Report notes that this is an estimate and it is the actual blasting results that should be considered in preference to a theoretical calculation. It also notes that blast induced air overpressure is likely to be harder to control than the blast induced ground vibration due to other factors like wind, wind direction etc. beyond the quarry operatorôs control.

The blast induced air overpressure results over the past 32 months confirm that the highest air overpressure result of 116.3dBL, with this being the only result over 115dBL, or a 1.47% lower environmental license limit exceedance rate which is well below the 5% allowed. As set out in the Blast Report, a number of initiatives aimed at reducing the air overpressure have been implemented at the quarry with no blast induced air overpressure over 115dBL since that blast. Martins Creek Quarry have a proven track record of meeting the blast induced air overpressure ANZEEC Guidelines 1990 limits.

As the impacts of blast induced air overpressure are highly dependent on the prevailing wind and atmospheric conditions, blasts that are similar can produce significantly different airblast readings at a particular monitor dependent on these conditions. The Martins Creek Quarry currently monitors weather conditions in order to time operations to mitigate impacts.

The Blast Report identifies the current measures in place to manage the impacts of flyrock and notes that there has there has never been a flyrock incident at the quarry, including in the last 3 years that the Applicant has managed the quarry

The Blast Report concludes that the impacts of quarry operations on people will likely be minimal given the low level of vibration and air overpressure likely to be generated at the closest residences. Animals are also unlikely to be unduly affected due to the small number of blasts and the low levels of vibration and air overpressure. Buildings and natural features will not be affected due the low level of vibrations and air overpressure which are an order of magnitude below which the onset of damage occurs.

Mitigation Measures

In accordance with the ANZEEC Guideline 1990, the Blast Report recommends that the likely blast induced ground vibration and air overpressure limits are likely to be for:

a. Ground vibration:
    i. Less than or equal to 5mm/s PPV achieved for at least 95% of the blasts in a year
    ii. Maximum of 5% of the blasts can have a PPV of greater than 5mm/s PVV but less than or equal to 10mm/s per annum and
    iii. Under no circumstances shall a blast generate a PPV of greater than 10mm/s
b. Air overpressure:
    i. Less than or equal to 115dBL achieved for at least 95% of a blasts in a year
    ii. Maximum of 5% of the blasts can have an air overpressure greater than 115dBL but less than or equal to 120dBL and
    iii. Under no circumstances shall a blast exceed 120dBL.

The Blast Report specifies that the quarry should operate subject to the existing EPL conditions that restrict blasting with no blasting on Sundays or public holidays.

The blast frequency should be less than or equal to 50 times per annum but the aim should be to minimise the blasts by firing a nominal 15000bcm blast size

Blasting will generally be typical opencut free face blasting, and a well sorted crushed angular aggregate of a nominal size of 9mm (7mm to 11mm) is to be used as stemming to minimise air overpressure.

The Blast Report recommends that all of the current measures in place to manage flyrock should be implemented, including engaging a good quality licensed drill and blast provider with a proven track record in quarry and construction blasting.

Blasting is to be undertaken to meet all legislative and regulatory requirements, Australian Standards (specifically AS2187.2-2006) and relevant Codes of Practice as a minimum including ANZEEC Guidelines 1990 and the relevant licence conditions with respect to blasting.

The Blast Report specifies there will be no storage of explosives or explosive precursors on site as they will be mobilised to each blast with any excess returned to the drill and blast contractors or the explosive supplierôs premises.

The current techniques to mitigate ground vibration, blast induced air overpressure, flyrock and fumes currently implemented in the Martins Creek Quarry should continue to be required for the proposal (as outlined in the Blast Report).

To address wind, which can produce air overpressures in excess of blasting licence conditions, the Blast Report recommends that the Applicant monitor and record wind speeds as well as other meteorological conditions.

Further detailed recommendations and mitigation measures are specified in the Blast Report.

Conclusion

The standard drill and blast design for the quarry described in the Blast Report is considered to be appropriate for the rock types to be blasted based on past blast outcomes.

As the recorded data from the monitoring stations demonstrates that the quarry has been operating well within the limits set in the EPL, the Blast Report concludes that the current systems, procedures and methodologies have been successful in managing the impacts of blast induced ground vibration and the Martinôs Creek Quarry has the capability to successfully manage this issue into the future by continuing to implement the systems, procedures and methods current used to manage blast induced vibration

Martins Creek Quarry has a proven track record of meeting the relevant blast vibration and induced air overpressure guidelines since it took over operations at Martins Creek Quarry. Given that the quarry is currently operating within the limits of the relevant guidelines and licence conditions, the impacts of the proposal including the quarry extension are considered likely to be minimal if these standards are maintained.

The Geological Report and the assessment in the Blast Damage Report support a conclusion that the impacts reported at residences near the quarry are more likely to have been the result of forces other than blasting at the quarry. Therefore if the quarry were to continue operating to the standards set out in the Blast Report, the likely impacts from blasting are considered to remain at acceptable levels.

8.4 HAZARDS AND RISK

The following hazards and risks have been identified and assessed as part of this EIS:

A. Quarry Face Stability
B. Bushfire
C. Handling of dangerous goods

A. Quarry Face Stability

Assessment Approach

A site and geotechnical assessment has been carried out by Qualtest Laboratory Pty Ltd (Refer **Appendix K**) (**Geotechnical Report**). The assessment considers the site conditions and geology for the purposes of addressing quarry face stability.

In preparing the assessment, a site visit was carried out (including inspection of surrounding sites), the Business and Extraction Report (prepared by VGT Pty Ltd) (Refer **Appendix B**) was reviewed, the Martin Creeks Quarry Final Pit Design and Cross Sections (5 year, 10 year, 15 year, 20 year and 25 year) prepared by Daracon (Refer **Appendix C**) was reviewed, and engineering assessment and reporting was undertaken.

Existing Environment

The Quarry currently extracts Andesite rock types and the site is underlain by the Martinôs Creek ôAndesitic Ignimbriteô. The Andesite dominates the quarry faces and floor although there are some ômetasedimentsôexposed in parts of the quarry floor (red sandstone and claystone) (see **Figure 29** below).

Figure 29 Eastern face of main pit of existing Quarry showing visible underlying metasediments

There are some thin iron stains found on the joints of some yellow surfaces in the existing quarry, however these were determined to not compromise the strength of the material (see **Figure 30** below).

Figure 30 Existing Quarry floor (Bench 5), eastern face

The existing bench or quarry face heights range from 8m ï 14m and there are typically around 3 blasts per month under normal quarrying conditions, progressively forming a new face each time. Soil overburden thickness on the existing quarry is 1m and the soil and overburden batter is 18 degrees. Face angle on the existing quarry varies from 80 ï 90 degrees.

There are no known failures or history of instability events associated with the existing quarry face.

Impact Assessment

The Quarry and proposed extension have been assessed for slope instability against the relevant guidelines and publication specified and extracted in **Appendix K**.

The assessment carried out by Qualtest Laboratory Pty Ltd (Refer **Appendix K**) identified the following potential risks and hazards that could from the proposed development:

- Large scale (>10m^3) rock fall from spalling or toppling of rock masses along adversely orientated rock defects;
- Localised rock falls, where rocks or boulders are dislodged from the quarry face due to slope deterioration or wet weather; and
- Failure of overburden (the upper soil profile of up to 1m in depth) due to unsuitable batters, or erosion by concentrated surface water flows.

For all of these hazards and risks, the assessment concludes that all hazard events are unlikely and the risk is assessed as low (Refer **Appendix K**). All hazards are assessed as having limited impacts on personnel and equipment if the mitigation measures proposed in the assessment report are implemented (see below)..

Mitigation Measures

The Geotechnical Report recommends a range of mitigation measures to manage the hazards and risks identified in the report, including:

- Access to within 5m-10m of the Quarry face should be limited, with personnel preferably only accessing the area only with cabin protection from plant machinery;
- Scaling loose blocks with excavators during quarrying;
- Blasting behind any inferred dyke or fault structure in order to reduce poor face stability conditions;
- Incorporating a risk analysis and safety management plan for personnel beneath the quarry faces;
- Drainage measures implemented above and behind the quarry face to avoid concentrated water flows on the quarry face or infiltration;
- Diversion of surface water flows from upslope areas away from the quarry face;
- Benches and pit floor should be graded to promote positive drainage conditions;
- All work is to be carried out in accordance with the quarry extraction operation plans, safety management plans, and site specific work method statements and procedures; and
- In the event of signs of future instability, large scale wedge, planar or toppling instability, further geotechnical advice should be sought.

Conclusion

The Geotechnical Report concludes that the current quarry bench designs are performing adequately and that variable bench heights may be incorporated in the proposed development. The Geotechnical Report also assessed that there was little to no seepage and that the expansion of the quarry will exhibit similar ódryô quarrying conditions. The Report concludes that periodic pumping out and other recommended conventional drainage controls will adequately manage any minor seepage and ponding of water.

The Geotechnical Report recommends the above listed measures to control any potential localised instability risk within and of the quarry face.

B. Bushfire

Bushfire Risk Assessment Approach

A Bushfire Assessment Report has been undertaken by Conacher Consulting for the proposed quarry extension and future development within the subject site at Martins Creek.

As development consent is not being sought for subdivision of the land for residential purposes or a special fire protection purpose within the meaning of the rural fires legislation, a bushfire safety authority under section 100B of the *Rural Fires Act 1997* is not required.

Under Section 79BA of the *Environmental Planning and Assessment Act 1979* a consent authority must be satisfied that the development conforms to the specifications and requirements of the document *Planning for Bush Fire Protection Policy 2006* prepared by the

NSW Rural Fire Service. A bushfire hazard assessment has been included in **Appendix J**. As the site is on bushfire prone land, under section 79BA of the *Environmental Planning and Assessment Act 1979*, a bushfire hazard assessment is required. However, as stated above, the proposed development is exempt from requiring a bushfire safety authority under section 100B of the *Rural Fires Act 1997* and integrated referral to the RFS is not required.

Existing Environment

It is considered that the threat from bushfires is relatively low as the vast majority of the site has been disturbed as part of the existing quarry operations. The existing offices and sheds are located within cleared areas, with the land surrounding these buildings managed to the condition of an inner protection zone. This provides protection from possible bushfire attack from the forested areas.

Impact Assessment

The attached Bushfire Assessment in **Appendix J** considers whether the proposed development conforms to the provisions of *Planning for Bushfire Protection 2006* (**PBP 2006**). The key aim of PBP 2006 is to provide for the protection of human life and to minimise the impacts to property from the threat of bushfire.

Bushfire Prone Lane Map

As can be noted in Figure 31 below, majority of the subject site and surrounding land is identified as bushfire prone land.

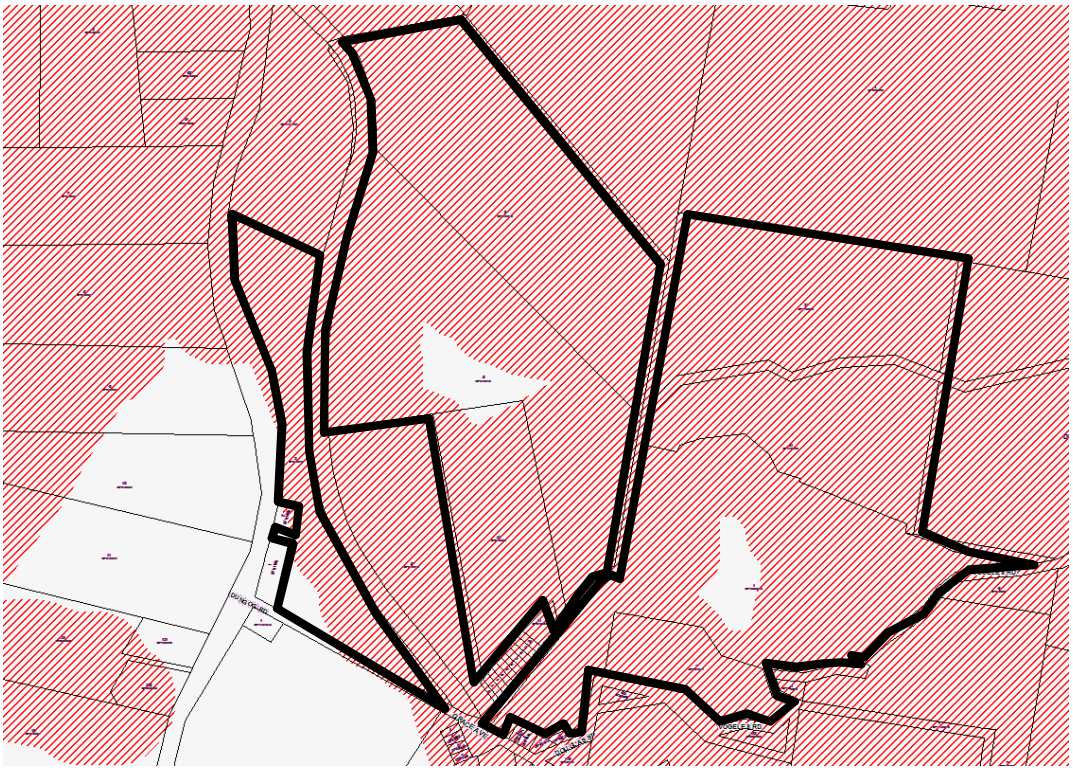

Figure 31 Bushfire Prone Land (source: Dungog Shire Council)

Forest Fire Danger (FDI) Index

As the subject site is located within the Dungog LGA in the Greater Hunter Region, the FDI relevant to the site is 100. This index is used to determine the required asset protection zone and bushfire attack categories.

Vegetation Classification

According to the Bushfire Assessment Report, the vegetation directly threatening the existing buildings and facilities within the subject site is classified as Forest Vegetation Formation, as per the PBP 2006. This threat is located to the west of the site. However, it should be noted that this threat is separated by approximately 100m of cleared land. The remainder of the vegetation within 140m of this area is classified as managed land.

Slope Assessment

Within 100 metres of the existing site offices, amenity buildings and machinery maintenance sheds, the slope to the north and east is upslope, with a 0-5 degree downslope to the south and west.

Bushfire Protection Measures

Bushfire protection measures have been identified within the Bushfire Assessment Report. These include the following:

Asset Protection Zone (**APZ**) and Bush Fire Attack

As identified within Section 3 of the attached Bushfire Assessment Report, an APZ, as defined in the PBP 2006, is ó*not required in the strictest sense for an extractive industries type development*ô However, it is considered that the surrounding development and clearing of land for the proposed expansion will provide a sufficient separation distance from any bushfire hazard.

A defendable area between 20 and 100m can be provided within the existing cleared and quarried areas, which will continue to be maintained to prevent the accumulation of flammable materials. It is identified within the Bushfire Assessment Report that the working quarry areas and hard standing areas are to be maintained as an Inner Protection Area (IPA) in accordance with the PBP 2006 standards.

Bushfire Protection Requirements

As noted within the Bushfire Assessment Report, the AS3959-2009 construction levels are not applicable to industrial buildings or extractive industries. However, it is assumed that any proposed buildings are likely to be constructed of fire resistant materials in order to reduce potential threat to lives and assets.

Due to the presence of vegetation within the subject site, in particular the close proximity of vegetation to the north-east and west of the current facilities, it is considered that additional

safeguard measures be implemented to reduce threat. The safeguard measures identified within the Bushfire Assessment Report include:

- *ómaintenance of the retained areas of curtilage, access or hard stand areas within the development as in inner Asset Protection Zone in accordance with PBP(RFS 2006).*
- *Provision of an on-site mobile water pump and tank for use in protecting buildings from bushfire impacts during a local bushfire event.*
- *Retention of water in an on-site dam so that it can be accessed in a bushfire emergency.*
- *Preparation of a Bushfire Emergency Response and Evacuation Plan for inclusion in the Emergency Safety Procedures for the Quarry Operation'*.

Access

The attached Bushfire Assessment Report has assessed the proposed development against Section 4.2.7 Access/Internal Roads in the PBP 2006. As a result, it is considered that the proposed development will benefit from direct ingress and egress routes directly to the main public road, being Station Street. This will then provide access to the local public road network.

It is considered that the existing carpark and hardstand areas, in conjunction with the existing public road system, will provide adequate access and turning areas for emergency services. It is considered that these facilities will also provide for safe evacuation while simultaneously providing access for emergency services.

Water Services

The site is connected with Councilôs reticulated water system. The Bushfire Assessment Report has nevertheless recommended an on-site water supply be provided within the subject site. Due to the nature of onsite activities, the location of the site, and the presence of vegetation surrounding the site, it is considered that an onsite water system be provided in accordance with PBP 2006, which includes:

- A dedicated water supply of 20,000 litres stored on-site in tanks, pools or ponds;
- Water tanks to be fitted with a 65mm Storz outlet with a gate or ball valve;
- A sign displayed on the property entry point that a static water supply is available for bushfire control purposes;
- The existing and future water storage ponds associated with the quarry would provide an adequate water supply for a bushfire emergency. Additionally, the provision of an on-site mobile water pump and tank, with fire fighting hose connections, should be provided for protecting buildings from bushfire impacts from the adjoining forested lands.

Conclusion

The following recommendations were made within the bushfire assessment in relation to reducing the potential for loss of life and property damage by impact of bushfire.

- *ómaintenance of the defendable space area of 20 to 100 metres around the existing office and amenities area;*
- *Use of cladding materials for the external surfaces for future buildings which are fire retardant materials such as metal sheeting, pre-cast cement panels or masonry;*

- *Provision of an on-site mobile water pump and tanker fitted with firefighting hose connections;*
- *Regular inspections and maintenance of the Managed Lands or curtilage/revegetated areas/hard stand areas within the proposed development is to be undertaken by the owners (or their agents) according to PBP (RFS,2006);*
- *Maintenance of any retained areas of Managed Lands or curtilage/gardens within the development as an Inner Protection Area (IPA) in accordance with PBP (RFS, 2006); and*
- *Preparation of a Bushfire Emergency Response and Evacuation Plan for inclusion in the Emergency/Safety Procedures for the Quarry Operation'*.

The Bushfire Assessment Report has also recommended that the report be referred to the Rural Fire Service for their review and comment.

It is considered that if these recommendations and mitigation measures are undertaken, compliance with the aims of Planning and Bushfire Protection 2006 will be ensured. Further, the risk to life and property from bushfire threat will be reduced.

C. Handling of dangerous goods on site

The handling of dangerous goods on site has been identified as a potential risk. These dangerous goods include petroleum and explosive products associated with the ongoing and proposed operations within the site.

It should be noted, that a development application (**DA**) was lodged with Dungog Shire Council in May 2016, being DA 52/2016, for the proposed upgrade of the existing refuelling station within Martins Creek Quarry. The proposed upgrades specifically include:

- The replacement of the existing oil/water separator and associated infrastructure;
- The replacement of a section of existing hardstand; and
- An additional bunded shed to the south of the existing tank enclosure.

Under clause 12 of the *State Environmental Planning Policy No 33—Hazardous and Offensive Development*, development for the purposes of a potentially hazardous industry must prepare a preliminary hazard analysis in accordance with the current circulars or guidelines published by the Department of Planning and Environment, and submit the analysis with the development application.

Risk Assessment Approach

Contamination from petroleum & other contaminants

A contamination assessment was undertaken by JM Environments in October 2015 for DA 52/2016. The assessment specifically relates to Lot 1 DP1006375, being the existing refuelling and facilities area of the quarry.

The main objectives of the assessment are to:

- Identify potentially contaminating activities that are currently being performed on the site and that may be been performed on the site in the past;
- Assess areas of Areas of Environmental Concern (AECs) and Chemicals of Concern (COCs) for the site; and
- Assess the nature and extent of contamination on the site.

In order to carry out the assessment, the following processes were undertaken:

- A desktop study ï including a review of published information relating to soils, acid sulphate, geology and hydrology, historical photography and documentation, NSW Office of Environment and Heritage (NOEH) notices, and NSW Office of Water (NoW) records;
- A site walkover;
- Review and collation of the above information and identification of potential AECs, and potential COCs; and
- Preparation of the assessment.

Explosives

Peter Bellairs Consulting Pty Ltd undertook a Blasting and Vibration Report in November 2015 (**Appendix I**), which reviews the existing blasting operations at Martins Creek Quarry. This assessment concluded that á*there appear(s) to be no significant issues to blasting being undertaken at the proposed Martins Creek Extension project based on a proven track record in achieving Licence limits and meeting all regulatory requirements and the analysis and information presented*ô

Currently, Martins Creek Quarry is operating under Environmental Protection Licence No. 1378 (**EPL**), which regulates conditions relating to blasting operations. Specifically, the EPL stipulates conditions relating to overpressure levels and limits, ground vibration, hours of blasting operations, and monitoring of blasting operations within the quarry.

Existing Environment

Petroleum & Other Contaminants

Refuelling and other contaminant handling operations are currently undertaken to the east of the fixed processing plant on the subject site. Refer to Figure 32 & 33 below. The refuelling station in particular caters for both high speed and regular refuelling. Oil and grease is discharged via portable hand pumps or direct air powered drum pumps.

Figure 32 Existing Refuelling Station

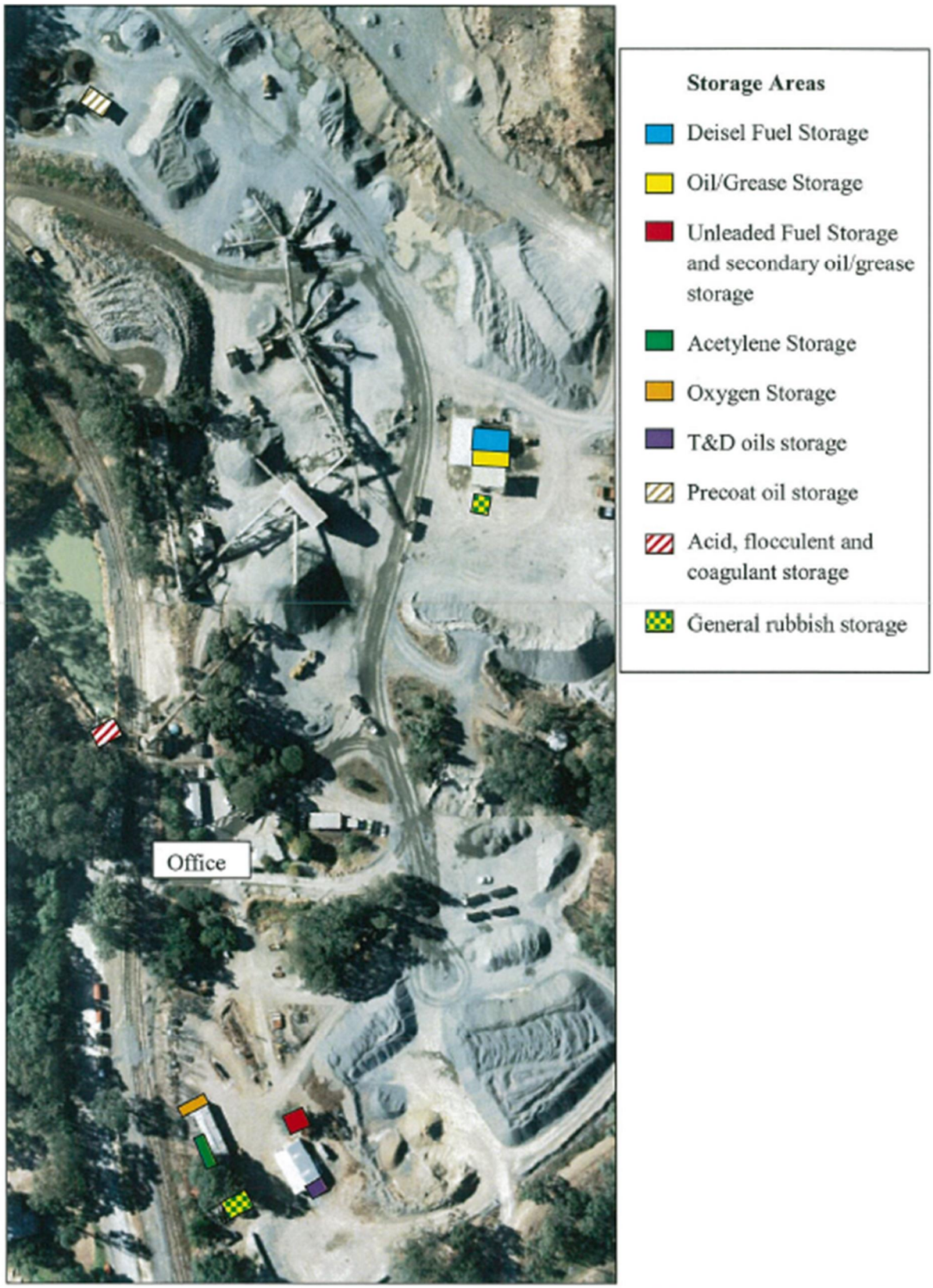

Figure 33 Contaminant Storage Areas

The refuelling station comprises of a 20,000 litre diesel storage tank, and a grease and oil storage area for the storage of 205 litre drums (grease) and 1,000 litre intermediate bulk containers (IBC) (oil).

The area is fully bunded and fitted with an oil water separator to process any petrochemical spills. All waste products are stored within dedicated IBC that is emptied periodically by licensed waste contractors.

All fixed plant equipment is refuelled using a portable diesel fuel tank mounted on the rear of a quarry service vehicle.

Explosives

Blasting is currently contracted out by Martins Creek Quarry, and involves using a hydraulic drill rig system to drill the blast pattern with contemporary bulk explosives pumped directly from contracted delivery vehicles. The Martins Creek Quarry Business and Extraction Report (**Appendix B**) references Peter Bellairs report (**Appendix I**), which identifies a typical blast pattern used at Martins Creek Quarry as involving an 89 millimetre diameter hole with a 500mm sub-drill on a 2.8 m (Burden) and 3.2 metre (Spacing) grid layout, with a typical powder factor of approximately 0.6 to 0.65.

Impact Assessment

Petroleum & Other Contaminants

A recent investigation of the existing refuelling station site was undertaken for the aforementioned modification and upgrade of the existing refuelling station. The contamination assessment prepared by JM Environmental identified that the site may be potentially contaminated from past and present refuelling purposes. In particular, it stated that *'there is a potential that the area has been contaminated by leaks and spills of hydrocarbons such as diesel and lubricants that may have seeped through expansion joints, joints in the oil water separator system or run off from the edges of the existing hardstand'*.

However, JM Environmental concluded that it is not believed the potential contamination is a major issue, and state the *'the contamination, if present, is likely to be limited to the upper soils and it is not considered to be prohibitive to the development at this stage. Upgrading of the oil water separator should reduce the potential for contamination to occur in the future'*.

As the DA currently lodged with Dungog Council for the premises has been designed to improve the existing conditions of the refuelling station, thus reducing the potential for contamination, it is considered that once the upgrades have been undertaken the proposed development will have minimal impacts on the existing operations and environment. These upgrades are considered to sufficiently support the proposed expansion of the quarry. In the meantime, it is considered that the current temporary mitigation measures will continue to reduce contamination for the existing and proposed operations.

Explosives

As blasting is currently contracted out and is undertaken in accordance with the contractor blast management plan, it is considered that the proposed expansion of the quarry will not significantly alter the risk of blasting operations undertaken.

Peter Bellairs report concluded that all blasts have been under the lowermost environmental license vibration limit of 5mm/s PPV and air overpressure limit of 115dBL. These limits are set for quality of life issues, and it is anticipated these limits will continue to be achieved.

Mitigation Measures

Petroleum & Other Contaminants

While the development application lodged with Dungog Shire Council for the modification and upgrading of the existing fuel station has not yet been determined, it should be noted that there are currently temporary mitigation measures in place to deal with potential contamination risks.

These temporary mitigation measures will remain in situ until a determination regarding the DA currently lodged with Dungog Shire Council has been made, and subsequent upgrades have been undertaken. It is considered that these mitigation measures and proposed upgrades will satisfactorily reduce risks associated with the existing refuelling station and petroleum facilities during both the current operations and proposed operations. It is recommended that inspections be undertaken post upgrades to monitor any significant staining or odorous soils.

Further, it should be noted that regular monitoring and onsite maintenance is required in accordance with the EMP (**Appendix C**).

Explosives

While it is not anticipated that significant impacts will be created by the proposed expansion of the quarry, it is considered that the following mitigation and management measures can be undertaken to reduce harm to life and impacts on quality of life within the area:

- All shotfires to ensure people near the blasting area are at a safe distance, and/or provided with an appropriate blasting shelter;
- Develop and comply with a Blast Management Plan (BMP), incorporating the Australian Standard (AS) 2187.1;
- Prepare a safe work method statement (SWMS) for use of explosives in accordance with Work Health and Safety Regulation 2011.

It is considered that the risk to quality of life, life, and property as part of the existing and proposed development will be significantly reduced if the aforementioned, and current, mitigation measures are undertaken.

Potentially hazardous and offensive industries

A preliminary hazard analysis or risk screening methodology under SEPP 33 has been prepared for the proposed works. SEPP 33 was gazetted in 1992 to ensure the protection of the

community and environment from hazardous and offensive industries. The objectives of SEPP 33 include:

a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and
b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and
c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and
d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and
e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and
f) to require the advertising of applications to carry out any such development.

Under clause 12 of the SEPP a development for the purposes of a potentially hazardous industry must prepare a preliminary hazard analysis in accordance with the current circulars or guidelines published by the Department of Planning and Environment, and submit the analysis with the development application.

Hazardous Industry Planning Advisory Papers

There are a number of Hazardous Industry Planning Advisory Papers (HIPAPs) produced by the NSW Department of Planning which need to be considered in the preparation of a Hazard Analysis depending on the situation. This includes:

- HIPAP No. 1 - Industry Emergency Planning Guidelines
- HIPAP No. 2 - Fire Safety Study Guidelines
- HIPAP No. 3 - Risk Assessment
- HIPAP No. 4 - Risk Criteria for Land Use Planning
- HIPAP No. 5 - Hazard Audit Guidelines
- HIPAP No. 6 - Guidelines for Hazard Analysis
- HIPAP No. 7 - Construction Safety Studies
- HIPAP No. 8 - HAZOP Guidelines
- HIPAP No. 9 - Safety Management System Guidelines
- HIPAP No. 10 - Land Use Safety Planning
- HIPAP No. 11 ï Route Selection
- HIPAP No. 12 ï Hazards Related Conditions of Consent

The Process

Under SEPP 33 any development which is likely to be hazardous or offensive must be assessed to examine the potential risk to the environment and community of the project. The first stage of the SEPP 33 process is to prepare risk screening assessment. Guidelines produced by the

Department of Urban Affairs and Planning (DUAP) and the Department of Planning (DoP) identify a number of 'threshold limits' for certain classes of dangerous goods. If an amount of a substance (e.g. fuel), which is identified on the Australian Dangerous Goods (ADG) register exceeds the 'threshold limits' identified in the SEPP 33 guidelines, than a risk assessment of the hazard is required. If the amount of a substance does not trigger the 'threshold limits' than a risk assessment is not required under SEPP 33. Notwithstanding this, and products must be stored, transport or used in accordance with the manufacturers specifications and/or Australian Standards if they apply.

The *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6: Hazard Analysis* produced by the DoP states that the Department has produced an integrated hazards related assessment process which comprises:

Prior to Approval

- A preliminary hazard analysis undertaken to support the development application by demonstrating that risk levels do not preclude approval.

Post Approval

- A hazard and operability study, fire safety study, emergency plan, and an updated hazard analysis undertaken during the design phase of the project;
- A construction safety study carried out to ensure facility safety during construction and commissioning, particularly when there is interaction with existing operations.

Operational Phase

- Implementation of a safety management system to give safety assurance during ongoing operation;
- Regular independent hazard audits to verify the integrity of the safety systems and that the facility is being operated in accordance with its hazards-related conditions of consent.

SEPP 33 Guidelines

Outside of the HIPAP guidelines the major policy and guideline that accompanies SEPP 33 is the Department of Planning's *Applying SEPP 33: Hazardous and Offensive Development Application* Guidelines. *Applying SEPP 33* was originally published in 1994. In 2008, the Department of Planning exhibited a draft of an updated version of *Applying SEPP 33*. This was finalised in 2011. This document has been considered in preparing this Preliminary Hazard Analysis.

The then Department of Urban Affairs and Planning (DUAP) also produced a guideline in 1997 titled *Multi-Level Risk Assessment*. This guideline has been considered in preparing the Preliminary Hazard Analysis.

Relevant Acts and Guidelines

It should be noted that there a number of complimentary pieces of legislation which ensure management of dangerous goods in NSW. These include:

Dangerous Goods (Road and Rail Transport) Act 2008

The objective of the *Dangerous Goods (Road and Rail Transport) Act 2008* is to regulate the transport of dangerous goods by road and rail in order to promote public safety and protect the environment. Under Section 9(1) an individual involved in the transport of dangerous goods by road or rail who fails to ensure that the goods are transported in a safe manner is guilty of an offence.

Dangerous Goods are listed on the Australian Dangerous Goods Code (ADG Code). If any product(s) listed on the ADG Code is transported to the site, then this Act will apply. It is the responsibility of the transport operator to ensure goods are transported appropriately to site.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) aims to protect the environment from a number of potential sources including air and water pollution, waste, and noise pollution.

Schedule 1 of the POEO Act lists a number of ñscheduled activitiesò which requires the NSW Office of Environment and Heritage (OEH) to issue an ñEnvironmental Protection Licenceò (EPL). Schedule 1 identifies works considered to be a ñscheduled activityò under the POEO Act. The current quarry operates under an existing EPL licence which is overseen by the Environmental Protection Authority (EPA) and includes ongoing monitoring and auditing requirements.

Work Health and Safety Act 2011

Work health and safety (WHS) laws require employers and all other workplace parties to consult and cooperate in the management of workplace risks, in order to protect the health and safety of workers and others who might be at risk from the work. The legislation is supported by codes of practice that provide guidance in achieving the required standard of health and safety.

Health and safety risks arising from work must be effectively managed by eliminating or minimising risks so far as is reasonably practicable, to protect workers and other persons against harm to their health, safety and welfare. Risk management must follow the established hierarchy of risk control. Risks must be managed so far as is reasonably practicable. This depends on the likelihood of adverse consequences and their potential severity, methods of eliminating or minimising the risk and what the person knows or ought to know about it, and lastly the cost of dealing with the risk.

WorkCover NSW must be notified of serious injuries and incidents and before carrying out certain potentially dangerous activities. Breach of WHS laws can have a range of consequences, including penalty notices (on-the-spot fines), improvement or prohibition notices from inspectors; prosecutions; heavy financial penalties; imprisonment; enforceable undertakings and other non-monetary sanctions.

Safety Data Sheets

A safety data sheet (SDS), previously called a Material Safety Data Sheet (MSDS), is a document that provides information on the properties of hazardous chemicals, how they affect

health and safety in the workplace and on how to manage the hazardous chemicals in the workplace. For example it includes information on the identity, health and physicochemical hazards, safe handling and storage, emergency procedures and disposal considerations. An SDS is an important tool for eliminating or minimising the risks associated with the use of hazardous chemicals in workplaces. In general, products stored on site will have a SDS attached to that product which will require the existing quarry to store and handle that product in accordance with the SDS.

RISK SCREENING

Risk Screening

Risk screening is the first stage of a Preliminary Hazard Analysis identified under SEPP 33. As the name suggests, risk screening attempts to identify (i.e. screen) any potential risks associated with the hazardous materials that may be stored on a site. Risk screening identifies whether the location and/or amount of hazardous goods stored on site is a ópotentialôrisk and therefore further assessment is required to identify mitigation and management measures for that risk.

Dangerous Goods

All materials or substances considered to be dangerous goods are listed on the Australian Dangerous Goods (ADG) register. The ADG register groups or categorises materials and substances into classes, which include:

1.1	Substances that have a mass explosion hazard
1.2	Substances that have a projection hazard but not a mass explosion hazard
1.3	Substances that have a fire hazard and either a minor blast hazard or minor projection hazard or both but not a mass explosion hazard
1.4	Substances that present no significant hazard
1.5	Very insensitive substances that have a mass explosion hazard
1.6	Extremely insensitive articles that do not have a mass explosion hazard
2.1	Flammable gases
2.2	Non-flammable, non-toxic gases
2.3	Toxic gases
3	Flammable liquids that meet specified flash point criteria
4.1	Flammable solids
4.2	Substances liable to spontaneous combustion
4.3	Dangerous when wet
5.1	Oxidising substances
5.2	Organic peroxides
6.1	Toxic substances are those liable either to cause death or serious injury or to harm human health if swallowed or exhaled or by skin contact
6.2	Infectious substances are those known or reasonably expected to contain Pathogens
7	Radioactive material as defined in the Code
8	Corrosive substances are those that by chemical action will cause severe damage when in contact with living tissue. They may also cause other damage in the case or leakage
9	Miscellaneous dangerous goods and articles that may present a danger during transport not covered by other classes.

On Site Substances

The substances listed on the ADG are proposed to be on the subject site are identified in the table below (Figure 34). This list was provided by Buttai Gravel as part of the assessment, and is based on current operations at Martins Creek.

Material	ADG Classification	Quantity	SEPP 33 Screening Threshold
Oxygen (compressed)	2.2	300 kg	NA
Acetylene	2.1	300 kg	100 kg
Diesel Fuel	9	20,000 L	NA
Unleaded Fuel	3	200 L	5 tonne
LPG (above ground)	2.1	100 kg	10 Tonne or 16 cubic metres
Jacques BAC Part A	9	400 L	NA
Jacques BAC Part B	9	40 L	NA
Cold Galvanising (Paint)	3	40 L	2 tonne
Aerosol Spray Paint	2.1	7.2 kg	100 kg
Cold Galvanising (Aerosol)	2.1	6 kg	100 kg
Hand Cleaner	9	60 L	NA
Spot Marking Spray	2.1	16 kg	100 kg
Penetrene	2.1	5 L	500 kg
Brake Cleaner	3	10L	2 tonne
Nickel Anti-Cease	2.1	10L	500 kg
Sulphuric Acid 35% (Water Treatment)	8	800 L	25 tonne

Material	ADG Classification	Quantity	SEPP 33 Screening Threshold
Precoat	**3**	**30,000 L**	**2 tonne**
Compressed Argon	**2.2**	**100 kg**	**NA**

Figure 34 Table of substances onsite, source: Buttai Gravel

Based on the above analysis there are two *possible* hazardous substances on the site ï acetylene and the aggregate pre-coat agent ï under the screening requirements of SEPP 33. These substances are, however, only considered hazardous under the SEPP 33 policy where other land uses are approximately 30m and 11m, respectively from the source.

It should be noted that WorkCover NSW, under their legislative provisions, have different thresholds for notification, and Buttai Gravel would be required under this legislation to notify WorkCover if the WorkCover limits are met (as identified in the Work Health and Safety Regulation). SEPP 33 is a policy to identify *potential* issues for consideration in the planning assessment process. During the operational phases of the project WorkCover would be the agency responsible for managing dangerous goods.

The aggregate precoat agent is stored in the northern part of the existing quarry and is at least 400 metres from the nearest land use, and therefore under SEPP 33 is not considered hazardous. The precoat figures presented above are the maximum rate at any one time that *could* be on site. The acetylene storage area is towards the southern end of the site and is approximately 75m from the nearest dwelling, twice the identified distance (30m) under SEPP 33. Buttai Gravel have identified that this is to be relocated further north.

It is noted that diesel fuel is considered a class 9 good in the safety data sheet which does not have a screening threshold, however, is managed on site through bunding and ongoing site management.

It is noted that there are several other chemicals on site which are not considered dangerous goods, which are identified of small quantities and used for cleaning common areas and maintaining plant and equipment (e.g. greases, coolants).

In sum, based on the information provided, it is considered that the proposed quarry would not be considered as hazardous or offensive industry under SEPP 33. Nonetheless, appropriate management of dangerous goods on the site will be required in accordance with relevant health and safety standards.

Management

It is recommended that to assist in ongoing management of materials on the site, the following measures be implemented:

- The regular maintenance and inspection of bunding on site;
- Clear and appropriate signage is maintained on site;
- Adequate and maintained fire safety equipment;

- Emergency response procedures and staff training including site inductions;
- Compliance with WHS Guidelines;
- Maintenance, on site of Safety Data Sheets;
- Ongoing maintenance of equipment in accordance with manufacturerôs specifications.

It is identified that these measures are already identified in the environmental and site management plan for Martins Creek Quarry and this plan should be continually updated in accordance with industry best practice and current standards. In addition, the DA currently being assessed by Dungog Council for an upgrade to the fuel farm will ensure this item on site continues to meet best practice standards for managing and potential environmental issues.

Conclusion

Based on the information presented within the contamination assessment, it can be concluded that the potential contamination stemming from past and present uses of the area is localised, and is not expected to be significant. It was concluded that the site is suitable for the refuelling operations, with any existing contamination not expected to infiltrate the surface due to hard rock geology. In addition, the proposed upgrades of the station will reduce potential contamination, with inspections recommended post upgrades to monitor any contamination.

Further, as blasting is contracted out, and no hazardous blasting materials are stored on site, it is considered that the risk associated with this operation is limited. The handling, mixing and detonating of explosives is undertaken by the assigned contractor who follows procedures in accordance with the contractorôs blast management plan. It is considered that the proposed expansion of the quarry will not dramatically alter these operations, however minor modifications may be required to ensure compliance with noise monitors within the site and surrounding area.

Based on the information provided it is considered that the proposed quarry would not be considered as hazardous or offensive industry under SEPP 33. Nonetheless, appropriate management of dangerous goods on the site will be required in accordance with relevant health and safety standards.

8.5 SOILS, GEOLOGY AND TOPOGRAPHY

Assessment Approach

Qualtest Laboratory NSW Pty Ltd has prepared a Geotechnical Report (**Appendix K**) that includes an assessment of the:

- likely impacts of the proposed development on the soils and land capability;
- likely impacts of the proposed development on the topography; and
- compatibility of the proposed development with other land uses in the vicinity.

The Geotechnical Report has been prepared taking into account regional and local geology, topography, soil types, and the nature of the proposed quarry operations.

The Geotechnical Report considers the likely impacts of the proposed development on landforms with reference to the Quarry Face Stability Assessment undertaken by Qualtest Laboratories NSW Pty Ltd (See **Appendix J**).

VGT Pty Ltd has prepared a Geology Assessment (Refer **Appendix K**) including a volume assessment of the resource. The Geology Assessment includes results from previous geological assessments at the site including exploration programs in 1968 and 2006. A site visit and drilling was conducted to gather samples at various locations. Surveys and 3D modelling software have been used to assess the volume of the resource.

The Geology Assessment includes the results of the petrographic analysis of the quarry materials which has been undertaken to determine the suitability of the resources for the proposed end uses (concrete aggregate, rockfill for erosion control).

Existing Environment

In respect of soils, no previous contamination work has been identified for the site. A search of records issued by OEH under the *Contaminated Land Management Act 1997* and actions taken under the *Environmentally Hazardous Chemicals Act 1985* revealed no orders or actions have been issued for the subject site or adjacent lots. This EIS also considers potential contamination in Section 8.

Further, the Acid Sulphate Soil Planning maps prepared by Dungog Shire Council indicate that the site is not affected by Acid Sulfate Soils.

The existing quarry on the site currently produces Andesite and the Geological Assessment describes the rock as ólatiteô

The regional geology is described in Geology Assessment as ócarboniferous volcanic and sedimentary sequencesô The Martins Creek Andesite that underlies the site of the quarry terminates in the vicinity of the rail line to the north and north west of the site where other rock sequences commence.

The Geological Assessment describes the quarry face and floor as dominated by volcanic rock, with some exposure of underlying sandstone and claystone on parts of the quarry floor.

In respect of suitability for agricultural production, the Geotechnical Report identifies that the subject site itself would be considered generally unsuitable for agricultural uses due to limiting restrictions including extreme slope, low productivity, and the physical and chemical characteristics of the soil.

The Geotechnical Report describes the surrounding land uses, including the railway line to the west, residences to the south, and the boundaries of other properties to the north. The closest residences to the west will be 250m from the quarry boundary. At the fullest extent of the proposed extension of the quarry, the closest residences to the south will be within 300m of the quarry boundary.

The Geotechnical Report identifies that there are no known farming operations in the immediate locality and no agriculture areas would be removed from production or agricultural uses as a result of the proposal.

Impact Assessment and Significance Assessment

The Geological Assessment describes the Latite base as following the existing topography of the site. The calculated volume of the Latite on the site is 14.1 million cubic metres (38.07 million tonnes).

A petrographic analysis set out in the Geological Assessment records the testing of samples from the quarry in relation to suitability for use as concrete aggregate and rockfill for erosion control. The petrographic assessments describe the potential for reactivity and describe the Latite as strong and durable. The samples were considered suitable for use as concrete aggregate and for use as a source of marine armour rock, rip rap, revetment or rockfill.

The Geotechnical Report concludes that the proposed development has a low risk of resulting in slope instability.

The Geotechnical Report addresses the matters in the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* specific to the assessment of compatibility with surrounding land uses.

Mitigation Measures

Impacts related to the risks of slope stability have been assessed and mitigation and management measures proposed in Section 9 of this EIS. In addition the Geotechnical Report identifies mitigation measures to assist with minimising soil erosion include shaping overburden and other materials, topdressed with soil and planted for regrowth.

Risks related to contamination and potential contamination have been addressed and mitigation and management measures proposed in Section 9 of this EIS.

Conclusion

Given the findings in the Geological Assessment, the resource available is considered significant, and the development of the resource is considered to be an orderly and economical use of the land, in particular as the infrastructure for extraction is already established.

In addition the Geotechnical Report considers that there is minimal risk of slope instability and proposes measures to shape and plant overburden to address potential soil erosion.

8.6 SURFACE WATER QUALITY AND GROUND WATER

Assessment Approach

A Water Quality Impact Assessment (**WQIA**) has been prepared by JM Environments to assess the current surface and ground water quality and any potential impacts on water quality that may result from the proposed extension of the quarry (Refer **Appendix G**).

The WQIA has been prepared having regard for the SEARs, the relevant legislation, and surface water quality monitoring was undertaken, field parameters collected, and laboratory samples were taken from two onsite dams and the Paterson River (upstream and downstream from the quarry). A search of registered bores on the site and surrounds was undertaken and monitoring wells were installed in the areas of the site on which the quarry extension is proposed. A survey of boreholes was undertaken to establish bore and groundwater levels. Groundwater sampling was undertaken to assess background groundwater quality and monitoring of groundwater levels was undertaken to assess temporal variation of levels. Hydraulic testing has also been undertaken to estimate the hydraulic conductivity values and a detailed site water balance model was prepared.

The WQIA identifies the locations where surface water samples were taken and lists contemporary conditions (meteorological and quarry operations) relevant to the time the sampling was carried out. The samples were compared with NSW Department of Primary Industries data for the Paterson River to ascertain whether the samples were representative of the long term water quality at each monitoring location.

The WQIA identifies the four wells where ground water data was collected and the justification for the chosen sites. The ground water wells were sampled for water quality in March 2015 and August 2016 and the WQIA describes the rainfall events preceding the sampling.

Refer to the WQIA at **Appendix T** for a summary of relevant legislation, guidelines and policies and their application to the project.

ACOR Consultants Pty Ltd has prepared a Report on Engineering and Transport (**Report on Engineering**) that also addresses water management on the site, including stormwater (Refer **Appendix H**).

Existing Environment

The site is located in the Paterson River Valley in a temperate climate. The WQIA notes that the highest average rainfall occurs in February (121.5mm) and the lowest average rainfall occurs in August (37.2mm). The site is located on the south west facing slopes of a ridge up to 150m AHD.

The WQIA specifies that the site is on the boundary of the Ten Mile Road and Birdsview Colluvial Soil Groups. These Soil Groups are described as both moderately deep and generally well drained. The hazards associated with the Ten Mile Road Soil Group are identified as high water erosion, localized shallow soils, high run on and seasonal waterlogging, and strongly to extremely acid soils of low fertility. The limitations associated with the Birdsview Soil Group are

described in the WQIA as steep slopes, mass movement hazard, rock outcrop, water erosion hazard, high run on, foundation hazard and localized shallow soils.

Vegetation on the site is as described in the Biodiversity Assessment Report prepared by Conacher Environmental (Refer **Appendix L**).

The Hunter Estuary Wetlands are located approx. 57 km from the quarry site. Given this, it is unlikely the proposed development will have any impact on these wetlands.

Surface Water

The site is within the Paterson/Allyn Rivers catchment area. The WQIA describes the catchment as receiving approx. 605 gigalitres of rainfall annually. The Paterson River and Allyn River feed the Hunter River and a dam at Lostock on the Paterson River can contain algae which impacts downstream water quality.

The main water demands associated with the operation of the quarry includes both process water and potable water. The main demands for water are used in dust suppression on the crushing and screening plant, stockpiles and haul roads.

Drainage on the quarry site is currently collected in three sediment dams:

- Dam 1 collects water from the processing and sales area and is located to the south west of the site administration buildings;
- Dam 2 collects water from the southern work compound area and generally pumps water into Dam 1 for treatment;
- Dam 3 collects water from the western pit of the quarry and is either discharged or pumped to a holding dam for later discharge or use for dust suppression on haul roads and stockpiles.

Dam 1 is fitted with a flocculent dosage system for the treatment of total suspended solids. All surface water runoff is currently captured within this stormwater detention and filtration facility located towards the south west of the administration building. The majority of the filtrated water is then recycled within the quarry as part of the dust suppression measures. During larger storm events some of the treated runoff is released into the local water courses that feed into the Paterson River.

All dams are licensed to be discharged under the existing environment protection licence (**EPL**) 1378. Offsite discharge of surface water quality is regulated under the same EPL.

The Engineering Report describes the current methodology for stormwater management on the site, with reference to the existing Stormwater Management Control Plan (**Appendix H**).

Ephemeral streams drain stormwater run off from areas up gradient of the existing processing area and the western pit, discharging into the Paterson River. The Engineering Report contains a map of the stream order across the sire (Refer **Appendix H**).

The WQIA identifies the water allocations and access licences of properties downstream from the quarry (Refer **Appendix G**).

The WQIA contains the results of the water quality samples tested and concludes that the existing quarry operations are not having a discernible effect on the water quality of the Paterson/Allyn Rivers catchment. The locations, operational and meteorological conditions relevant to the water quality sampling are detailed in the WQIA.

The WQIA identifies that there is the potential for the uncontrolled discharge of water from the site following significant rain events. In April 2015 one such significant rain event occurred and the quarry was required to pump out captured storm water. This action was sanctioned by the EPA as part of the emergency orders issued for the quarry in order to enable quarry production to continue for the purposes of providing emergency supplies to repair local roads damaged by the storms.

The WQIA describes the sampling undertaken during the significant rainfall event April 2015 which show that the water discharged from the quarry had lower suspended solids than the receiving waters of the Paterson River.

Flooding

The subject land is situated approximately 1.1 kilometres to the north east of the Paterson River and located between 30m and 40m above the river.

It is therefore considered that the site is not affected by riverine flooding.

Groundwater

Groundwater has already been intercepted in the western pit of the existing quarry and a licence under section 115 of the *Water Act 1912* has been obtained to manage the existing groundwater seepage into the quarry (Refer **Appendix G**).

Analysis of groundwater samples set out in the WQIA concludes that the groundwater is not suitable for drinking water purposes and that the aquifier is low yielding and fractured.

Impact assessment and mitigation measures

The WQIA includes a detailed assessment of the matters listed in the SEARs (Refer **Appendix G**).

Surface water impacts and proposed management measures

The proposed quarry design will intercept a first and second order stream in the western pit of the quarry and will intercept a second and third order stream in the eastern pit (Refer Figure 35 below).

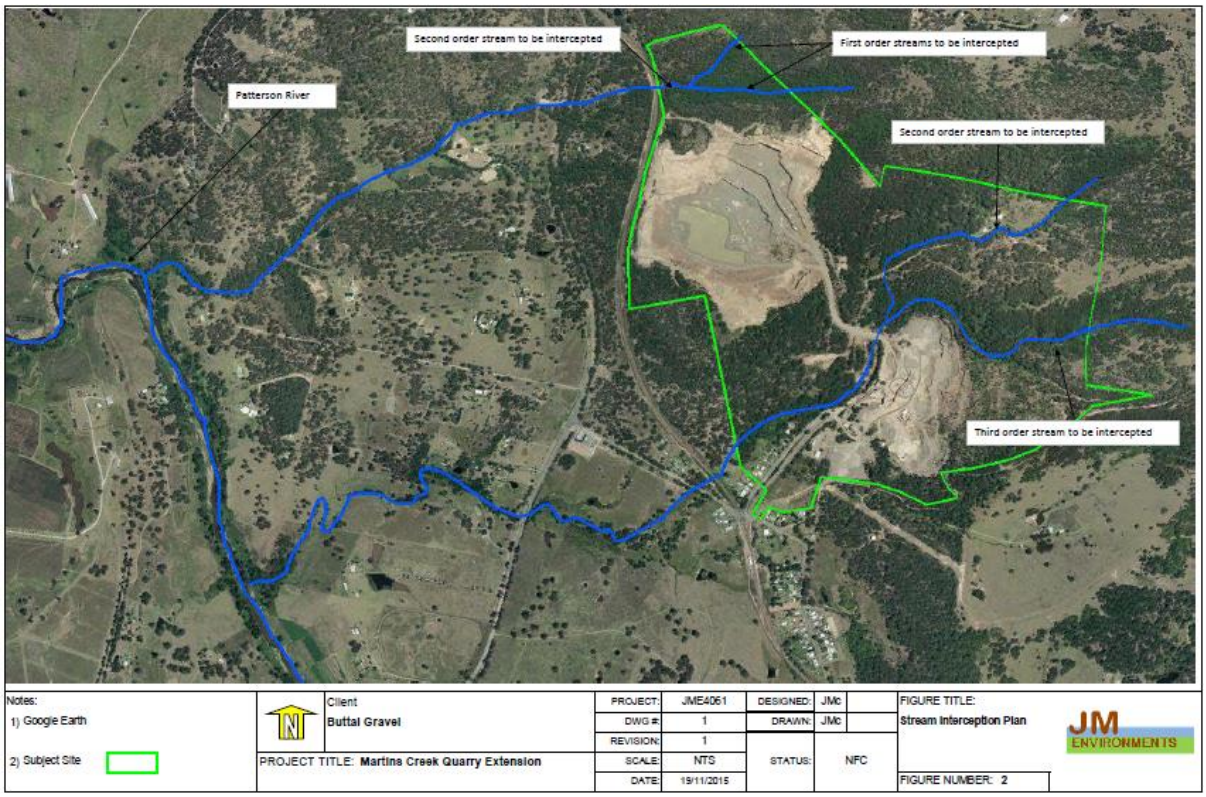

Figure 35 Stream Interception Plan

Surface water of the production area will be managed as per current systems described above. The WQIA describes how the quantity of surface water in this area is not expected to increase as a result of the extension of the quarry and will gradually decrease some 15 years post approval. 5 ha of the western pit is proposed to be quarried as part of this proposal and surface water will be collected in Dam 3 and excess discharged under the existing EPL.

The east pit is proposed to be quarried prior to intercepting the stream identified above. A quarry void (Dam 4) will be created and extended post approval as operations progress and before the streams are intercepted. Dam 4 will be discharged to a drain feeding into one of the intercepted streams and the existing EPL is proposed to be amended post approval to regulate the discharge.

The WQIA recommends Progressive Erosion and Sediment Control Plans be prepared to minimise the generation of sediment laden water caused by stormwater flowing over the open quarry face. The plans are to contain the measures outlined in the WQIA including management of wastewater discharge from dewatering, blasting, drilling, washing vehicles and other activities that may add pollutants to water.

The WQIA identifies that Dam 1 has capacity to act as a sediment basin for the production area, based on an assumption that the water within the settling zone is pumped out within 5 days of a rain event. If water is to be released offsite, the WQIA recommends that the water is tested daily during the controlled release to ensure the discharge criteria under the EPL is met.

As the majority of surface water collected on the site will be discharged under the existing EPL, the WQIA concludes that there will be little impact on downstream surface water sources as a result of the development. The WQIA proposes surface water monitoring measures to ensure water discharged is of an appropriate water quality.

The WQIA concludes that if the surface water management measures proposed are implemented, particularly in relation to the sediment dams, the cumulative impacts of the quarry on water resources in the region are expected to be minimal.

Groundwater impact assessment and mitigation measures

The WQIA contains an outline of the hydrogeological assessment of the proposed extension to the quarry (Refer **Appendix G**).

Quarrying is proposed to be carried out in the western pit over the next thirty years. Given the fractured nature of the rock aquifer, the WQIA anticipates that the aquifer will not have large storage. Further the monitoring results in the WQIA conclude that significant drawdown of groundwater will be limited to the immediate vicinity of the western pit.

The impacts of the development are described in the WQIA, in particular that the western quarry pit will comprise of a permanent groundwater sink which will reduce groundwater levels in the immediate vicinity. The assessment concludes that the likely limited extent of water level drawdown should have a negligible impact on neighbouring groundwater users, particularly as the nearest registered well is located some 1.5km from the proposed pit footprint.

There have been no groundwater dependent ecosystems identified in the proposed quarry expansion area.

The WQIA has assessed the proposal against the NSW Aquifer Interference Policy and concludes that the activity is likely to have a minimal impact as:

- There are no high priority groundwater dependent ecosystems; or high priority culturally significant sites listed in the schedule of the relevant Water Sharing Plan within 40m of the quarry;
- There are no water supply works effected by the interference of the aquifer; and
- The groundwater quality is not expected to lower the beneficial use category beyond 40m from the quarry.

The WQIA recommends the following mitigation and management measures to address groundwater:

- Establishment of a monitoring network using selected exploration boreholes to assess the actual extent of groundwater drawdown;
- Monitoring of water levels on a quarterly basis;
- Water quality sampling on an annual basis; and
- Monitoring the water quality of the pit seepage water to assess suitability for use in quarry processes, in the event that sufficient groundwater volume is encountered.

Site water balance

Site water balance analysis in the WQIA consists of measuring the available water storage against water availability. The WQIA assesses site water balance in four scenarios which align with the proposed quarry plan at different stages of the proposed operations (Refer **Appendix G**).

The results of the modelling indicate that rainfall runoff captured in sediment basins will provide adequate water for haul road dust suppression. Potable water will continue to be used for production due to client specifications. The current water mains can supply an adequate amount of potable water for the predicted increases. The water balance data indicates that the site would be relatively balanced, with sufficient water available for reuse in dry periods and some wet weather discharges following large rainfall events. Overall the site is considered to have excess water supply through rainfall runoff captured in sediment basins.

Licensing and other requirements

The WQIA identifies that a water access licence is not required for the sediment dams (existing dams and proposed Dam 4) because the surface water capture does not require a licence when water needs to be retained for pollution control.

The WQIA considers the proposal against the Water Sharing Plan for the Paterson Regulated River Water Source 2007. The WQIA concludes that the water currently excluded from the Paterson/Allyn River catchment (due to the presence of the quarry), and the water likely to be excluded due to the proposed extension of the quarry is unlikely to effect the water security of other Water Access Licence holders in the catchment.

The EPL will require amendment post approval to regulate the proposed discharge from Dam 4. The current discharges regulated under the EPL are proposed to be continued including requirements for surface water monitoring.

The WQIA identifies that the quarry (both the current and proposed operations) intercepts a fractured rock aquifer. A licence under section 115 of the *Water Act 1912* has been obtained to manage the existing groundwater seepage into the quarry associated with the current operations (Refer **Appendix G**). For interference related to the proposed extension, a licence under the *Water Management Act 2000* is required for the aquifer interference activity; however these provisions have not been commenced (see comments from the NSW Office of Water attached to the SEARs).

Conclusion

The WQIA demonstrates that there will be minimal impacts on the flow of the ephemeral streams the quarry and extension will interrupt.

The measures proposed in the WQIA should be implemented to manage total suspended solids throughout the life of the quarry to ensure water quality downstream is not adversely impacted by operations.

The water balance modelling demonstrates that there is likely to be adequate water available for reuse in dry periods and some wet weather discharges following large rainfall events. Overall

the site has been assessed as likely to have excess water supply which will be captured in sediment basins.

The surface water quality management measures outlined in the WQIA should be implemented to ensure minimal impacts on the surface water downstream of the quarry.

The WQIA notes that the extension of the quarry is not planned to further intercept the aquifer and seepage is currently regulated by a licence issued by the NSW Office of Water.

Overall impacts on water quality are considered in the WQIA to be likely minimal and can be adequately addressed by the measures proposed in the WQIA.

8.7 ECOLOGY

Assessment Approach

Conacher Consulting Pty Ltd were engaged to assess likely ecological impacts and prepared the Biodiversity Assessment Report (Refer **Appendix L**). The consultants hold the necessary accreditations to carry out the assessment.

The Biodiversity Assessment Report has been prepared having regard to the SEARs and in particular the attachments prepared by the Office of Environment and Heritage (**OEH**), the Department of Primary Industries, and the Commonwealth Department of Environment.

Biodiversity impacts have been assessed in the Biodiversity Assessment Report against the relevant legislation and the Framework for Biodiversity Assessment (published by OEH in September 2014) (**FBA**).

The landscape features have been identified in the Biodiversity Assessment Report by reference to datasets published by OEH and interpretation of aerial photographs. The Bionet Atlas of NSW Wildlife (NSW OEH 2016) and an assessment against the FBA ćcalculatorô was undertaken to determine flora and fauna threatened species and populations. A range of literature was reviewed as part of preparing the Biodiversity Assessment Report (Refer **Appendix L**).

Plot and transect based surveys of flora were undertaken within vegetated areas on the site in accordance with stratification and methodologies published by OEH. Targeted surveys were undertaken over 15 months, searching for threatened flora species during the relevant flowering seasons. Specimens of plants not readily identified in the field were sent to the Royal Botanic Gardens for identification.

A detailed fauna survey was conducted in accordance with methodologies published by OEH, and OEH was contacted to seek approval for the use of particular methodologies to survey for the Eastern Pygmy Possum and the Brush-tailed Phascogale (Refer **Appendix L**). The Biodiversity Assessment Report identifies that the vast majority of surveys conducted exceeded the level of effort recommended in the relevant OEH survey guidelines (published 2004).

Conacher Consulting Pty Ltd has also prepared a Flora and Fauna Management Plan as part of the assessment, recommending habitat clearing measures and reporting requirements.

Existing Environment

Landscape features

The Biodiversity Assessment Report identifies the site as within the Upper Hunter IBRA Sub-region and part of the Scone ï Gloucester Foothills Mitchell Landscape, on the boundary of the Newcastle Coastal Ramp Mitchell Landscape.

The Biodiversity Assessment Report identifies watercourses through the proposed development areas, including first, second and third order watercourses and a map of existing cleared vegetation on the site and in the locality (See Figure 36 below).

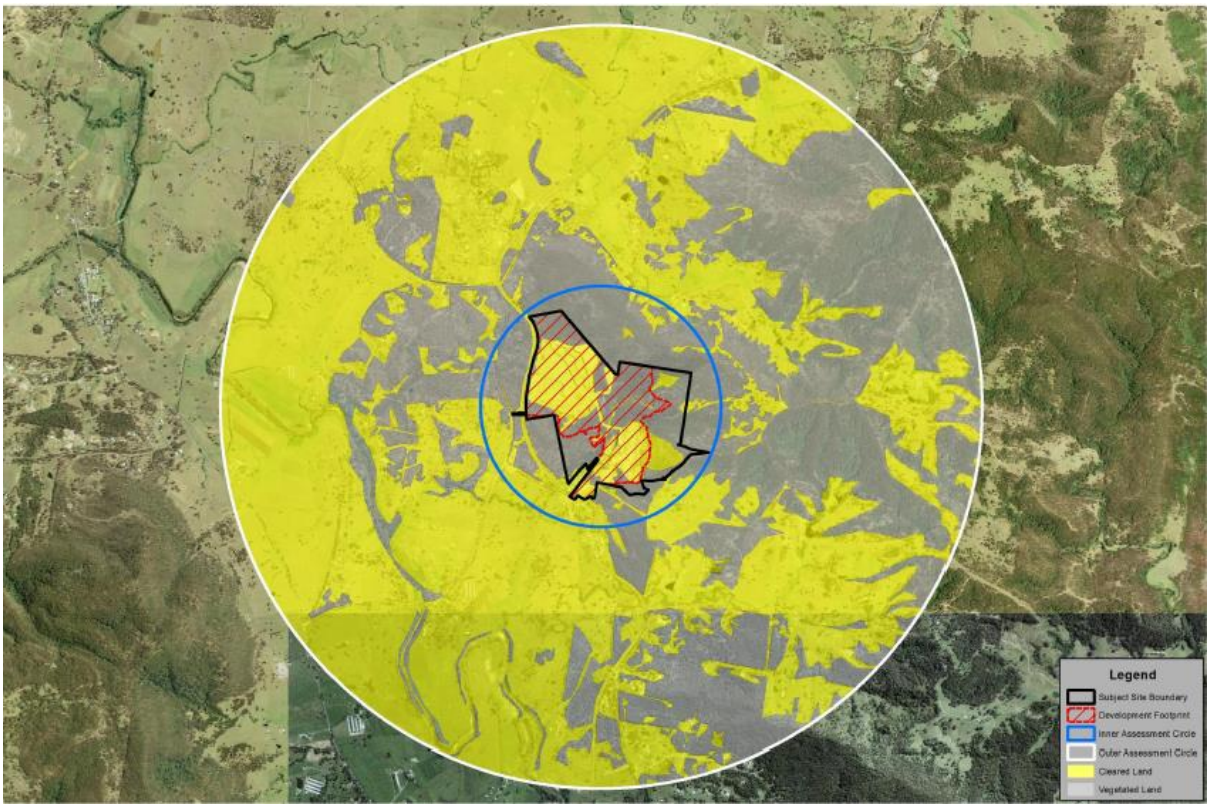

Figure 36 Cleared land and vegetated land on the site and in the locality

Existing biodiversity connectivity linkages and gaps have been identified, including where the proposal will likely impact local biodiversity connectivity (see Figure 37 below).

Figure 37 Current biodiversity connectivity linkages and likely impacts on biodiversity connectivity linkages

Flora

There are a number of broad habitat types on the subject site. These are:

- Dry Sclerophyll Forest
- Wet Sclerophyll Forest
- Rainforest
- Cleared / Disturbed Land

Although there are no Endangered Ecological Communities specifically listed with the Dungog Local Government Area, the following communities have suitable habitat mapped within the subject site:

- Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions
- Lowland Rainforest on Floodplain in the NSW North Coast Bioregion

The vegetation communities and zones identified on the site are listed in the Biodiversity Assessment Report as:

- Whalebone Tree ï Red Kamala dry subtropical rainforest of the lower Hunter River;

- Spotted Gum ï Narrow-leaved Ironbark shrub - grass open forest of the Central and Lower Hunter;
- White Mahogany ï Spotted Gum ï Grey Myrtle - semi mesic shrubby open forest of the central and lower Hunter Valley;
- Slaty Red Gum grassy woodland on hinterland foothills of the southern North Coast; and
- Cleared Land and Landscape Rehabilitation Areas.

All of the vegetation identified is characterised to be of good condition.

The development site currently contains approx. 56.1ha of cleared land and landscape rehabilitation areas. Rehabilitation areas are not part of the proposed development footprint and cover some 8.1ha of the study area.

The 4.9ha of the Whalebone Tree ï Red Kamala dry subtropical rainforest of the lower Hunter River on the development site is listed as a Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions EECûunder the *Threatened Species Conservation Act 1995* (**TSC Act**).

The Spotted Gum ï Narrow-leaved Ironbark shrub-grass open forest is listed as an EEC under the TSC Act for the Sydney Basin Bioregion only and therefore the 3.7ha of this vegetation community on the development site is not considered to be listed under the TSC Act.

Other vegetation communities identified on the development site are not considered to be listed under the TSC Act.

The Biodiversity Assessment Report contains specific details and maps showing the location of these vegetation communities.

The following specific credit type flora species were targeted during site surveys as detailed in the Biodiversity Assessment Report:

- Cynanchum elegans
- Eucalyptus glacina
- Pterostylis chaetophora (in accordance with the SEARs)
- Senna acclinis

A list of all flora species identified during the surveys is attached to the Biodiversity Assessment Report at **Appendix L**.

Fauna

The following specific geographic fauna habitat features were identified on the site:

- Land within 100m of a emergent aquatic or riparian vegetation (potential Green and Golden Bell Frog habitat)
- Land within 40m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber

The Biodiversity Assessment Report contains a comprehensive list of the fauna species observed during all surveys and maps showing locations.

A koala was observed during spotlighting surveys and call recording surveys during 2014 and 2015. The Biodiversity Assessment Report identifies that the koala was observed in all habitats present on the site except the rainforest habitats and the portion of Slaty Red Gum grassy woodland on the hinterland foothills of the southern North Coast vegetation community.

The Biodiversity Assessment Report finds that koalas are not considered likely to utilise the rainforest habitats or Slaty Red Gum grassy woodland on the site due to the lack of preferred feed trees and the dense lantana respectively.

No koala scats were found during the surveys of the site and the Biodiversity Assessment concludes that the activity levels of koalas on the site are low.

The Biodiversity Assessment lists the following ôecosystem credit speciesôas observed within the site during surveys:

- Little Lorikeet;
- Speckled Warbler;
- Varied Sittella;
- Powerful Owl;
- Squirrel Glider;
- Grey-headed Flying-fox;
- Yellow-bellied Sheathtail-bat;
- Eastern Freetail-bat;
- Eastern Bentwing-bat;
- Large-footed Myotis; and
- Greater Broad-nosed Bat.

The Biodiversity Assessment notes that, although a likely roost site of the Powerful Owl was observed on site, it is considered that this site would only be occasionally used as the species was not observed at the location during subsequent site surveys.

The following migratory species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) were observed on the site during surveys:

- Rufous Fantail; and
- Black-faced Monarch.

The Biodiversity Assessment Report identifies that a section of a watercourse to the south of the site and below the site detention basin contains freshwater habitat with in stream gravel beds and is classified as ñType 2 ï Moderately sensitive key fish habitatòand ñClass 3 ï Minimal key fish habitatòas it is an unnamed waterway with intermittent flow.

The remainder of the watercourses on the site are identified in the Biodiversity Assessment Report as ñType 3 ï Minimally sensitive key fish habitatòcontaining areas of ñClass 3 Minimal key fish habitatòand ñClass 4 Unlikely key fish habitatò. The dams on the site are considered to not meet the criteria for classification as key fish habitat.

The freshwater fish species recorded on the Bionet Atlas of NSW Wildlife (OEH 2016) within the Upper Hunter / Central Rivers catchment are listed in the Biodiversity Assessment Report. The Biodiversity Assessment Report notes that the Mosquito Fish (introduced species) was

observed within the dams during surveys and notes that no threatened aquatic species are likely to occur.

RAMSAR wetlands

The Hunter Estuary Wetlands are located approx. 57 km from the quarry site. A detailed assessment of surface water quality, including an assessment of impacts from any discharge from the site is included in the WQIA and in this EIS.

Impact Assessment

The Biodiversity Assessment Report contains a full assessment of the proposal under the FBA including an assessment against section 5A of the EP&A Act (**Attachment Q**).

The Biodiversity Assessment Report sets out the likely impacts requiring further consideration by the consent authority under the FBA. Of these, the Biodiversity Assessment Report identifies that all of the relevant species or landscapes are either not present on the site, or are unlikely to be impacted by the proposal.

In particular it is noted that the SEARs require further consideration of Pterostylis chaetophora, however, as none were found during the targeted surveys, the Biodiversity Assessment Report concludes that no further consideration of likely impacts on this species is required.

The Biodiversity Assessment Report sets out the likely impacts which require offsets as per the FBA, including impacts on plant communities and threatened species, and calculates the offsets required (ecosystem credits and species credits).

The impacts identified include:

- White Mahogany ï Spotted Gum ï Grey Myrtle - semi mesic shrubby open forest of the central and lower Hunter Valley ï 11.7ha will be impacted;
- Spotted Gum ï Narrow-leaved Ironbark shrub - grass open forest of the Central and Lower Hunter ï 3.7ha will be impacted;
- Slaty Red Gum grassy woodland on hinterland foothills of the southern North Coast ï 12.2ha will be impacted;
- Whalebone Tree ï Red Kamala dry subtropical rainforest of the lower Hunter River -a Vulnerable Ecological Community listed under the TSC Act ï 4.9ha will be impacted;
- Eucalyptus glaucina (Slaty Redgum) ï threatened species ï approx.1562 trees will be removed; and
- Koala - threatened species ï removal of approx. 26.9ha of suitable habitat.

The Biodiversity Assessment Report identifies that there are no categories of impacts that do not require a determination of offsets under the FBA and that the 56.1 ha of cleared land within the development footprint does not require further assessment under the FBA.

The Biodiversity Assessment Report has addressed impact assessment and mitigation measures under the EPBC Act, including consideration of whether there are likely to be significant impacts on Matters of National Significance under the EPBC Act (Refer **Appendix L**). In summary, the impacts on koalas and Eucalyptus glaucina are considered to meet the threshold for referral to the Commonwealth.

Likely impacts on the Grey-headed Flying-fox are considered not to meet this threshold under the EPBC Act and relevant Guidelines as the Biodiversity Assessment Report finds that no roost or camp sites were observed within the site; the species is highly mobile and only small numbers were observed during surveys; the area of proposed foraging habitat loss is relatively small in comparison to the overall extent of the habitat available in the locality; and the proposal is not likely to result in the introduction of disease or invasive species.

Likely impacts on the migratory species, the Rufous Fantail and Black-faced Monarch, are not considered to meet the threshold for Commonwealth referral as the Biodiversity Assessment Report concludes that the site does not contain important habitat for nationally listed migratory species; the proposal will not result in the introduction of invasive species; and the area of the proposed habitat is relatively small compared to the areas of habitat available within the region for these species.

The Biodiversity Assessment Report includes details of the habitats, surveys, assessments, avoidance and mitigation measures and offsets in relation to the EPBC Act listed threatened species identified as likely to be significantly impacted by the proposal.

Mitigation Measures

The following measures have been identified in the Biodiversity Assessment Report as means of avoiding or mitigating the proposalôs likely impacts of biodiversity:

- Utilising the existing established infrastructure on the site;
- Pre-clearing and relocation surveys for fauna species during construction / site clearing;
- Ecological supervision of clearing during construction / site clearing;
- Measures in the Flora and Fauna Management Plan (Refer **Appendix L**);
- Implementation of suitable erosion and sediment controls during construction and operation;
- Implementation of suitable nutrient management controls during construction and operation;
- Implementation of protection zones for adjoining vegetation to be retained during construction and operation;
- Weed management of cleared edges and quarry pit during construction and operation;
- Implement environmental safeguards under EPA licensing requirements and as per EIS recommendations.

A Site Rehabilitation Plan (refer **Appendix L**) outlines the rehabilitation program that will be implemented at the end of the quarry life. This will contribute towards the re-establishment of vegetation and limit the impact of the proposed vegetation removal as part of the quarry operations.

The Biodiversity Assessment Report describes how it is considered that these measures will avoid or minimise impacts to the greatest extent practicable and notes that other measures are not considered practical or feasible given the nature of the extractive industry proposed.

Conclusion

The Biodiversity Assessment Report identifies that the following threatened species were observed on the site:

- Eucalyptus glaucina (threatened flora species listed in the TSC Act and the EPBC Act);
- Koala (threatened fauna species listed in the TSC Act and the EPBC Act);
- Grey-headed Flying-fox (threatened fauna species listed in the TSC Act and the EPBC Act);
- Little Lorikeet (threatened fauna species listed in the TSC Act);
- Speckled Warbler (threatened fauna species listed in the TSC Act);
- Varied Sittella (threatened fauna species listed in the TSC Act);
- Powerful Owl (threatened fauna species listed in the TSC Act);
- Squirrel Glider (threatened fauna species listed in the TSC Act);
- Yellow-bellied Sheathtail-bat (threatened fauna species listed in the TSC Act);
- Eastern Freetail-bat (threatened fauna species listed in the TSC Act);
- Eastern Bentwing-bat (threatened fauna species listed in the TSC Act);
- Large-footed Myotis (threatened fauna species listed in the TSC Act); and
- Greater Broad-nosed Bat (threatened fauna species listed in the TSC Act).

The following migratory species listed in the EPBC Act were observed on the site:

- Rufous Fantail; and
- Black-faced Monarch.

The Biodiversity Assessment Report identifies that the Lower Hunter Valley Dry Rainforest in the Sydney Basin and the NSW North Coast Bioregions, a vulnerable ecological community listed in the TSC Act, was observed on the site.

No threatened ecological communities listed in the EPBC Act, and no threatened populations listed in the TSC Act were observed during surveys. No critical habitats listed under either the TSC Act or the EPBC Act were observed.

Likely impacts on the Koala and Eucalyptus glaucina are considered to meet the threshold for referral to the Commonwealth for assessment. The likely impacts on the Grey-headed Flying-fox are assessed in the Biodiversity Assessment Report as not triggering requirements for Commonwealth referral.

The Biodiversity Assessment Report proposes mitigation measures to minimise likely impacts on biodiversity and concludes that, under the FBA, a total of 2301 ecosystem credits are required to offset likely impacts and a total of 21,868 Eucalyptus glaucina species credits are required for offsetting. A Biodiversity Credit Report is attached to the Biodiversity Assessment Report at **Appendix L**.

8.8 EUROPEAN HERITAGE

In accordance with the Secretaryôs Requirements, this Section of the EIS considers the likely impacts on the European heritage (cultural and archaeological) of the development.

Niche Environmental and Heritage Pty Ltd undertook a Historical Heritage Assessment (**Appendix M**) including a field survey to ascertain any potential impacts resulting from the proposed quarrying operations (**Historic Heritage Assessment**).

Site History

The Historic Heritage Assessment describes how settlement in the region did not begin until 1812, despite the survey of the Hunter Valley being completed in 1801. In 1819, the Hunter was opened to free settlement and in 1823 a free settler, Edward Gostwyck Cory, received a grant for 2,030 acres, including the area now known as Martins Creek.

The ñGostwyck Estateôwas used for horse-breeding, vineyards, and sheep breeding. A timber water mill was also constructed on the property. The report concludes that whilst there were a number of buildings constructed as part of the ñGostwyck Estateò, none were built within the area of the proposed development.

Over time, the Gostwyck Estate was subdivided, sold and developed:

- In 1840, the Martins family purchased the land now known as Martins Creek.
- The site of the existing quarry, south of the area of the proposed development, was bought by Jack Gillespie in 1903 and the quarry established to provide ballast for the construction of railways and roads in the area. A total of three quarries operated in the Martins Creek area in the first half of the 1900s.
- The railway from Maitland to Dungog was opened in August 1911, and Martins Creek Railway Station was constructed.
- In 1914, a railway siding was constructed specifically for the purposes of quarrying for ballast for the North Coast rail line. and the then Department of Railways resumed land which is now part of the existing Martins Creek Quarry site for the establishment of a quarry.

The history of the specific land that falls within the area of the proposed development is set out in the table below:

Date	Use or activity
22 March 1876	Part of the land known as ñPortion 116ôis notified as a travelling stock reserve, later cancelled on 17 January 1891.
28 April 1887	Part of the land known as ñPortion 8ôsold as a Conditional Purchase to Charles Thomas Gitlenden and a part of the site is later resumed for railway purposes
18 June 1891	Portion 116 selected as a Conditional Purchase by Charles Thomas Gitlenden and later sold to Mary Cann, and a part of the site was later resumed for quarry purposes
11 August 1903	Part of the land known as ñPortion 56ôgranted to George Osmond as a Conditional Purchase.
1914	The then Department of Railways resumed the land for the

	establishment of a quarry.
1915-present	Extraction, quarrying operations and processing continuing on site.

Register Searches

NSW State Heritage Register
A search of the NSW State Heritage Register, the Register of the National Estate, the register of the National Trust, and the environmental heritage listings in Schedule 5 to the *Dungog Local Environmental Plan 2014* were undertaken.

Australian Heritage Database
A search of the Australian Heritage Database, maintained by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities, was undertaken on 6 May 2015. That search found no record of heritage listings on world, commonwealth or national registers relevant to the site.

NSW State Heritage Register
A search of the NSW State Heritage Register was undertaken on 6 May 2015. That search found no items of State heritage significance relevant to the site.

NSW State Heritage Inventory
A search of the NSW State Heritage Inventory was undertaken on 6 May 2015. The State Heritage Inventory lists items that are identified on a Heritage Conservation register established by NSW Government agencies to identify heritage items on land under their control or ownership. The search identified the following item that is considered relevant to the site on land owned or controlled by RailCorp:

Martins Creek Railway Station	Station Street, Martins Creek Database No 4801206

Martins Creek Railway Station is located directly adjacent to Martins Creek Quarry and has a historic relationship with the quarry. The location of the listed item is shown on Figure 38 below.

Dungog Local Environmental Plan 2014
A search of the environmental heritage listings in Schedule 5 to the *Dungog Local Environmental Plan 2014* was undertaken on 6 May 2015. The following listed items that are identified as items of local heritage significance are relevant to the proposed development:

Martins Creek railway buildings and quarry	Cory Street, Martins Creek Lot 1 DP1006375 (Item I97)
St James Church	95 Cory Street, Martins Creek Lot 1 DP177492 (Item I96)

The locations of the listed items are shown on Figure 38. The lot on which the Martins Creek railway buildings and quarry are located partially overlaps with the southern part of the site of the proposed development (the Project Areaô identified in Figure 38 below).

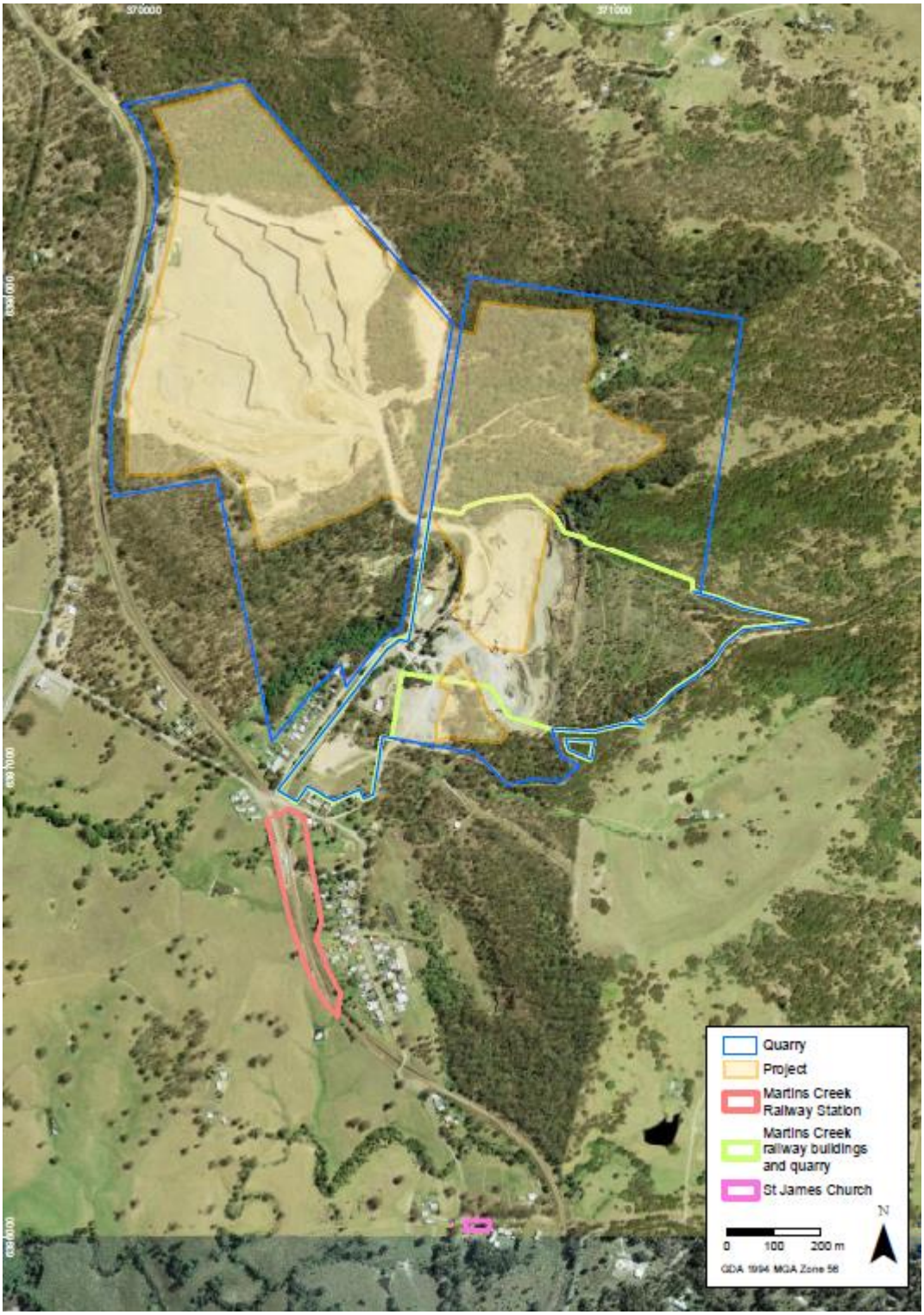

Figure 38 Listed historical heritage items relevant to the proposed development (Project area).

Hunter Regional Environmental Plan 1989 (Heritage)

The *Hunter Regional Environmental Plan 1989 (Heritage)* is an environmental planning instrument (deemed State Environmental Planning Policy) that identifies items of State, regional, or local significance and conservation areas in the Hunter region. A search of the instrument was undertaken on 6 May 2015 and no relevant items or areas were identified. It is noted that this instrument is to be repealed in August 2015.

Statement of significance

The Historic Heritage Assessment includes an assessment and statement of significance addressing the local heritage item identified as Martins Creek Quarry which is in and directly adjacent to the area of the proposed development.

The assessment against the framework and criteria set out in the *NSW Heritage Manual* (prepared by the NSW Heritage Council and the then Department of Urban Affairs and Planning) concludes that the item is considered significant at a local level for its historical heritage value and is likely to be significant for its associations with the local community.

Impact Assessment

The northern part of the curtilage of the lot on which the listed local heritage item ôMartins Creek railway buildings and quarryôis situated overlaps with the southern boundary of the area of the proposed development (see Figure 38 above).

The Historic Heritage Assessment identifies that the Martins Creek railway buildings and the extent of the original quarry were restricted to the southern portion of the relevant allotment and very little physical evidence of the original quarry remains on the site. In addition, a field inspection was undertaken and no items relating to the early quarrying or occupation of the site were located in the area of the proposed development.

The Historic Heritage Assessment concludes that there would be no impact on the heritage significance of the local heritage item as:

- the significance of the quarry is assessed as restricted to local historical heritage values;
- the original extent and historical setting of the quarry has largely been lost through continuous use and expansion of the site; and
- the proposed development that will be carried out on the part of the allotment containing the local heritage item will only consist of low impact exploration activities.

Furthermore, the Historic Heritage Assessment identifies that no modifications to the rail line or quarry infrastructure are proposed within the curtilage of the heritage items, including the primary crusher and rail loader. These facilities are fully functioning and essential to the daily operation of the quarry and its future expansion.

The field inspection of the site and surrounds was conducted and a survey undertaken by qualified consultants at Niche Environmental and Heritage Pty Ltd. The survey was undertaken for the purposes of identifying potential items of historic heritage, in particular any items associated with the previous pastoral, railway, or quarry development in the area. The survey found no historical heritage items or areas of archaeological potential.

An area adjacent to the site, approx. 1km south, was identified as an area of historical archaeological potential as it was adjacent to the location of a former sawmill and hut which had

been identified on historical plans. The survey found the land recently cleared and no evidence of above ground remains. It was noted that whilst subsurface deposits may be present on this site, the location is well outside of the area of the proposed development and will not be impacted by the development.

The Historic Heritage Assessment recommends that no further historical heritage assessment in the area of the proposed development is necessary prior to the commencement of extraction and exploration works.

Mitigation Measures and Policies

In the unlikely event that historical archaeological relics are uncovered as part of the proposed development, work would cease and a suitable qualified archaeologist would be engaged to assess the condition, extent and likely significance of the remains. Statutory requirements to notify State agencies and to provide for the future management of the relics would apply.

If, in the future, more intensive works than exploration activities are conducted in the area overlapping the lot containing the local heritage item of Martins Creek railway buildings and quarry, the Historic Heritage Assessment recommends that further heritage assessment may be required.

Conclusion

The Historic Heritage Assessment identifies the listed State Heritage Martins Creek Railway Station and the listed local heritage items of St James Church and Martins Creek railway buildings and quarry as located within the wider vicinity of the site. A field inspection found no potential items of historic heritage, or items associated with the previous pastoral, railway, or quarry development in the site area.

The site area on which relatively low impact exploration activities are proposed to be carried out overlaps with a portion of the lot on which the listed local heritage item of Martins Creek railway buildings and quarryôis situated. Martins Creek railway buildings and quarry are assessed as having only local significance for historical heritage value. Given that no modifications to the rail line or quarry infrastructure are proposed within the curtilage of these heritage items, and that they are not located on the part of the lot which overlaps with the extraction area, the proposed development is considered to have no impact on heritage significance.

The Historic Heritage Assessment recommends that no further historical heritage assessment is necessary prior to the commencement of extraction and exploration works

8.9 ABORIGINAL HERITAGE

In accordance with the SEARs, this Section of the EIS considers the likely impacts on the Aboriginal heritage (cultural and archaeological) of the development.

Niche Environmental and Heritage undertook an Aboriginal Cultural Heritage Assessment Report (**ACHAR**) to ascertain the potential impacts resulting from the proposed extension to the quarrying operations (Refer **Appendix N**). Figure 39 below shows the areas assessed in the ACHAR.

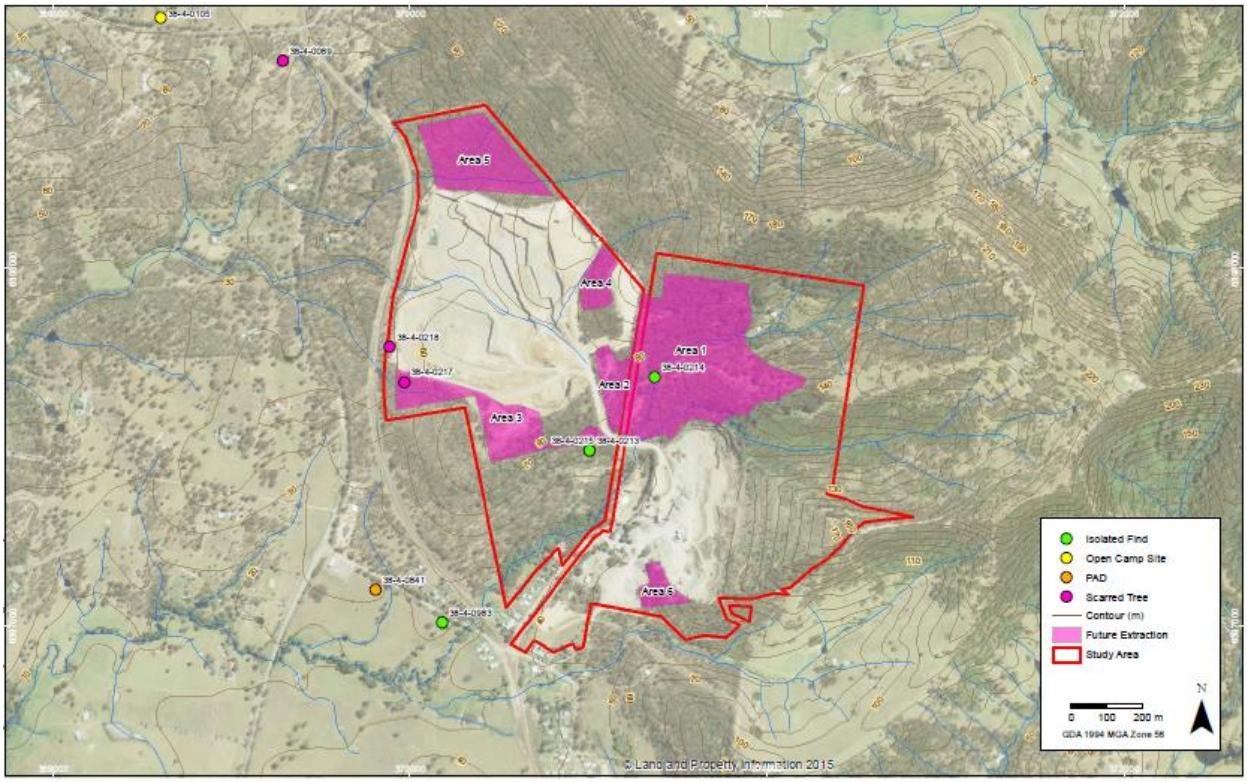

Figure 39 Areas the subject of the ACHAR

Previously recorded items

A search was conducted of the Aboriginal Heritage Information Management System (**AHIMS**) maintained by the OEH during the preparation of the preliminary environmental assessment for the project.

The search identified two items of Aboriginal heritage within Lot 1 DP1006375, Lot 5 DP242210 and Lot 42 DP815628, both previously recorded scarred tree sites:

- Item 38-4-0217
- Item 38-4-0218

During the field survey conducted for this assessment, Item 38-4-0217 was located and determined not to be a culturally modified tree, and hence not an Aboriginal object under the *National Parks and Wildlife Act 1974*.

An aborist report has been undertaken for Item 38-4-0217 and confirms the conclusions in the ACHAR (The aborist report has been included in the ACHAR at **Appendix N**).

A submission has been made to OEH requesting the AHIMS records be amended (Refer to the ACHAR at **Appendix N**).

Item 38-4-0218 could not be located during the field survey and it was concluded that it no longer exists. A Site Impact Recording Form was submitted to OEH and the AHIMS register has since been amended to identify the site as ódestroyedô(Refer **Appendix N**).

The ACHAR also identifies Items 38-4-0213; 38-4-0214 and 38-4-0215 as inside the boundaries of the quarry, with Items 38-4-0213 and 38-4-0215 located some 30m from the site area.

Item 38-4-0214 could not be found during the survey conducted in the preparation of the ACHAR and due to the complete loss of topsoil at the site at the listed location, it was determined that the site has low archaeological potential (Refer **Appendix N**).

Items 38-4-0213 and 38-4-0215 are located in close proximity to the proposed new access driveway.

Consultation process

Consultation was undertaken in accordance with the SEARs and the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 prepared by the then Department of Environment, Climate Change and Water and was conducted by Niche Environment and Heritage Consultants Pty Ltd.

The consultation process followed the following steps:

Stage 1 ï Notification of project proposal and registration of interest.
Stage 2 ï Presentation of information about the proposed project.
Stage 3 ï Gathering information about cultural significance.
Stage 4 ï Review of draft cultural heritage assessment report.

The notification process, associated with Stage 1, was initiated on 9 February 2015 by contacting Dungog Shire Council, Mindaribba Local Aboriginal Land Council, Hunter Local Land Services, Native Title Services Corporation Limited, National Native Title Tribunal, NSW Office Of Environment and Heritage (Newcastle) and the Office of The Registrar Aboriginal Land Rights Act 1983 (NSW).

A newspaper advertisement was placed in the Dungog Chronicle on 11 March 2015.

As a result of Stage 1, the following 17 individuals and organisations have become Registered Aboriginal Parties (**RAPs**) for the project:

- Aboriginal Native title Elders Consultation (ANTEC) ï Margaret Matthews
- Cacatua Culture Consultants (CCC) ï George Sampson
- Hunter Traditional Owner (HTO) ï Paulette Ryan
- Hunter Valley Cultural Consultants (HVCC) ï John Matthews

- Hunter Valley Cultural Surveying (HVCS) ï Luke Hickey
- Hunters & Collectors (H&C) ï Tania Matthews
- JLC Cultural Cervices (JLC) ï Jenny Chambers
- Lower Hunter Wonnarua Council Inc. (LHWC) ï Tom Miller
- Mindaribba Local Aboriginal Land council (MLALC) ï Donna Matthews
- Murrawan Cultural Consultants Pty Ltd (MCC) ï Robert Smith
- Smith Dhagaans Cultural Group (SDGG) ï Tim Smith
- Gomaroi Namoi ï Stephen Talbot
- Tocomwall Pty Ltd ï Scott Franks
- Todd Heard
- Ungooroo Aboriginal Corporation ï Alan Paget
- Upper Hunter Heritage Consultants (UHHC) ï Darrell Matthews
- Wonnarua Culture Heritage ï Gordon Griffith

All RAPôs were provided with the project information on 16 April 2015, and invited to comment on the cultural significance of the site.

Although the draft report was also provided to the RAPôs for comment, no submissions were received.

Register Searches

The following searches were undertaken:

- National Heritage Registers (No heritage listings relevant to the site were identified)
- NSW State Heritage Register (No Aboriginal heritage sites listed on the register were relevant to the site)
- State Heritage and Conservation (s.170) Registers (No Aboriginal heritage sites listed on the register were relevant to the site)
- *Dungog Local Environmental Plan 2014* (No Aboriginal heritage sites listed in the plan were relevant to the site)
- National Parks and Wildlife Act Registers (AHIMS) (see analysis below)

The AHIMS database, maintained by the OEH, identified a number of Aboriginal heritage objects in and around the quarry site. The search also identified three (3) objects within the quarry boundaries, and two (2) objects within the extension area the subject of the ACHAR. These include:

Site ID	Site Name	Site Type	Distance from the subject area
38-4-0213	Martins Creek 1	Open Site	Inside quarry boundaries
38-4-0214	Martins Creek 2	Open Site	Inside quarry boundaries
38-4-0215	Martins Creek 3	Open Site	Inside quarry boundaries
38-4-0217	Martins Creek 5	Open Site	Inside the extension area the subject of the ACHAR
38-4-0218	Martins Creek 6	Open Site	Inside the extension area the subject of the ACHAR

A number of other items were returned in the search results which are located outside of the quarry boundary, but within a radius of 1500m or less from the extension area the subject of the ACHAR (Refer **Appendix N** for the full list of search results).

Local Aboriginal History

The ACHAR describes that, previous to European settlement, the local area was occupied by the Wonnarua and Worimi peoples. Not much is known of the cultural practices and customs of these groups prior to European arrival. Europeans did encounter numerous small groups of 8 or nine families scattered throughout the area.

Aboriginal people lost their homes and hunting grounds from the 1830ôs onward, as European population increased and spread through the county side. The local Aboriginal population dwindled to almost zero by the turn of the century.

The ACHAR states that *'today Wonnarua and Worimi people continue to live in the district and maintain a strong and active interest in their cultural heritage through participation in the development process, education and community development.'*

The Worimi Local Aboriginal Land Council was established in 1984, and the Wonnarua Nation Aboriginal Corporation was established in 1999.

Previous Investigations

A number of previous investigations were undertaken for the area of the existing quarry operations and in the area surrounding the Martins Creek Quarry. These include:

- Dunnet and Packard (1991)
- Austral Archaeology (2005)
- Austral Archaeology (2008)
- McCardle (2009)
- Junburra (2011)

The ACHAR contains a summary of these report and investigations (Refer **Appendix N**).

It would appear that the areas identified in the AHIMS database, and the subject of the previous reports, have not been disturbed as part of the previous and current quarry operations.

Assessment of Significance

The ACHAR contains a summary and detailed description of the methodology and modelling used to assess the significance of the relevant site (Refer **Appendix N**).

The predicative modelling described in the ACHAR identifies that stone artefact sites are the most likely sites of significance to occur within the relevant site area. The ACHAR notes that ground surface visibility was poor over most of the site area and no stone artefacts were found during the field surveys.

Scarred trees were the second most likely type of site of significance. However the ACHAR concludes that because the tall open forests on the site contain young trees, the original vegetation has been extensively cleared and few remnant mature trees remain. Discussion of previously identified scarred trees is set out above.

The ACHAR concludes that it is considered unlikely that Aboriginal archaeological sites would occur in the relevant site areas the inhospitable nature of the terrain indicates that it would not have been used as a camping ground or travelling route.

The Assessment of Significance addresses the following values which are considered in detail in the ACHAR:

- *Archaeological Value*
  The site is considered of low archaeological value as no items were identified onsite, and the ACHAR concludes that it would be unlikely that any objects would be located on the site (which is consistent with previous assessments of the site and surrounds).

- *Social Value*
  The ACHAR did not identify any specific area or places of social or cultural value.

- *Historic Value*
  The limited size of the undisturbed areas is considered to limit any cultural importance to the *'cultural or natural history of the area and/or region and/or state.'*

- *Scientific Value*
  The site is considered of low scientific value as no items were identified onsite, and the unlikelihood of any objects being located on the site. The ACHAR concludes that the subject area does not have the potential to contribute to a further understanding of the cultural or natural history of the local area, region, or state.

- *Aesthetic Value*
  The location of the existing Martins Creek Quarry and related operation in the immediate vicinity of the site means that the site is considered of little to no aesthetic value.

Mitigation measures and management

The ACHAR recommends the following management processes and mitigation measures to address the discovery and management of Aboriginal objects and places during operations:

- The management plan should include recommendations and measures for Items 38-4-0213 and 38-4-0215 to avoid any accidental harm during construction of the proposed new access driveway;
- Management processes for the discovery of objects should be put in place before the commencement of operations in the extension area;
- Management processes should include appropriate incident reporting procedures during initial ground disturbance works (e.g. clearing of vegetation);
- Management processes should include reporting to OEH and compliance with the relevant regulatory requirements; and
- Personnel and sub-contractors working on the site should complete a relevant cultural heritage induction, training or information session prior to commencing work on the site.

This should include making personnel aware of the potential for Aboriginal objects, types of objects and places that may be found and why they are important.

Conclusion

The ACHAR concludes that the proposed activity is not likely to harm any known Aboriginal objects or cultural heritage values and the site is located in an area of low Aboriginal archaeological potential. The ACHAR recommends that the mitigation measures and management protocols described above should be implemented to ensure appropriate protections are in place to manage discoveries of Aboriginal objects or places on the site during operations.

8.10 EROSION AND SEDIMENTATION CONTROL

Assessment Approach

Erosion and sediment control has been addressed as part of the assessment of air quality and surface water (Refer Section 8 of this EIS).

Mitigation Measures

The Stormwater Management Control Plan for the quarry incorporates a comprehensive erosion and sedimentation control regime that includes the following:

- Construction of all erosion and sediment controls required for the development prior to the commencement of clearing works within the catchment areas;
- Construction of catch and diversion drains to ensure areas of sediments dams are complete prior to works commencing in the area;
- Construction and regular maintenance of silt fences to contain sediment down slope of disturbed areas;
- Maintain plant and vehicle park up areas to ensure no pollution and sedimentation of water ways;
- Seeding / Hydro-mulching of disturbed areas to provide rapid growth of vegetation;
- Inspections and repair of erosion sediment controls to ensure they are performing adequately;
- Construction of drains upslope of areas to be disturbed to convey clean runoff away;
- Diversion of surface and road runoff away from disturbed areas;
- Limiting the number of roads and tracks established;
- Progressively reshaping, topsoiling and vegetating road and cut and fill batters, to maximise long term stability; and
- Regular maintenance of sediment controls to ensure adequacy of controls in place.

The Environmental Management Plan for the quarry (Refer **Appendix C**) also contains relevant mitigation and management measures to address erosion and sediment control including:

- Construction and plant traffic will be confined to defined haul roads and work areas;
- Works will be progressively rehabilitated so as to minimise exposure of exposed soils;
- Additional inspections of the site will be conducted after rain events;
- Quality of water released from the site is to be monitored;F
- Sandbags and sediment controls are to be installed around stormwater inlets and outlets;
- Silt fencing to be installed along batter slopes, stock piles and other disturbed surfaces that may drain into water;
- Stock piles will be located away from drainage channels and paths, water bodies and other high risk locations;

Conclusion

The Water Quality Impact Assessment identifies that the quality of the surface water currently being discharged from the site is not having a discernible effect downstream (Refer **Appendix T**). Therefore the above measures and current sediment controls at the quarry are considered adequate to maintain these levels and address erosion and sedimentation impacts.

8.11 SOCIAL AND ECONOMIC IMPACTS

Assessment Approach

A Social and Economic Assessment (**SEA**) was undertaken by Monteath and Powys Pty Ltd in 2016 (**Appendix O**), which determined the social impacts of the existing and proposed development.

As part of the assessment, a multi method approach was undertaken to fully ascertain the impacts of the proposed development. This methodology includes:

- An analysis of Census data from the Australian Bureau of Statistics (ABS) to profile Martins Creek, the Dungog Local Government Area (LGA), and New South Wales (NSW);
- A review of other published social and economic data;
- A review of existing documentation relating to the subject site, including Council reports;
- A review of Dungog Shire Councils social and community plans;
- A review of relevant strategic and statutory planning documents;
- A review of existing social and community infrastructure;
- A discussion of the potential impacts of the development; and
- Consideration of possible mitigation and/or management options.

Existing Environment

Martins Creek is a small township in the Dungog LGA, which is primarily serviced by the main centres of Dungog, Maitland and Raymond Terrace. These areas include retail and business centres, medical facilities, educational establishments, childcare facilities, public transport, and recreational open space.

The following socio-economic demographics have been noted:

- The ABS Index of Socio-Economic Disadvantage value for Martins Creek is lower than that of the Australian average, although other nearby areas are slightly higher (e.g. Paterson, Vacy).
- At the 2011 Census the population of Martins Creek was 341 persons with a median age of 40 years. The median age in Paterson (43 years) and Dungog LGA (44) is above the median age for NSW.
- Martins Creek has a significant proportion of persons aged 45-54 years and 15-24 years but compared to other areas in the LGA has a lower proportion of persons aged over 55 years.
- Martins Creek as with other areas in Dungog LGA has a high proportion of persons born in Australia, but a lower proportion of Indigenous persons compared to other areas in NSW.
- The make-up of households in Martins Creek varies compared to other areas in NSW with 36% being couples with dependents higher than the NSW average. Paterson is even higher at 40%.
- Median household income in Martins Creek is slightly higher ($1,483) than for other areas in the LGA, including Paterson ($1,309).

- There are a large proportion of detached houses in Martins Creek and other areas in Dungog LGA and the majority are being purchased or owner-occupied.
- At the 2011 Census, Martins Creek had a relatively low unemployment rate and a high labour force participation rate. Nearby Paterson had an extremely low unemployment rate at the 2011 Census.
- The largest proportion of workers in Martins Creek with a qualification is in the area of Engineering and Related Technologies, Health Care, Education, Retail and Construction.
- John Hunter Hospital provides higher order health care services in the Hunter Region including Dungog. Data collected at the LGA level for Dungog identifies a high utilisation of health services.
- There were no crime hotspots in Martins Creek compared to other areas in the LGA.

Impact Assessment

It is considered in the SEA that the proposed development will generally create positive social impacts when balanced with any likely costs (refer to the SEA at **Appendix O** for the detailed cost benefit analysis). In particular, the proposal will generate employment both directly and indirectly and contribute to local infrastructure and community services via developer contributions obligations. It is considered that the project will provide positive economic and social benefits to the local community and will contribute to large scale infrastructure projects which provide benefits to both the region and State.

Overall, the project is estimated to create 31-36 additional jobs during the operation of the quarry, at full capacity, with approximately up to another 155 jobs during construction and decommissioning.

The flow on effects of the operational jobs are likely to have a total effect in the order of around 70 jobs in the broader economy. It is expected that given the suppliers and contractors currently used on the site are predominantly local (i.e. Hunter Region) that the flow on effects will generally be contained in the region.

It is estimated that road/construction works associated with the project will be approximately $4.26 million. With flow on effects this is estimated at an impact of $11.9 million in the broader economy. Based on current costs for salaries, goods and services, it is expected that the quarry will contribute approximately $20 million per annum, in addition to the proposed infrastructure works. Based on the gross regional product (GRP) per worker in Dungog LGA it is expected that the additional jobs will add $4.8 million to the GRP of Dungog LGA (based on current figures).

The project will continue to create employment for the staff and contractor already employed by the quarry. It is considered that the project will provide positive economic and social benefits to the local community, and that local section 94 development contributions and/or a voluntary Planning Agreement can provide additional funding sources for local infrastructure in the community.

One of the important benefits of the proposal is the ongoing contribution to major construction projects in NSW. In particular it is anticipated that the Pacific Highway Upgrade in Northern NSW will require quarry materials in excess of volume and quality available locally to meet

project demands. Based on NSW Trade and Investment data, Martins Creek contributes approximately 55% of the total volume of high quality materials to the local area.

Mitigation Measures

As part of the ongoing operations of the quarry it is recommended that:

- Buttai Gravelôs environmental management plan be continually monitored and reviewed;
- The sites environmental management plan and/or site management plan continue to include details for members of the public to contact if issues arise during the operations of the quarry;
- Following approval Buttai Gravel continue to consult with the community;
- Buttai Gravel continue to use local suppliers where practical; and
- Environmental mitigation and management measures as identified in the specialist reports included in this EIS should be implemented at the appropriate time.

Conclusion

It is considered that the project will provide positive social and economic benefits to the local community and will contribute to large scale infrastructure projects which provide benefits to both the region and State. While there may be some environmental costs from the project, the importance of the quarry to ongoing State and regional construction projects and contributions to the local, regional and State economy outweighs any likely impacts.

8.12 VISUAL AMENITY

Assessment Approach

A Visual Impact Assessment has been prepared by Moir Landscape Architecture Pty Ltd (**Appendix P**), having regard to Dungog Shire Councilôs relevant guidelines.

A qualitative and quantitative approach has been taken in the Visual Impact Assessment. The methodology involved systematically evaluating the visual environment and using value judgements based on community responses to surveys.

The assessment classifies the character of the landscape and the relative aesthetic value. The ability of the landscape to absorb different types of development on the basis of physical and physical character has been determined.

The visual quality of the landscape is described in the Visual Impact Assessment as how viewers may respond to designated scenery. Visual quality relates to aesthetics and is a subjective analysis, although the Visual Impact Assessment identifies that there are some generally accepted assumptions as to ratings of visual quality that have been relied upon (Refer **Appendix P**).

Visual sensitivity is described in the Visual Impact Assessment as a measure of how critically a change to the existing landscape is viewed by people from different areas, based on the number of people likely to be affected, land use and distances from the viewer to the proposal.

Visual impacts have been assessed by considering the combined effect of visual quality and visual sensitivity. Visual impacts have been assessed with recommendations for corresponding impact mitigation measures.

The quantitative assessment included digital terrain modelling of the site and surrounds, view shed analysis to determine the visibility of the proposal and preparation of survey accurate photomontages of the proposal and the proposed mitigation measures.

Moir Landscape Architecture Pty Ltd has undertaken fieldwork with reference to key viewpoints and locations with optional views towards the site.

Existing Environment

The site contains an existing quarry with well advanced extraction faces in two pits, surrounded by dense vegetation (see Figure 40 and Figure 41 below). Topographically, the site slopes downwards from the vegetated ridgeline to the south of Merchants Road.

Martins Creek is a small town located between Dungog and Maitland consisting of a number of single storey residences concentrated along Corey Street. There is a small church and a school located on Cook Street to the south.

Surrounding land is used for agricultural purposes, rural residential purposes and the region has landscapes that include steep vegetated slopes, gently undulating foothills, and sloped agricultural land with only remnant vegetation.

Figure 40 Aerial view of existing quarry

A full description of the existing site and locality is set out in Section 2 of this EIS and in the Visual Impact Assessment at **Appendix P**.

Figure 41 View of existing quarry from Vogeles Road

Due to the predominantly rural character of the locality, the landscape quality rating is assessed in the Visual Impact Assessment as generally moderate. It is identified that modifications to the landscape around Martins Creek and Horns Crossing have occurred over time, including roads, railways, infrastructure, land clearing and construction of ancillary structures associated with agriculture. Areas around Mount Johnstone, along Gresford Road, and rural areas of Paterson to the south of the site are assessed as having a moderate to high landscape quality rating due to the low level of human influence in those locations.

Visual sensitivity ratings for industrial developments and freight rail lines (the existing site environment) are rated in the Visual Impact Assessment as ólowô for the foreground, middle ground and background distance zones (Refer **Appendix P**).

Impact Assessment

View points
The Visual Impact Assessment includes analysis of 16 different viewpoints adjacent to and around the development site and locality (Refer **Appendix P**). Of these, 10 are considered to have views from which the development proposal would be visible.

Impacts on viewpoints have been assessed with reference to topographic maps and photographs taken at eye level and with the lens to simulate the field of human vision.

Visual sensitivity is described in the Visual Impact Assessment as a measure of how critically a change to the existing landscape is viewed by people from different areas, based on the number of people likely to be affected, land use and distances from the viewer to the proposal. Visual sensitivity ratings for industrial developments and freight rail lines are rated (the existing site environment) as low for the foreground, middle ground and background distance zones (Refer **Appendix Y**).

Viewpoints likely to have the highest visual sensitivity were identified as:

- Station Street, Martins Creek (15m to nearest site boundary)
- View Street, Vacy (650m from the site)
- Lane off Dungog Road (557m from the site)
- Martins Creek Tennis Courts (375m from the site)
- Cory Street, Martins Creek (45m to nearest site boundary)

Visual effect is described in the Visual Impact Assessment as the interaction between a proposal and the existing environment and is often expressed in terms of visual contrast. The assessment identifies that the proposal is likely to have a moderate visual effect at 6 locations, and a low or no effect at the remaining 10 locations (Refer **Appendix P**). Generally, where viewpoints are in close proximity to the proposal, future development would be screened by vegetation or topography.

Visual impact has been assessed at each of the 16 locations by combining the visual sensitivity and visual effect assessments. Of the 16 locations assessed, the proposal is assessed as only likely to have a high visual impact on one location, at Station Street, Martins Creek (15m to nearest site boundary) (See Figure 42 and Figure 43 below).

Figure 42 Views from Station Street, Martin Creek

VIEWPOINT MC01A: Station Street

VIEWPOINT MC01B: Station Street cropped from MC01A

Figure 43 Existing view from Station Street, Martins Creek

Visual impacts were assessed at Station Street Martins Creek as likely to be high given the residential land use and the proximity to the proposed acoustic wall. Plans and drawings of the proposed acoustic wall are set out in **Appendix I**. It is noted that the proposed acoustic wall at this location is linked to the extension of the rail siding, which will not proceed if market conditions do not make increased rail haulage economically feasible. If the rail siding is not extended as part of the proposal, it is likely that the visual impact from the quarry in this location will remain as per current (see Figure 43 above).

Images from the 15 other viewpoints are set out in the Visual Impact Assessment (Refer **Appendix P**).

Photomontages

The Visual Assessment includes photomontages of the likely visual impacts of the proposal superimposed on to images of the site. The photomontages have been used to assess potential visibility from local and regional areas around the site.

Figure 44 below shows the existing viewpoint from Station Street, Martins Creek and the view if the proposed acoustic wall is constructed which is assessed in the Visual Impact Assessment has likely to have a low to moderate visual impact due to the scale and proximity to residences.

Figure 44 Photomontages of view from Station Street, Martins Creek showing the proposed the acoustic wall if the rail siding is extended, including additional landscaping to mitigate the impacts

As the site is generally concealed by prominent vegetated ridges to the north, east and south, the highest visual impact is likely to occur from the west. Due to the progressive nature of the proposed expansion to the quarry, the visual changes will occur sequentially over the 25 year operational period. Future expansion will eventually make a portion of the mined face more visible (see Figure 45 below).

Figure 45 Photomontages of view from Douglas Voge Road before and after the proposed development

Figure 46 shows photomontages of the view from Dungog Road before and after the proposed development and demonstrates the visual impact of clearing as a result of the proposal.

Figure 46 Photomontages of view from Dungog Road before and after the proposed development

Views of the quarry will be available to motorists and residents from Gresford Road, see Figure 47 below showing photomontages of the view from Gresford Road before and after the proposed development and associated clearing of vegetation.

Figure 47 Photomontages of view from Gresford Road before and after the proposed development

The Visual Impact Assessment considers the proposed new access driveway will be in keeping with the existing access driveways along Dungog Road and would therefore have a minimal impact.

Mitigation Measures

The Visual Impact Assessment notes that the areas of the site determined to have the highest visual impacts will be rehabilitated as early as practical to reduce visual impacts as the development progresses over time.

The Visual Impact Assessment describes the following mitigation measures to better achieve visual integration of the proposal with the existing landscape character:

- Retaining the existing tree line buffer along the ridgeline to ensure the backdrop to the west of the site is maintained;
- Physical separation and visual fragmentation of the expansion areas to reduce the visual impact of the expanding quarry face;
- Preservation of pockets of existing vegetation on the site will reduce the impact of the clearing associated with the proposal;
- Entry and internal roads should be positioned as closely as possible to existing contours to minimise earthworks and retain some of the existing vegetation areas;
- All vegetated areas outside of the expansion footprint should be retained and protected from earthworks;
- The type, height and colour of future ancillary structures and machinery materials should not contrast significantly with surrounding bushland; and

- Screen planting (in consultation with affected landowners), particularly along Station Street should be used to soften the visual impact of the acoustic wall and other high visual impacts on residences.

Conclusion

The Visual Impact Assessment recommends mitigation measures which, if adopted, are described as assisting considerably in ensuring potential visual impacts as a result of the proposal are reduced. In particular, the retention of buffer zones between the proposed expansion areas will significantly reduce the overall impact of the proposed quarry expansion by breaking up the areas of exposed earth. Retention of vegetated areas outside of the expansion footprint, especially along the western boundary of the site, is considered to contribute significantly in reducing likely visual impacts of the proposal.

The existing quarry has been a landscape element in the locality for some 100 years and is considered part of the existing landscape character. Although the proposed extension will have the potential to negatively impact the existing visual amenity in some locations, these changes will occur progressively given the nature of the project and the mitigation measures proposed are considered appropriate to minimise the visual impacts associated with the future development of the quarry.

8.13 CUMULATIVE IMPACTS

Assessment Approach

Cumulative impacts have been assessed having regard to the extent of the existing quarry operations and the proposed mitigation and management measures outlined in this EIS which will apply to both current and future operations.

The Brandy Hill Quarry located in the region is currently seeking approval to extend their operations. There has been limited information provided with regard to the Brandy Hill quarry expansion. It is understood the current weighbridge truck counts have been provided to the Applicant, however proposed haulage routes, proposed blasting, proposed truck counts, or other operational details have not been available to inform the cumulative impact assessment as part of this EIS.

Existing Environment

Air quality
The quarry is located in a rural area where surrounding agricultural activities are not considered to have impacts on air quality that would be substantial enough to contribute to any cumulative impacts.

The AQIA identifies that there are unsealed roads and driveways in the vicinity of the quarry which, depending on how often they are used, may contribute in some locations. Regional sources of adverse air quality impacts can include bushfires, dust storms or other weather conditions.

Dust pollution is currently produced by the quarry during blasting activities, processing of quarry materials and transportation to end users.

Water quality
Drainage on the quarry site is currently collected in three sediment dams. All dams are licensed to be discharged under the existing environment protection licence (**EPL**) 1378. Offsite discharge of surface water quality is regulated under the same EPL.

Ephemeral streams drain stormwater run off from areas up gradient of the existing processing area and the western pit, discharging into the Paterson River. The WQIA contains the results of the water quality samples tested and concludes that the existing quarry operations are not having a discernible effect on the water quality of the Paterson/Allyn Rivers catchment.

Groundwater has already been intercepted in the western pit of the existing quarry and a licence under section 115 of the *Water Act 1912* has been obtained to manage the existing groundwater seepage into the quarry.

Traffic
Discussions with the relevant road authorities have indicated that there are no proposed road network changes, or other roadworks and upgrades planned (other than routine maintenance) in the vicinity of the quarry and current road network.

The recently completed Hunter Expressway has significantly altered traffic patterns on the New England Highway by reducing traffic movements along the Highway. This has also improved the capacity of side roads; in particular Melbourne Street is the most relevant side road for this proposal.

Onsite observations detailed in the TIA conclude that during peak periods, the road network associated with the quarry operations functions well with minimal delay or congestion. The only exceptions identified include delays and congestion at the intersection between Melbourne St and the New England Highway during peak morning periods and delays occurred in Lorn and through intersections in Maitland at High St.

Noise and vibration
The Martins Creek Quarry is the only source of industrial noise in the locality. The Martins Creek Quarry is the only source of blasting vibration in the locality.

The existing quarry operations consist of a number of acoustic emitters that include drilling and blasting operations, initial crushing within the quarry floor, secondary ballast crushing and sorting, transportation of materials within the quarry areas, and truck and rail loading. Haulage of materials through the townships of Paterson and Bolwarra Heights has also been identified as an issue by local residents.

The area surrounding Martins Creek Quarry consists of rural residential development with large lot subdivisions and the township of Martins Creek itself. Other noise sources identified include the North Coast Rail Line and Dungog Road.

The trucks from Martins Creek Quarry share the haul route with other vehicles including heavy vehicles utilising the route for regional haulage.

The Blast Report demonstrates that the lowest level of blast induced ground vibration specified in the EPL has never been recorded at any of the monitoring sites.

Ecology
The Biodiversity Assessment Report identifies the site as within the Upper Hunter IBRA Sub-region and part of the Scone ï Gloucester Foothills Mitchell Landscape, on the boundary of the Newcastle Coastal Ramp Mitchell Landscape.

The Biodiversity Assessment Report identifies watercourses through the proposed development areas, including first, second and third order watercourses and a map of existing cleared vegetation on the site and in the locality.

Impact Assessment

Air quality
In all instances, the concentrations of particulate matter associated with the project are predicted to be below the EPAôs specified assessment criterion at the receptors modelled. The modelling for dust deposition from the quarry at the identified sensitive receptors indicates that the cumulative mean monthly deposition associated with the quarry is predicted to be less than 3.8g/m^2/month at all nearest non-project related receptors.

Watering of unpaved haul roads and enclosed crushers, windbreaks and proposed noise barriers will mitigate impacts. Pollutant concentrations and dust deposition levels are predicted to meet the requisite criteria levels at the surrounding receptor locations.

As the greenhouse gas assessment for both direct and indirect emissions form the project predict that the proposal is likely to represent an increase in direct emissions of 0.0012% per annum on total Australian greenhouse emissions, it is considered that the proposal, incorporating the proposed mitigation measures where feasible, would be suitable in terms of greenhouse gas emissions.

Water

The WQIA concludes that the water currently excluded from the Paterson/Allyn River catchment (due to the presence of the quarry), and the water likely to be excluded due to the proposed extension of the quarry is unlikely to effect the water security of other Water Access Licence holders in the catchment.

The measures proposed in the WQIA should be implemented to manage total suspended solids throughout the life of the quarry to ensure water quality downstream and surface water quality is not adversely impacted by operations.

Traffic

Dungog Shire Council have advised that there is limited development growth expected in the study area north of Bolwarra and through Brandy Hill. Development that is expected around Morpeth is identified in the TIA as mainly aged care / retirement village development which generates little traffic flow.

The main development in the locality that is likely to contribute to traffic flows is the Brandy Hill Quarry and proposed expansion. The proposed expansion to the Brandy Hill Quarry seeks consent for production of around 1.5 million tonnes per annum. There has been limited information provided with regard to the Brandy Hill quarry expansion. It is understood the current weighbridge truck counts have been provided to the Applicant, however proposed haulage routes, split of demand for end products, or details on any increased truck movements have not been available to inform the cumulative impact assessment as part of this EIS. The assessment in the TIA has extrapolated from the figures provided in the Preliminary Environmental Assessment submitted for the Brandy Hill Quarry extension.

As part of the quarry extension, the New England Highway will be accessed via Flat Road and Melbourne St rather than Belmore Road through Lorn. The route through Lorn will only be used to service local markets in Maitland.

In addition the proposed new access arrangements will significantly improve traffic conditions in Martins Creek.

At an absolute peak capacity, the TIA calculates that the impacts of some 320 laden trucks exiting the site per day would be considered acceptable under current guidelines and it would be an appropriate volume for the capacity of the existing road network.

However, in response to strong community feedback, and given the current condition of the road network, it is proposed to reduce the proposed number of trucks to a maximum of 215 laden trucks leaving the site per day, with a maximum peak rate of 40 laden trucks leaving the

site per hour in the mornings. The proposed number of daily outbound laden trucks is only 2/3 of the number considered acceptable in the TIA. As evidenced by the analysis in the TIA, this lower number of truck movements is well below the number considered to have acceptable impacts.

The TIA also concludes that traffic flows will only be minimally impacted as a result of the proposal, given the peak number of truck movements associated with the quarry will remain at the current rate of 40 laden trucks per hour outbound in the mornings, with a significant decrease in the afternoon.

The TIA concludes that the data collected from the relevant road networks demonstrates that these networks currently carry traffic flows well within their capacity. Because the peak hourly rate of truck movements will not increase as a result of the proposal, the existing road network will continue to operate within acceptable limits.

The TIA identifies that there is currently adequate off-street and on-street parking available to satisfy local demands.

Noise and vibration

In the early stages of the quarry plan, the Acoustics Report identifies that some of the existing infrastructure that is currently located near the residences in Station Street and Corey Street will be relocated and those areas will be rehabilitated.

The Report concludes there will be little to no impact as a result of evening processing for residents near monitoring locations. Similarly, the Acoustics Report finds that the operations connected with early morning loading and dispatch are unlikely to cause more than minimal increases in the ambient sound level and will be consistent with Project-Specific Noise Criteria.

The Acoustics Report has assessed the likely impacts of maintenance activities at the quarry and concludes that as it is proposed that all maintenance activities are to be moved to the northern part of the processing area, where they will be conducted behind the noise barrier on the southern side of the processing area, noise from maintenance is likely to be below 25dB at the closest residences and unlikely to cause offensive noised or sleep disturbance.

The likely noise impacts residences in Dungog Road will experience as a result of the new access driveway are considered in the Acoustic Report to be compliant with the assessment criteria in the NSW Road Noise Policy and would be likely to be less than the traffic noise levels currently experienced by residents of Station Street.

The bench design and measures proposed in the Blast Report are estimated to achieve blast induced vibration levels of less than the lower limit specified in the existing EPL. Martins Creek Quarry have a proven track record of meeting the blast induced air overpressure ANZEEC Guidelines 1990 limits.

The Blast Report concludes that the impacts of quarry operations on people will likely be minimal given the low level of vibration and air overpressure likely to be generated at the closest residences.

Martins Creek Quarry has a proven track record of meeting the relevant blast vibration and induced air overpressure guidelines since it took over operations at Martins Creek Quarry.

Given that the quarry is currently operating within the limits of the relevant guidelines and licence conditions, the impacts of the proposal including the quarry extension are considered likely to be minimal if these standards are maintained.

The Geological Report and the assessment in the Blast Damage Report support a conclusion that many of the impacts that have been attributed to blasting at residences near the quarry are more likely to have been the result of forces other than blasting at the quarry.

It is considered that upgrades of equipment will occur during the life of the quarry to install modernised equipment with lower impacts as a result.

Ecology
The proposal was assessed under the Framework for Biodiversity Assessment which include requirements to identify and assess likely cumulative impacts (Refer **Appendix L**).

Mitigation Measures

The detailed mitigation measures proposed in the EIS have been developed to manage any likely cumulative impacts.

Conclusion

The mitigation measures proposed will improve the environmental management of the current quarry operations and adequately address the likely cumulative impacts as a result of the proposed extension.

9. Environmental Management and Monitoring

9.1 COMPILATION OF PROPOSED MITIGATION MEASURES

Air quality, odour and greenhouse gas

- Windbreaks, including the proposed noise attenuation measures;
- Optimisation of incline/decline haul routes to reduce transport distances from the extraction area;
- Consider use of alternative fuels such as biodiesel for mobile plant and renewable energy technologies such as wind or solar;
- Install energy efficient crusher and other plant equipment;
- Implement solar-powered lighting where possible;

Traffic and Access

- The construction of the proposed new access driveway and onsite provision of parking for trucks will mitigate the current impacts on Station Street residences;
- The proposal to divert trucks away from the Lorn haulage route and instead access the New England Highway via Flat Road and Melbourne Street will significantly improve the traffic environment through Lorn;
- The TIA lists the following potential upgrade works and recommends they be put forward for discussion with the relevant road authorities in order to cater for the continued use of the key haulage routes by the quarry:
    - Upgrade intersection to provide a dedicated sheltered right turn lane at Dungog Road and Gresford Road;
    - Provide physical guidance for vehicles to manoeuvre around the 90 degree bend in Paterson;
    - Upgrade intersection to provide a dedicated sheltered right turn lane at Butterwick Road and Clarence Town Road; and
    - Upgrade intersection to provide a dedicated sheltered right turn lane at Clarence Town Road and Brandy Hill Drive (this may need to take into account future upgrades associated with the proposed Brandy Hill quarry expansion with appropriate cost sharing);

Noise and Vibration

- Engineering noise control elements including an 8m high noise barrier to the southern area of the processing area and a 3m high noise barrier to the southern section of the haul road and dump area;
- Engineering noise control treatments to plant equipment including the primary and secondary crusher, fixed screens, rail loading screen and hopper;
- Relocation of maintenance functions on the site;
- Discontinuation of the use of the southern part of the site for stockpile and ancillary support functions;
- New access driveway and product dispatch;
- Discontinuation of heavy vehicles using Station Street for dispatch of material; and
- Construction of a noise barrier to the rail siding in conjunction with the extension of the rail siding to facilitate 24 hours/7days a week rail loading;

- Current techniques to mitigate ground vibration, blast induced air overpressure, flyrock and fumes should continue;

Hazards and risks

- Drainage measures implemented above and behind the quarry face to avoid concentrated water flows on the quarry face or infiltration;
- Diversion of surface water flows from upslope areas away from the quarry face;
- Benches and pit floor should be graded to promote positive drainage conditions;
- Proposed buildings are likely to be constructed of fire resistant materials;
- Upgrades to the refuelling station in accordance with the separate DA currently lodged with Council;
- The regular maintenance and inspection of bunding on site;
- Clear and appropriate signage is maintained on site;
- Adequate and maintained fire safety equipment;
- Emergency response procedures and staff training including site inductions;
- Compliance with WHS Guidelines;
- Maintenance, on site of Safety Data Sheets;
- Ongoing maintenance of equipment in accordance with manufacturerôs specifications;

Surface water quality and ground water

- Capture surface water and retain it onsite for pollution control (rainfall runoff captured in sediment basins will provide adequate water for haul road dust suppression);
- Stage the quarry plan so that a quarried void (proposed east pit) is available before the before intercepting streams, the quarry void will be used as a dam, and discharged to a drain feeding into one of the intercepted streams (regulated under the EPL);
- Capture excess water supply in sediment basins;

Ecology

- Utilise the existing established infrastructure on the site;
- The protection zones for adjoining vegetation are to be retained during construction and operation;

Soil, erosion and sediment control

- Construction of all erosion and sediment controls required for the development prior to the commencement of clearing works within the catchment areas;
- Construction of catch and diversion drains to ensure areas of sediments dams are complete prior to works commencing in the area;
- Construction and regular maintenance of silt fences to contain sediment down slope of disturbed areas;
- Construction of drains upslope of areas to be disturbed to convey clean runoff away;
- Diversion of surface and road runoff away from disturbed areas;
- Stock piles will be located away from drainage channels and paths, water bodies and other high risk locations;
- Silt fencing to be installed along batter slopes, stock piles and other disturbed surfaces that may drain into water;
- Construction and plant traffic will be confined to defined roads and work areas;

Social and economic impacts

- Following approval, Buttai Gravel should continue to consult with the community;
- Buttai Gravel should continue to use local suppliers where practical;
- Environmental mitigation measures as identified in the specialist reports included in this EIS should be implemented at the appropriate time;

Visual amenity

- Retain the existing tree line buffer along the ridgeline to ensure the backdrop to the west of the site is maintained;
- Physical separation and visual fragmentation of the expansion areas;
- Preservation of pockets of existing vegetation on the site;
- Entry and internal roads should be positioned as closely as possible to existing contours to minimise earthworks and retain some of the existing vegetation areas;
- All vegetated areas outside of the expansion footprint should be retained and protected from earthworks; and
- The type, height and colour of future ancillary structures and machinery materials should not contrast significantly with surrounding bushland.

9.2 ENVIRONMENTAL MANAGEMENT AND MONITORING

The current Environmental Management Plan applying to Martins Creek Quarry (as amended from time to time) is proposed to also apply to the extension of the quarry (Refer **Appendix C**).

The following specific management and monitoring measures have been proposed as part of this assessment:

Air quality, odour, and greenhouse gas

- Emission controls and mitigations practices set out in **Appendix F**, including watering of unpaved haul roads, enclosed crushers, wheel wash;
- Maintain optimum tyre pressure on trucks;
- Reduce vehicle idling time;
- Regulate daily operation of lighting;

Traffic and Access

- Heavy vehicles from Martins Creek Quarry continue to adhere to the self-imposed speed limit of 40kmph on the section of Tocal Road through Bolwarraand Paterson;

Noise and Vibration

- Operational noise monitoring will be carried out quarterly at Station Street and near residences on Dungog Road;
- Minimise the exposure of equipment to surrounding residences when carrying out topsoil stripping;
- Blast induced ground vibration and air overpressure limits in accordance with the ANZEEC Guideline 1990;
- Restrict blasting to current licence conditions in the EPL;
- Blast frequency should be less than or equal to 50 times per annum but the aim should be to minimise the blasts by firing a nominal 15000bcm blast size;
- Use stemming to minimise air overpressure from blasting;

- All of the current measures in place to manage flyrock should be implemented, including engaging a good quality licensed drill and blast provider with a proven track record in quarry and construction blasting;
- Monitor and record wind speeds as well as other meteorological conditions;

Hazards and risks

- Scaling loose blocks with excavators during quarrying;
- Blasting behind any inferred dyke or fault structure in order to reduce poor face stability conditions;
- Incorporating a risk analysis and safety management plan for personnel beneath the quarry faces;
- All work is to be carried out in accordance with the quarry extraction operation plans, safety management plans, and site specific work method statements and procedures; and
- In the event of signs of future instability, large scale wedge, planar or toppling instability, further geotechnical advice should be sought;
- The working quarry areas and hard standing areas are to be maintained as an Inner Protection Area to address bushfire risks;
- Provision of an on-site mobile water pump and tank for use in protecting buildings from bushfire impacts during a local bushfire event;
- Retention of water in an on-site dam so that it can be accessed in a bushfire emergency;
- Preparation of a Bushfire Emergency Response and Evacuation Plan;
- A sign displayed on the property entry point that a static water supply is available for bushfire control purposes;
- All shotfires to ensure people near the blasting area are at a safe distance, and/or provided with an appropriate blasting shelter;
- Develop and comply with a Blast Management Plan, incorporating the Australian Standard 2187.1;
- A safe work method statement should be prepared for use of explosives in accordance with *Work Health and Safety Regulation 2011*;
- Regular monitoring and onsite maintenance of on-site petroleum storage facilities, in accordance with the EMP;
- Regular inspections of refuelling areas to monitor contamination risks;
- The regular maintenance and inspection of bunding on site;
- Clear and appropriate signage is maintained on site;
- Adequate and maintained fire safety equipment;
- Emergency response procedures and staff training including site inductions;
- Compliance with WHS Guidelines;
- Maintenance, on site of Safety Data Sheets;
- Ongoing maintenance of equipment in accordance with manufacturerôs specifications;

Surface water quality and ground water

- Establishment of a monitoring network using selected exploration boreholes to assess the actual extent of groundwater drawdown;
- Monitoring of water levels on a quarterly basis;
- Water quality sampling on an annual basis; and
- Monitoring the water quality of the pit seepage water to assess suitability for use in quarry processes, in the event that sufficient groundwater volume is encountered;

- Progressive Erosion and Sediment Control Plans be prepared;

Ecology

- Conduct pre-clearing and relocation surveys for fauna species during construction / site clearing;
- Ecological supervision of clearing during construction / site clearing;
- Implement the measures in the Flora and Fauna Management Plan (Refer **Appendix L**);
- Implementation of suitable erosion and sediment controls during construction and operation;
- Implementation of suitable nutrient management controls during construction and operation;
- Weed management of cleared edges and quarry pit during construction and operation;
- Implement environmental safeguards under EPA licensing requirements and as per EIS recommendations.

European heritage

- Undertake further heritage assessment if, in the future, more intensive works than exploration activities are conducted in the area overlapping the lot containing the local heritage item of Martins Creek railway buildings and quarry;
- If historical archaeological relics are uncovered, work will cease and a suitable qualified archaeologist would be engaged to assess the condition, extent and likely significance of the remains;

Aboriginal heritage

- The management plan should include recommendations and measures for Items 38-4-0213 and 38-4-0215 to avoid any accidental harm during construction of the proposed new access driveway;
- Management processes for the discovery of objects should be put in place before the commencement of operations in the extension area;
- Management processes should include appropriate incident reporting procedures during initial ground disturbance works (e.g. clearing of vegetation);
- Management processes should include reporting to OEH and compliance with the relevant regulatory requirements; and
- Personnel and sub-contractors working on the site should complete a relevant cultural heritage induction, training or information session prior to commencing work on the site. This should include making personnel aware of the potential for Aboriginal objects, types of objects and places that may be found and why they are important;

Soil, erosion and sediment control

- Maintain plant and vehicle park up areas to ensure no pollution and sedimentation of water ways;
- Seeding / Hydro-mulching of disturbed areas to provide rapid growth of vegetation;
- Inspections and repair of erosion sediment controls to ensure they are performing adequately;
- Limiting the number of roads and tracks established;
- Progressively reshaping, topsoiling and vegetating road and cut and fill batters, to maximise long term stability; and
- Regular maintenance of sediment controls to ensure adequacy of controls in place.

- Works will be progressively rehabilitated so as to minimise exposure of exposed soils;
- Additional inspections of the site will be conducted after rain events;
- Quality of water released from the site is to be monitored;
- Sandbags and sediment controls are to be installed around stormwater inlets and outlets;

Social and economic impacts

- Buttai Gravelôs environmental management plan should be continually monitored and reviewed;
- The siteôs environmental management plan and/or site management plan should continue to include details for members of the public to contact if issues arise during the operations of the quarry;

Visual amenity

- Screen planting (in consultation with affected landowners), particularly along Station Street should be used to soften the visual impact of the acoustic wall and other high visual impacts on residences.

10. Justification and Conclusion

10.1 JUSTIFICATION FOR UNDERTAKING THE PROPOSAL

The carrying out of the proposal as set out in this EIS is justified having regard to the following reasons:

Environmental

- The mitigation and management measures proposed are in line with the principles of intergenerational equity and the conservation of biological diversity and ecological integrity. In particular the proposed rehabilitation plan accords with the principle of polluter pays. As the proposal does not include development where the risks are not yet scientifically understood, the proposal is considered in line with the precautionary principal.
- Regularising and updating the environmental management controls that apply to the existing quarry operations will result in better environmental outcomes and consolidating existing development rights for the quarry in a single instrument will ensure consistency across the premises.
- In the locality, the proposed modifications to the current access arrangements and operations will reduce environmental impacts for residents of Martins Creek.

Social

- The proposal has been demonstrated to have overall a positive social benefit for the locality, the region and the State given the economic benefits and direct and indirect employment opportunities created as a result.
- Based on ABS data, the flow on employment effects are significant in the region. Any uncertainty on the future of the existing operations may result in the loss of valuable jobs in the LGA and wider Hunter Region. Conversely, approval for the expansion of the quarry will secure the existing jobs into the longer term.

Economic

- The economic benefits of the proposal are significant and not limited to the locality. Extending the quarry operations will make efficient use of already established infrastructure and it is likely the most economically efficient use of land that has already been identified as resource rich.
- The extension will enable further extraction of a significant resource as part of the proposed extension.
- There are substantial direct and indirect economic benefits for the locality, region and the State, including the supply of supply of aggregate and materials to facilitate large scale government infrastructure projects and future projects.
- Not extending the quarry or limiting existing operations would impact significantly on the supply of quarry materials in the Central Coast and Sydney regions, and, in particular, the Hunter region.

The proposed project is to continue extraction of hard rock from the site by completing the extraction of the existing operational areas on expanding the operational area, and then increasing the depth of extraction in the area where the current processing plant is located.

The project seeks to continue current operations to complete the extraction of material in existing areas in conjunction with expansion into the proposed new areas to maximise the utilisation of the resource.

Mining methods are expected to remain the same as currently used with rock being broken by Drill and Blast techniques in the pit with Run of Mine (**ROM**) material being trucked to the crushing plant for further processing before being stockpiled and loaded on to road trucks for delivery to market.

Specific justification for each element of the proposal is set out below:

PROPOSED	**JUSTIFICATION**
Extracting up to 1.5 million tonnes of hard rock material per annum	Resource deposits of andesite are uncommon, particularly in large deposits and are essential in the construction of infrastructure and all construction industries supplying product for a further 30 years in NSW and the Hunter region.
Expanding into new extraction areas and clearing of vegetation.	Large contiguous deposits of Andesite are exceptional and to access the deposit of the resource clearing of vegetation is necessary.
Quarrying to 6am ï 6pm (Monday to Saturday).	To ensure a supply of base material is at hand to be processed in accordance with the market demand preventing delays to the production chain of quarry products.
Processing to 6am - 10pm (Monday to Saturday).	To ensure a range of product is at hand to complement the diverse and widely spread market demand in a timely and efficient manner thereby preventing delays to critical infrastructure and construction projects.
Mixing and binding to 4:30am - 10pm (Monday to Friday) and 4:30am - 6pm (Saturdays).	To provide critical perishable road base product to on- site construction crews widely spread locations, at a time that is required to meet engineering standards and construction practices involved in the construction of state, regional & local infrastructure projects.
Stockpiling, loading and dispatch of road transport to 5:30am - 7pm (Monday to Saturday), up to a peak rate of 40 laden outbound trucks per hour in the mornings, and a maximum 215 laden trucks leaving the site per day.	To deliver critical product to construction sites or tertiary production plants throughout the region. Also to allow early loading and late return of parked trucks.
Train loading retained at 24 hours per day, 7 days per week.	To provide rail products via rail to the national and state lines and to provide future Sydney markets.
Maintenance works retained at 24 hours per day, 7 days per week.	Allow plant and equipment to be serviced out of production times so as to ensure contiguous supply of material to construction industries.

Allow loading & parking of trucks on site over night.	To reduce early morning traffic to the quarry and to have materials ready for dispatch to construction sites and plants.
Consolidating existing operations and approvals.	To formalise the historic and redundant consents and practices so the quarry operates in a manner contemporary to current practices and requirements.
Rehabilitating the site.	To return the quarry to a footprint similar to the existing surrounding habitat.

10.2 CONCLUSION

If the mitigation and management measures proposed in this EIS are implemented, it is considered that the proposed Martins Creek Quarry and extension is justified given the likely biophysical, social and economic impacts addressed above and in this EIS.

This EIS has been prepared by Monteath and Powys Pty Ltd on behalf of the Applicant.