

State Significant Development Application Environmental Impact Statement

Eagleton Quarry Barleigh Ranch Way

Submitted to Department of Planning and Environment
On Behalf of Eagleton Rock Syndicate Pty Ltd

January 2017 ■ 15647

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This report has been prepared by:



Jim Murray

27/01/2017

This report has been reviewed by:



Tim Ward

27/01/2017

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Statement of Validity

Development Application Details

Applicant name	Eagleton Rock Syndicate Pty Ltd
Applicant address	PO Box 898 Newcastle NSW 2300
Land to be developed	Part of Lot 2 in Deposited Plan 1108702, located on Barleigh Ranch Way (or Killaloe Lane)
Proposed development	Gravel and aggregate quarry with production capacity up to 600,000 tonnes per annum for up to 30 years, as further described in Section 4 of this Environmental Impact Statement

Prepared by

Name	Tim Ward
Qualifications	Bachelor of Science, Master of Environmental Management
Address	173 Sussex Street, Sydney
In respect of	State Significant Development - Development Application for development described above.

Certification

I certify that I have prepared the content of this EIS and to the best of my knowledge:

- it is in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000;
- all available information that is relevant to the environmental assessment of the development to which the statement relates; and
- the information contained in the statement is neither false nor misleading.

Signature



Name	Tim Ward
Date	27/01/2017

Executive Summary

Purpose of this Report

This submission to the Department of Planning and Environment (the Department) comprises an Environmental Impact Statement (EIS) for a Development Application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It relates to the proposed hard rock quarry at Eagleton, NSW.

Under clause 7, and clause 5 of Schedule 1, of *State Environmental Planning Policy (State and Regional Development) 2011* development for the purposes of extractive industry that extracts from a total resource of more than 5 million tonnes is State Significant Development (SSD). The proposed Eagleton Quarry will extract from a total resource of approximately 10 million tonnes, and so is SSD.

A request for the issue of Secretary's Environmental Assessment Requirements (SEARs) was sought on 15 October 2015. Accordingly, the SEARs were issued on 6 November 2015. This submission is in accordance with the Department's guidelines for SSD applications lodged under Part 4 of the EP&A Act, and addresses the issues raised in the SEARs.

Overview of the Project

The Eagleton Quarry proposal is for the extraction of a hard rock reserve that is a mixture of various igneous and sedimentary rock formations. The proponent, Eagleton Rock Syndicate Pty Ltd (Eagleton Rock), has identified rock formations suited to local and regional construction markets and therefore the project will contribute to satisfying an identified demand.

The Eagleton Quarry proposal incorporates a 30 year quarry operations area of approximately 30ha which includes a processing, sales and administrative area. The details of the proposal are set out in **Section 4**.

The key development parameters of the development proposal for which approval are sought include:

- Extraction and on-site processing of up to 600,000 tonnes per annum of rock;
- Transporting quarry products by truck to market;
- Improvements to public roads and a right of carriageway (on private land) to support the traffic transporting quarry products; and
- Undertaking quarry operations for 30 years.

The Site

The proposed Eagleton Quarry site is located on part of Lot 2 DP 1108702 which is within the Local Government Area of Port Stephens. The quarry site forms the part of Lot 2 to the west of Seven Mile Creek which transects the broader site. The site requires new infrastructure and equipment. The characteristics and various components of the site are set out in **Section 2**.

Planning Context

Section 6.0 of the EIS considers all applicable legislation in detail. The proposal is consistent with the requirements of all relevant Acts and SEPPs. The site is zoned RU2 – Rural Landscape. The proposal is permissible with consent and meets the objectives of the subject zone.

Environmental Impacts and Mitigation Measures

This EIS provides an assessment of the environmental impacts of the project in accordance with the SEARs and sets out the undertakings made by Eagleton Rock to manage and minimise potential impacts arising from the development.

A number of technical studies have been undertaken by specialist consultants to assess the potential impacts of the proposed Eagleton quarry project. An assessment of these potential impacts, provided in **Section 7**, has determined that there will not be any adverse social, economic and environmental impacts which cannot be managed or mitigated.

Key environmental issues are summarised below:

- **Traffic:** All quarry related traffic is expected to use Italia Road to access the Pacific Highway, via Barleigh Ranch Way (an unformed local public road) and a right of way of the adjoining land. The anticipated traffic will not create any unreasonable impacts on the traffic flow on Italia Road and Barleigh Ranch Way. The access road from the intersections between Italia Road and the Right of Carriageway, as well as the full length of the right of way, and the relevant section of Barleigh Ranch Way will be upgraded to Council's standard for a private rural road, with a sealed surface in order to accommodate the haulage requirements of the proposed quarry traffic. The intersection of Italia Road and the Pacific Highway is not predicted to be significantly affected and will continue to operate safely and at a satisfactory level of service during the lifetime of the project.
- **Flora and Fauna:** The project will require the clearing of approximately 28.4ha of plant community HU804 Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest. Biodiversity assessment has been carried out in accordance with the *Framework for Biodiversity Assessment* which has determined that the proposed development will require a total of 1,628 ecosystem credits to be retired under the *NSW Biodiversity Offsets Policy for Major Projects*. In addition to ecosystem impacts two threatened fauna species are identified as being potentially impacted – Koala and Southern Myotis. Species credits of 276 and 334 have been calculated respectively. A Biodiversity Offset Strategy has been provided setting out that a significant amount of credits will be obtained from biobanking the non-developed parts of the quarry site. No threatened flora species have been recorded at the site. No significant impacts have been identified in relation to riparian corridors, aquatic habitats, groundwater dependent ecosystems. The biodiversity assessment also concludes that the proposed development is considered unlikely to have a significant impact on threatened species or communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and a referral to the Commonwealth is not required.
- **Groundwater:** The proposal will extract rock down to 45 mAHD resulting in groundwater above this elevation seeping into the floor of the excavation and causing drawdown within the connected groundwater source. Detailed groundwater modelling has been carried out and subject to peer review, indicating that predicted drawdown beyond the boundary is less than 0.5m at 500m to the north-west of the site, and that there would be only minor baseflow loss to Seven Mile Creek of 0.75 m³/day (0.27 ML/year). A detailed assessment against the Aquifer Interference Policy has been carried out that concludes that the Eagleton Quarry would have a minimal impact on the aquifer at the site, and would have no impacts to any offsite water supply bores or high priority groundwater dependent ecosystems.
- **Surface Water:** The Water Management System is intended to contain runoff from the quarry area to prevent impacts on the water quality of the

downstream catchment, and includes diversion of clean water, and collection of potentially impacted water in two water management dams providing a total water storage capacity of around 57 ML. A detailed predictive site water balance has been prepared for the site, which concludes that the quarry could be operated without the need to import significant volumes of water for processing and dust suppression and without the need for discharges from the site to Seven Mile Creek.

The water management system includes significant water storage volume in order to prevent spilling for events at least up to the 100 year ARI 24 hour storm event, and internal treatment systems to contain and treat suspended solids and hydrocarbons. It is concluded that the proposed quarry would have no identifiable potential impact on water quality in Grahamstown Dam and will contain any water quality impact on-site meeting the Neutral or Beneficial Effect on water quality as required by Hunter Water. Further, the direct loss in yield is expected to be negligible, estimated to be less than 0.3% of net runoff into Grahamstown Dam.

No significant change to the downstream flooding risk are expected.

- **Noise and Vibration:** Acoustic modelling has been carried out in accordance with the EPA's *Industrial Noise Policy*. Under the operating scenarios modelled there is not predicted to be any exceedances of the project specific noise levels at any receptor, except for manager's residence for the Port Stephens Gardenland landscape supply facility where construction and operational noise activities may exceed the respective criteria. Eagleton Rock is negotiating a private agreement with the owner of this property, who is also the owner of the Eagleton Quarry site.

Blasting is expected to be controllable within the criteria established under the *ANZECC Guidelines to minimise annoyance due to blasting, overpressure and ground vibration*.

- **Air Quality:** Air quality modelling has been carried out in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The modelling indicates that there will be no significant impact on local air quality as a result of the proposed Eagleton quarry, and that emissions from the quarry will not cause any additional exceedances of the EPA's air quality criteria. The modelling relies upon the inclusion of best practice dust control measures, and these are included as mitigation measures.
- **Visual Impact Assessment:** Analysis of view corridors identifies that the quarry development will not be visually intrusive from any sensitive viewpoint. In all cases, it will be largely screened by intervening topography and existing vegetation.
- **Indigenous Heritage:** Assessment of Aboriginal cultural heritage has been carried out in accordance with the OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. The assessment identified two areas of Potential Archaeological Deposits and one Aboriginal item. The item will not be impacted as it is within the vegetated riparian corridor that will be retained. The new crossing of Seven Mile Creek will impact on one of these PADs and this area will be subject of subsurface testing, in consultation with local Aboriginal stakeholders, prior to the commencement of works in this area.
- **Historic Heritage:** The site is not located at or in the vicinity of any listed heritage items, and is unlikely to contain previously undiscovered historic heritage. As such, no impact to historic heritage is anticipated.
- **Waste:** It is not expected that the quarry development will generate large quantities of waste requiring off-site disposal. The largest amount of waste will be organic green materials associated with clearing of vegetation. Where

possible these materials will be transferred to the adjacent landscape supplies facility for input into its normal operations.

The site includes a deposit of some 3,000 tonnes of rejected tile fragments. It is proposed to assess these tile fragments in accordance with the EPA's Recovered Aggregate Exemption 2010, and reuse them as aggregate for the construction of the on-site access road, haulage roads and the processing area.

- **Hazards:** The quarry will not store or handle any dangerous goods in excess of the screening thresholds in the Department of Planning's *Applying SEPP 33* guideline.

A suite of measures have been proposed to ensure that contractors and staff are trained to prevent, control and survive bush fires. This includes the establishment of a number of alternative emergency access routes for incoming bush firefighting crews and for emergency exit of staff.

Conclusion and Justification

The assessment undertaken and outlined in this Environmental Impact Statement demonstrates that the proposed Eagleton Quarry project will not have any adverse social, economic and environmental impacts that cannot be managed or mitigated. The project will efficiently and effectively quarry a significant gravel resource to provide essential materials for the ongoing construction of housing and roads in the Hunter and Sydney metropolitan regions in an environmentally responsible manner.

1.0 Introduction

This Environmental Impact Statement (EIS) is submitted to the Department of Planning and Environment pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in support of an application for State Significant Development (SSD) for a hard rock quarry at Eagleton, NSW.

The key parameters for the development of the quarry are as follows:

- Extraction and on-site processing of up to 600,000 tonnes per annum of rock;
- Transporting quarry products by truck to market;
- Improvements to public roads and a right of carriageway (on private land) to support the traffic transporting quarry products; and
- Undertaking quarry operations for 30 years.

The EIS has been prepared by JBA, for the proponent, Eagleton Rock Syndicate Pty Ltd (Eagleton Rock) and is based on information provided by Eagleton Rock and supporting technical documents provided by the expert consultant team (see Table of Contents).

This EIS has been prepared in accordance with the requirements of Part 4 of the EP&A Act, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and the Requirements of the Secretary of the Department of Planning and Environment for the preparation of the EIS, which are included at **Appendix A**. This EIS should be read in conjunction with the supporting information and plans appended to and accompanying this report.

The EIS is structured as follows:

Section 1: Introduction, overview of the project, background, project team and approvals process.

Section 2: Site analysis, overview of existing site conditions, and summary of opportunities and constraints.

Section 3: Consideration of alternatives and reasons for carrying out the project

Section 4: The strategic and statutory planning framework applying to the site.

Section 5: A detailed description of the proposed development.

Section 6: Summary of the key issues from Consultation.

Section 7: Environmental assessment of the Project.

Section 8: A consolidated table of proposed Mitigation Measures.

Section 9: Project Justification

Section 10: Conclusion

1.1 Overview of Proposed Development

The Eagleton Quarry Project is for the extraction of a hard rock reserve that is a mixture of various igneous and sedimentary rock formations. Eagleton Rock has identified rock formations suited to local and regional construction markets and therefore the project will contribute to satisfying an identified demand. The Eagleton Quarry proposal incorporates a 30 year quarry operations area of approximately 30ha which includes a processing, sales and administrative area.

1.2 Background to the Development

Eagleton Rock in association with its affiliate company Williamtown Sand Syndicate Pty Ltd is developing construction material product streams to compliment a new and dynamic quarry company.

Eagleton Rock is developing further construction material product streams to compliment a new and dynamic quarry company. The company has detailed plans to provide high quality products and will work towards energy efficient process systems that reduce waste and improve its environmental footprint.

The proposed Eagleton Quarry would service demand for aggregate and crushed rock products in the Hunter, Central Coast and Sydney regions. It is anticipated that most of the customers would be based in Newcastle, Central Coast and the Lower Hunter. However, it is recognised that the significant growth in Sydney is creating ongoing demand for concrete and road surfacing aggregates.

Lower Hunter's growth for the next 20 years has been forecast by the NSW Department of Planning and Environment and documented within the *Hunter Regional Plan 2036*. This Plan has identified future development areas, principal land use types, settlement patterns and conservation outcomes. Key goals are to:

- Grow Australia's next major city; and
- Grow the largest regional economy in Australia.

The Plan forecasts that an additional 70,000 dwellings will be needed in the region by 2036, and that an additional 60,000 jobs will be created. The ongoing building and infrastructure development associated with these forecasts will create strong demand for the materials proposed to be extracted and processed at the Eagleton Quarry. In addition, the strategic location of the quarry will also make it a viable supply to the Port of Newcastle for the continued expansion of port facilities include coal loading and handling facilities.

The proposed quarry is located on the western part of Lot 2 in DP 1108702. The eastern part of Lot 2 is occupied by an existing landscape supplies facility, which has been operating at the site for over 10 years and is known as Port Stephens Gardenland.

The quarry will be operated independently from Port Stephens Gardenland landscape supplies facility and is an unrelated business. However, where appropriate this EIS considers the cumulative impacts of both facilities operating at the same time.

1.3 Approvals Process

Figure 1 below outlines the main steps in the approval process for a State Significant Development Application with indicative assessment timeframes.

The Eagleton Quarry proposal is currently at Step 2 with the public exhibition of the EIS. It is highlighted that at the current time the Minister has put in force a series of delegations. As such, the Minister is unlikely to determine the Development Application, but rather it will be determined under delegation to the Department of Planning and Environment or the Planning Assessment Commission. The appropriate delegated determining authority will be established after the public exhibition period.

1.4 Project Team

An expert project team has been formed to deliver the project and includes:

Proponent	Eagleton Rock Syndicate Pty Ltd
Planning and EIS	JBA
Groundwater	Umwelt Australia and URS
Civil Engineering and Infrastructure	Fisher Engineering Pty Ltd
Flora and Fauna	Kleinfelder
Water Quality and Quantity	Umwelt Australia
Traffic and Transport	GHD Newcastle
Indigenous Heritage	McCardle Cultural Heritage Pty Ltd
Air Quality and Greenhouse Gas	Pacific Environment
Noise	Global Acoustics
Geotechnical	Qualtest Laboratory Pty Ltd
Economics	Hunter Research Foundation Centre

JBA State Significant Development (SSD) Process

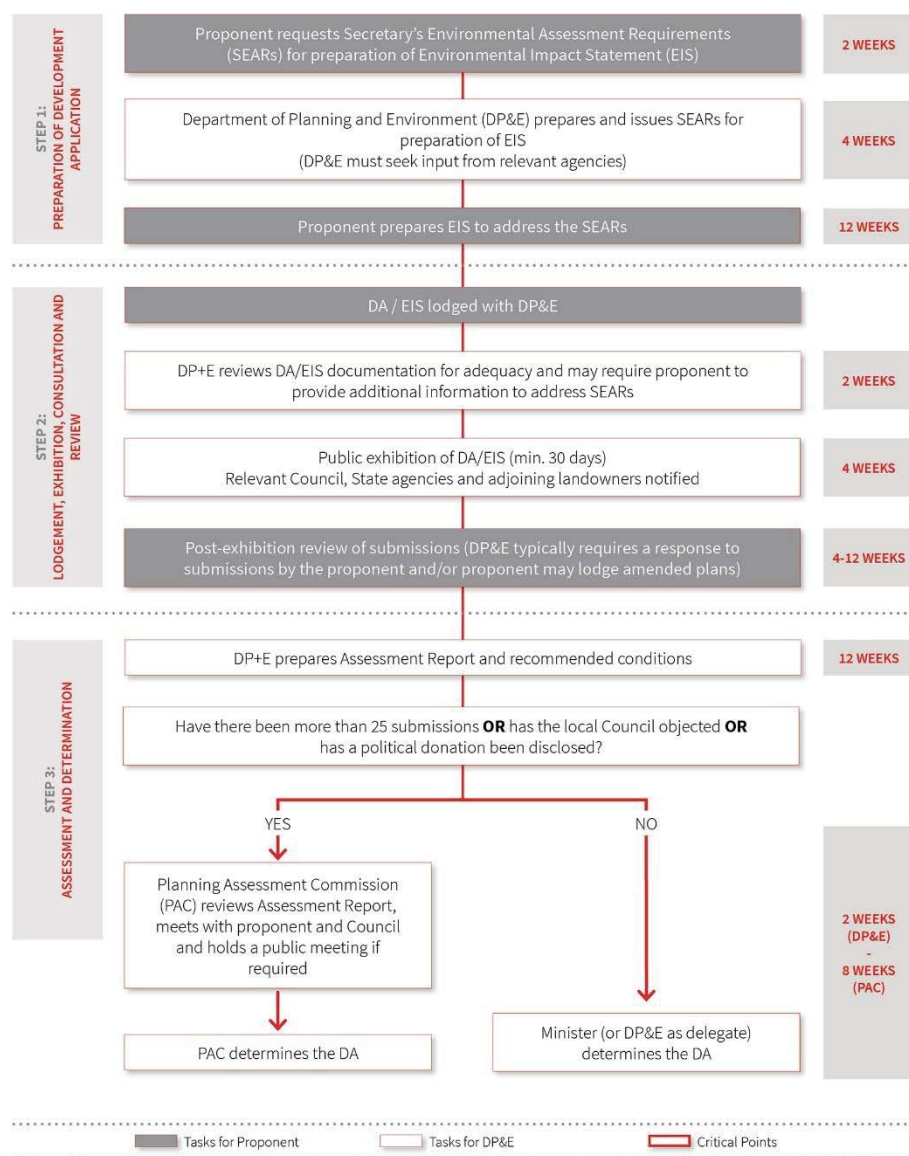


Figure 1 – State Significant development – development application process flow chart

2.0 Site Analysis

2.1 Site Location and Context

The proposed Eagleton Quarry is located at a site approximately 12km north of Raymond Terrace, within the Local Government Area of Port Stephens. The site is approximately 1.5km to the west of the Pacific Highway, approximately 2km southwest of the intersection of the Pacific Highway with Italia Road, and approximately 2.5km northwest of Grahamstown Dam. The site's location is shown at **Figure 2**.

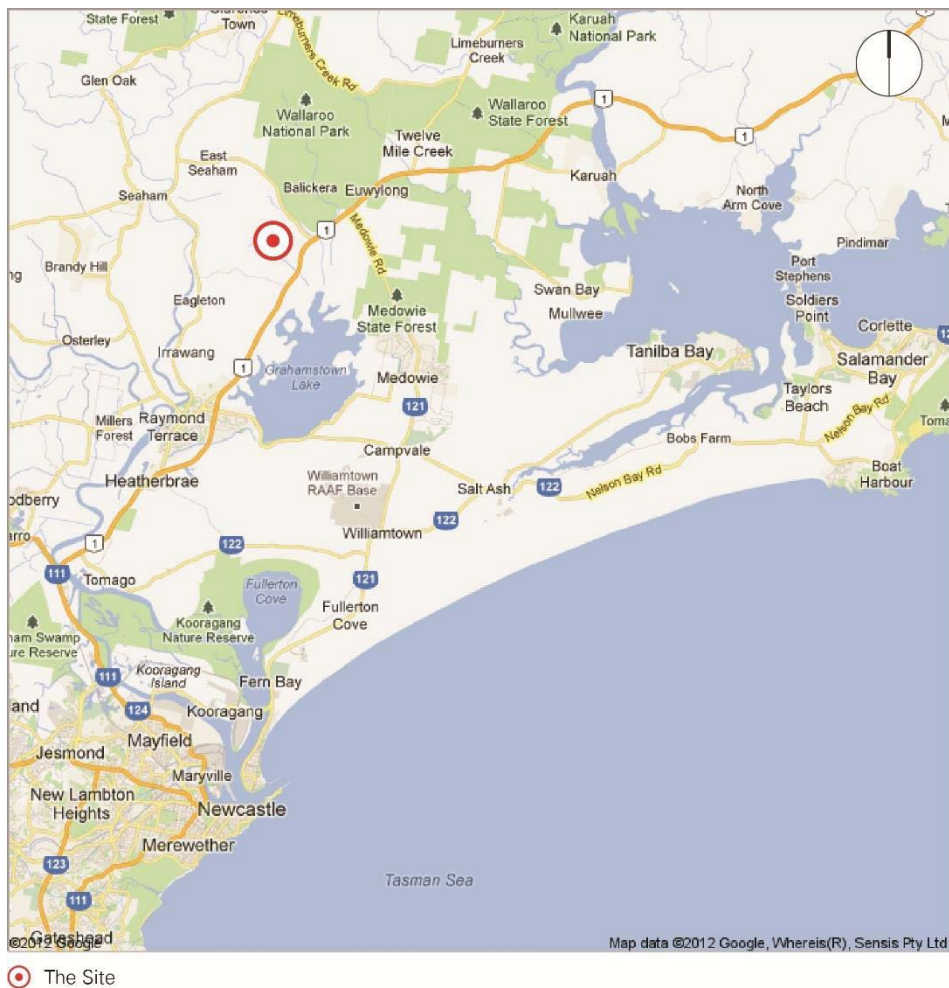


Figure 2 – Locality Plan

Source: Google Maps (modified by JBA)

2.2 Land Ownership and Legal Description

The Eagleton Quarry site is located on part of Lot 2 DP 1108702, located on Barleigh Ranch Way, Eagleton. Lot 2 is split north-south by Seven Mile Creek. The quarry site forms the part of Lot 2 to the west of the creek.

The land is owned by the owner and operator of the existing Port Stephens Gardenland landscape supplies business which operates on the eastern part of Lot 2 DP 1108702.

The right of carriageway upon which access to the proposed Eagleton Quarry site relies is located on private land legally described as Lot 2 DP 1158962 and Lot 1 DP 245116. A copy of DP 115227 (which is the precursor to Lot 2 DP 1158962 and Lot 1 DP 245116) is attached at **Appendix B** showing the right of carriageway.

It is highlighted that the right of carriageway as shown in DP 115227 is not in the same location as the existing gravel road used by landowners for access to Barleigh Ranch Way. The existing gravel road is located approximately 50m to the west of the right of way.

2.3 Site Characteristics

The characteristics and natural features of the site are shown in **Figure 3** and described in the following sections.

2.3.1 Physical Context

The site is located in an area of undulating hills. The site is on a west to east trending spur which ranges from approximately 120m AHD at the north western boundary to about 30m AHD in the southeast. The site is split north-south by Seven Mile Creek, which has a minor tributary running east-west through the site. Seven Mile Creek forms a valley through the site at between 45m AHD in the north and 30m AHD in the south.

2.3.2 Physical Infrastructure

The site has a number of un-sealed partially formed vehicle tracks, including an existing crossing of Seven Mile Creek, and a cleared area of approximately 0.6ha which has been cleared and graded.

2.3.3 Geological Setting

Reference to the Statewide Geology GIS database and the Newcastle 1:100,000 Geology Sheet indicates that three geological units are present near the site, as follows:

- The Italia Road (Cui) comprises sandstone, shale and coal. This is shown as sub cropping at the eastern side of the site.
- The Balickera Conglomerate (Cul) comprises conglomerate, rhyolite, tuff and ignimbrite and is shown as sub cropping over the remainder of the site.
- The Eagleton Volcanics (Ceg1e) sub crops to the north west of the site.

2.3.4 Natural and Cultural Heritage

The site is heavily wooded with vegetation type "Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin".

The site is split north-south by Seven Mile Creek, which has a minor tributary running east-west through the site. Seven Mile Creek conveys water to the south-east spilling Grahamstown Dam. As such, the site is within the drinking water catchment of Grahamstown Dam.

There is a high potential for isolated finds and/or artefact scatters or aboriginal significance in the vicinity of Seven Mile Creek and its tributaries.

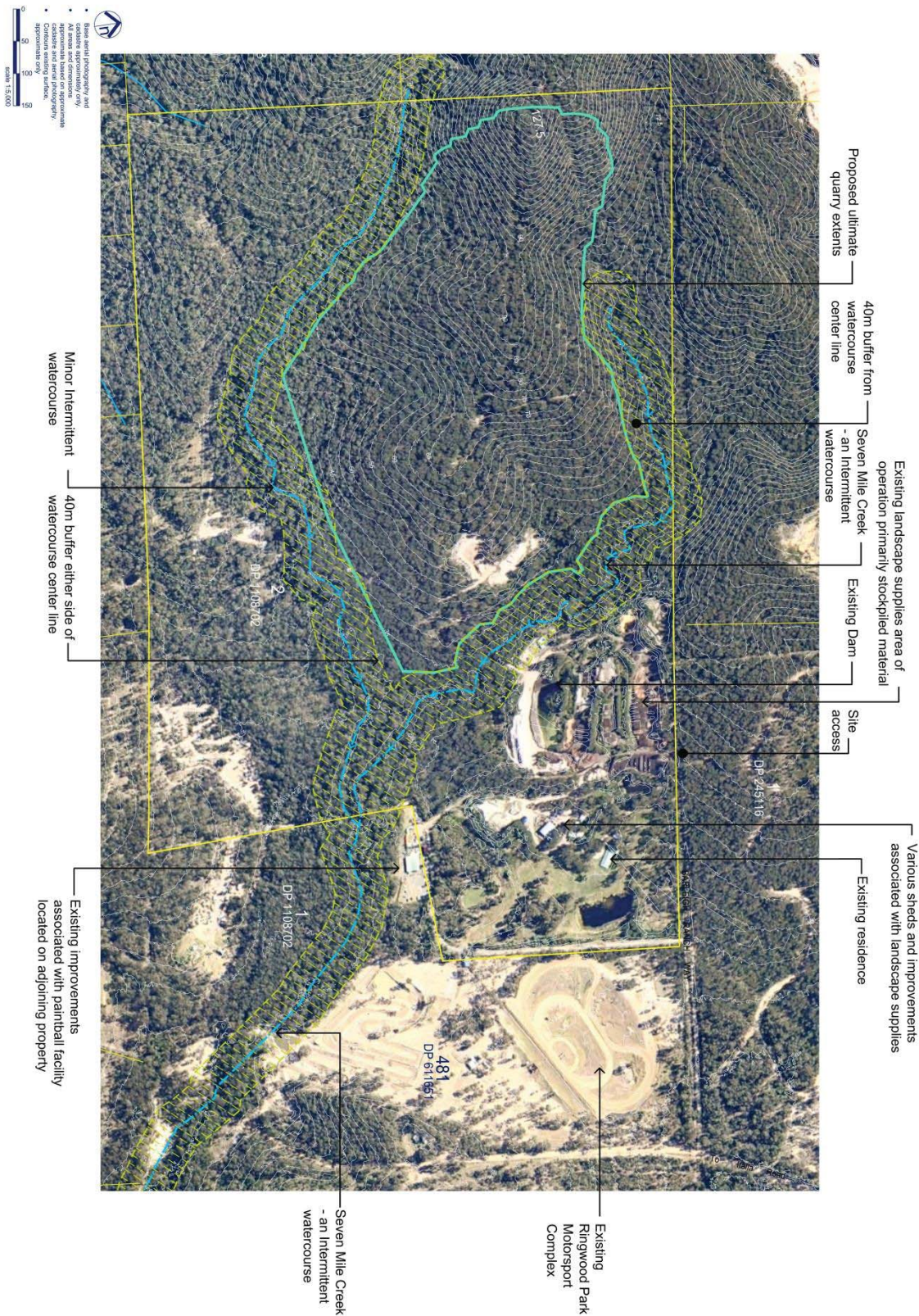


Figure 3 – Site Characteristics and Features
Source: Eagleton Rock Syndicate

2.3.5 Existing Transport Network

The local road access arrangements for the site are shown in **Figure 4** below. Access to the proposed quarry site is via Italia Road, which connects along a right of carriageway access road located on private land to Barleigh Ranch Way (a public road). The quarry site is accessed directly off Barleigh Ranch Way.

Italia Road connects through to Seaham in the west, and provides access to the Boral Seaham Quarry. The right of access provides access to a number of adjacent recreational land users, and Barleigh Ranch Way also provides access to the existing Port Stephens Gardenland landscape supplies facility.



Figure 4 – Road Access Plan
Source: Google Maps (modified by JBA)

2.4 Surrounding Development

Existing Development at the Site

The property (Lot 2 DP 1108702) is currently occupied by the Port Stephens Gardenland landscape supplies business and associated dwelling, which is situated in the north eastern corner of the site.

Surrounding Commercial / Recreational Development

Boral's Seaham quarry is located on lot C DP1645505 and Lot 66 DP753200 immediately to the north and northwest, and is clearly visible in **Figure 4**. The site is surrounded by a number existing recreational uses including:

- The MG Car Club located at Lot 1 DP 245116 and Lot 2 DP 1158962 to the northeast of the proposed Eagleton Quarry. The MG Car Club currently takes its access from the same right of carriageway as the Eagleton Quarry is proposed to. However, a Development Application (16-2011-564-3) was approved by Port Stephens Council in October 2013 (and subsequently modified in July 2015) for an upgraded racing track facility including a new intersection to provide access directly to the MG Car Club from Italia Road.

The upgraded MG Car Club race track is approved for race meetings and Supersprint and Hillclimb events on weekends, and for general track use 9am-5pm 7-days per week. Lot 1 DP 245116 and Lot 2 DP 1158962 contain the right of carriageway which benefits the proposed Eagleton Quarry site.

- Hunter Valley Paintball is located at Lot 1 DP 1108702 to the southeast of the proposed quarry, and immediately south of the existing landscape supplies operation. Hunter Valley Paintball also relies on the right of carriageway for access.
- Hunter MCC Raceway and MX Central are located at Lot 481 DP 611651 to the east of the site, between the landscape supplies operation and the Pacific Highway. Hunter MCC Raceway and MX Central also rely on the right of carriageway for access.

Surrounding Residential Properties

The nearest residential dwelling is located adjacent to the Port Stephens Gardenland landscape supplies operation which is a manager's resident for the landscaping supplies business. The owners and occupiers of this dwelling are supportive of the Eagleton Quarry proposal. The next nearest residential dwellings are located approximately 1km to the southwest of the site on Six Mile Road.

There is a single residential dwelling located to the northeast of the site, located on Italia Road between the intersections with the Pacific Highway and the right of carriageway. This dwelling is approximately 1.8 km away from the quarry site but only approximately 400m from the Pacific Highway. The nearest dwelling to the west is approximately 2km away. The location of neighbouring land uses and closest sensitive receivers are shown in **Figure 5**. A detailed adjoining properties map is provided at **Appendix C**.



Figure 5 – Surrounding Land Uses
Source: Google Maps (modified by JBA)

Future Residential Area of Kings Hill

The future Kings Hill residential area located south of Six Mile Road is predicted to result in significant residential intensification. At its most northerly extent the future R1 zoned residential area is limited to land within approximately 500m of the Pacific Highway, with the residual land zoned for large lot residential and environmental living.

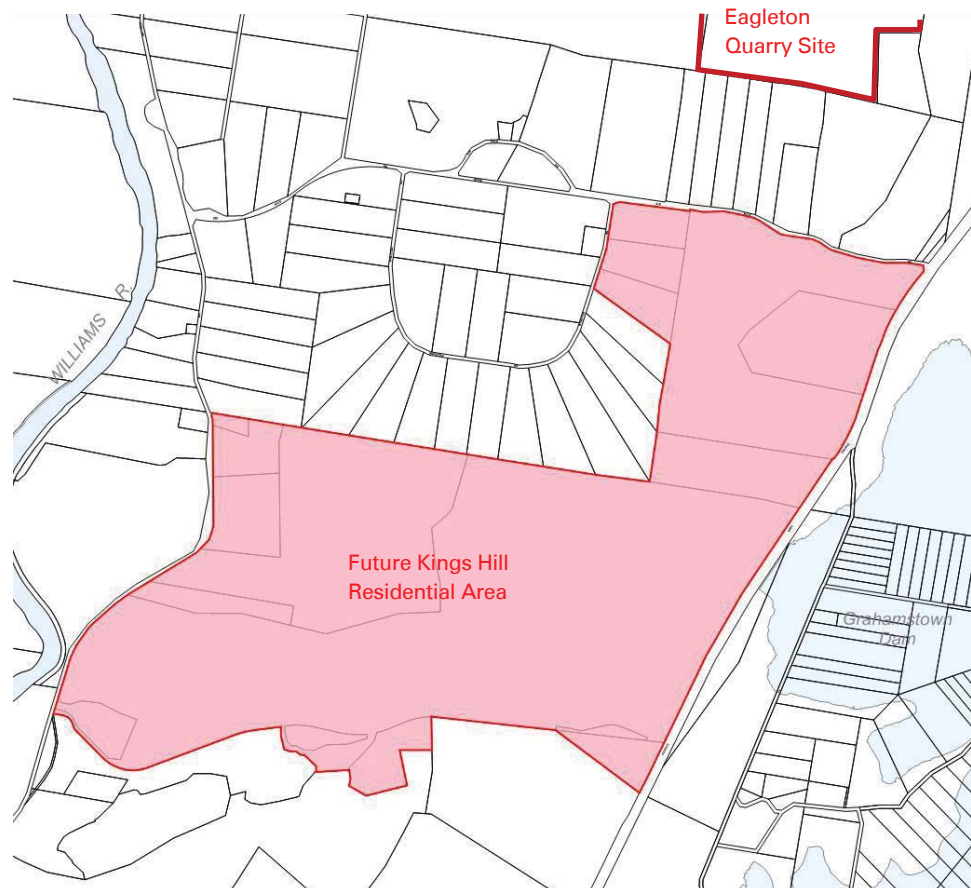


Figure 6 – Location of Future Kings Hill Residential Area
 Source: Port Stephens Development Control Plan 2014 (modified by JBA)

3.0 Project Justification and Alternatives

3.1 Resource Description

The identified resource contains a mixture of igneous and sedimentary rock formations suitable for concrete, road surfacing and road base aggregates, as described in the Preliminary Resource Assessment provided at **Appendix F**. The three main resource types include:

- Conglomerate which is a matrix of lithic sandstone comprising volcanogenic lithic fragments and lesser quartz and feldspar. The conglomerate is located at lower elevations generally in the eastern part of the proposed quarrying area.
- A porphyritic, felsic igneous rock (rhyodacite) which also contained some ignimbrite. The rhyodacite is mainly quartz and feldspar with fine groundmass, feldspar and shards of volcanic glass.
- At higher elevations to the northwest of the site a finer grained felsic igneous rock (rhyolite) has been identified, which contains higher amount of fine groundmass and correspondingly reduced quantities of quartz and feldspar.

3.2 Products and Market Demand

The resources described above have been identified as being suitable for a wide range of crushed and processed rock products used throughout the civil and construction industries including road bases, ballast aggregates, drainage aggregates, concrete aggregates and sealing aggregates.

Eagleton Rock is developing further constructions material product streams to compliment a new and dynamic quarry company. The company has detailed plans to provide high quality products backed up with long term quality and technical systems.

The proposed Eagleton Quarry would service local and regional demand for aggregate and crushed rock products. As such, most of the customers would be based in Newcastle, Central Coast and the Lower Hunter. Sydney is also a potential market for high quality concrete aggregates and road surfacing aggregates.

Demand for aggregate products will be driven by a combination of;

- Infrastructure – State or Federal spending on Roads, Rail, Ports, Schools, Housing, Hospitals etc.
- Private Investment – Commercial development, Industrial development and Residential construction

Lower Hunter's population growth for the next 20 years has been forecast by the NSW Department of Planning and Environment and is documented within the *Hunter Regional Plan 2036*. The Regional Plan has identified future development areas, principal land use types, settlement patterns and conservation outcomes. In particular, the Plan aims to:

- Ensure that sufficient employment lands are available to cater for 60 000 new jobs; and
- Plan for an additional 130,000 residents and 70,000 new dwellings.

These forecast figures indicate strong demand for quarried materials in the Lower Hunter Region and also to support the demand for materials in the Sydney Region where in recent years a number of essential reserves have been depleted.

Local projects requiring significant volumes of material in the immediate future are:

- RMS major road projects including M1 to Raymond Terrace, Singleton Bypass, Jesmond to Ranking Park, Tourle Street bridge duplication.
- Local Government road maintenance works.
- Newcastle Airport / RAAF expansion.
- Newcastle Port side land redevelopment (former BHP land).
- New Maitland Hospital.
- Commercial developments.
- Employment lands development.
- Residential development.

3.3 Objectives of the Development

The objectives of the proposed Eagleton Quarry are to establish a business providing high quality crushed rock and aggregate to meet ongoing construction demand in the Hunter, Central Coast and Sydney regions, in an efficient and environmentally sensitive manner without generating unreasonable impacts on the surrounding environment. The project seeks to provide up to 20 full time equivalent jobs during the 30 year life of the quarry.

3.4 Analysis of Alternatives

3.4.1 Option 1: Not Proceeding with any Quarry Development

As set out in **Section 3.3** above there is an identified demand for crushed rock and aggregate products. With this in mind, the alternative of not undertaking the proposed activity is not considered appropriate as there is an identified demand for the product.

Furthermore, it has been identified that growth in the Lower Hunter is expected to include the addition of 115 000 dwellings this alone will create the demand for in excess of 20MT. This growth is replicated in the continuing expansion of the coal export activities at the Port Newcastle – with the development of a new coal export terminal forecast for the coming years. The products which will be extracted from the quarry are integral to the construction industry to ensure projects can be economically and sustainably delivered. Plentiful supply is paramount to ensure efficient and economical supply of these products to the open market.

Failure to proceed with the proposed quarry will result in a limited supply of construction aggregates from a well located location capable of providing material to both the Lower Hunter region and the Sydney Market in an economically and environmentally sustainable manner. The result will be a scarcity of product, price increases and additional haulage cost to provide material from alternate location located further north such as Karuah, Port Macquarie and further south of Sydney towards Marulan.

3.4.2 Option 2: Alternative Sites

Another alternative which has been considered is the opportunity to undertake the proposed quarry activities on another site.

The site was originally identified due to its proximity to an existing quarry which quarries similar material – being the Boral Seaham Quarry to the north of the site. The proposed Eagleton Quarry will essentially extract materials from the same deposits of aggregate materials.

When identifying this opportunity, a range of alternative sites were investigated in a band between the Pacific Motorway just north of the proposed site to Martins Creek to the north west of the proposed quarry. Analysis of the alternatives informed Eagleton Rock that the proposed sites location was far more environmentally and economically sustainable due to its onsite attributes and constraints whilst also being much closer to the arterial road network.

3.4.3 Option 3: Quarry Layout

The proposed quarry layout has been optimised to consider site constraints and opportunities. Alternative layouts were dismissed due to non-conformant management of constraints and negative environmental impacts. The proposed layout and sequence of expansion limits impacts and provides a complying outcome for primary constraints including;

- Surface water
- Groundwater
- Noise impacts
- Ecology
- Air quality

The issues outlined above informed the ultimate quarry design and reflect the overall Eagleton Rock quarry philosophy which is to minimise off-site impacts by:

- operating with maximum efficiency and minimal environmental footprint,
- concentrating quarry activities, and
- avoiding double handling of material.

In addition to potential primary constraints the quarry layout and in particular the processing area will provide an efficient point of sale from the processing plant eliminating double handling of material and excessive stockpile storage areas.

The location of the internal access road has been selected to minimise conflict with the adjoining Gardenland landscape facility's operations.

3.4.4 Option 4: Quarry Access

Access to the site is via a right of carriageway over private land connecting Italia Road to Barleigh Ranch Way. A copy of DP 115227 showing the right of carriageway is attached at **Appendix B**.

There were two variations to be considered in relation to the quarry access arrangements.

- Use of the right of carriageway.
- The location of the site access connection to Barleigh Ranch Way.

Use of Right of Carriageway

The right of carriageway is currently the only legal access to the site. Consultation with the owner of the land has confirmed that there is no constraint to the use of the right of carriageway for providing access to the proposed Eagleton Quarry, subject to appropriate improvement works being implemented.

Notwithstanding this, Eagleton Rock consulted with the RMS to investigate alternative access arrangements to the site that would avoid the need to use the right of carriageway or the existing Italia / Pacific Highway intersection. In particular, as can be seen in the Adjoining Properties Map (provided in **Appendix C**), the road reserve for Barleigh Ranch Way continues eastward beyond the right of carriageway, extending for approximately 350m connecting to the Pacific Highway.

This option would involve creating a new at-grade intersection on the Pacific Highway only 650m from the existing Italia Road intersection. Eagleton Rock has consulted with the RMS in relation to the creation of a new-at grade intersection with the Pacific Highway at this location. Based on these consultations it is not considered likely that RMS would agree to the new intersection. This alternative access would also require clearing land to create a new road where one does not currently exist – with potential biodiversity and heritage impacts.

Ultimately, given the ongoing suitability of the existing access arrangements via Italia Road and the right of carriageway, and the complications associated with creating a new at-grade intersection on the Pacific Highway, it was determined that the most suitable access arrangement was to use this existing route via the right of carriageway.

Location of Driveway Connection

There were a number of possible locations identified for the site access driveway connection to Barleigh Ranch Way, as follows:

- Access driveway located to the west of the Port Stephens Gardenland landscape supplies facility, with Seven Mile Creek crossing located at the northern boundary of the Site. This option would require the construction and maintenance of approximately 900m of public road along Barleigh Ranch Way, and a sub-optimal connection of the internal access road with quarry dispatch areas due to steep grades. It would also result in maximising the vehicle conflict between landscape supplies vehicles and quarry vehicles along Barleigh Ranch Way.
- Access driveway located adjacent to the Port Stephens Gardenland landscape supplies facility, with the internal access road running through the landscape supplies facility. This option would cause logistical and safety complications for the operator of the landscape supplies business due to the close interactions that would occur between the quarry trucks and the operational areas of the landscape supplied facility.
- Access driveway located near the eastern boundary of the site, with an internal access road that follows the eastern and southern boundary of the site, minimising the demands on the public road as well as minimising the potential for conflict between the Eagleton Quarry traffic and the landscape supplies facility traffic.

The third option was selected as the preferred location for the internal site access road because it has the least impact on the adjacent Gardenland facility, is better suited to the ultimate location of the sales dispatch area, and best conforms to the site's constraints. In particular, the third option provides for a road with flatter grades, a better crossing of Seven Mile Creek (as it is at a location where

the creek and its banks are better defined and more easily spanned by a bridge), and provides for a more logical connection to the existing electricity network.

4.0 Description of the Development

4.1 Introduction

The Eagleton Quarry project is for the extraction of a hard rock reserve that is a mixture of various coarse conglomerate and fractured igneous rock. Eagleton Rock has identified rock formations in demand throughout the local, regional and Sydney civil construction and concrete markets.

The site is a greenfield site that requires new infrastructure and equipment.

The Eagleton Quarry proposal incorporates a 30 year quarry operations area of approximately 30ha which includes a processing, sales and administrative area.

The quarry layout is shown in **Figures 7, 8 and 9** and in **Appendix D** for various stages of quarrying. The following sections explain the works, activities and processes associated with the construction of the quarry and the associated infrastructure and the operation of the quarry.

4.2 Construction Activities

The following construction activities are required prior to the commencement of product delivery from the Eagleton Quarry:

- Clearing of vegetation and topsoil stripping – approximately 30ha of vegetation is required to be cleared progressively over the 30-year life of the quarry to produce the ultimate quarry footprint;
- Improvements to the access roads involving pavement reconstruction / widening and tar sealing of the access roads (subject to further design and detailed pavement design);
- Construction of stormwater quality and quantity devices.
- Construction of internal site access road and quarry haul road; and
- Establishment of a pad for processing and sales areas.

Throughout the initial works program, it is proposed materials won during these works will be used in the construction of other onsite works (i.e. blasted rock from processing pad or dams would be crushed and screed on site for use as roadbase in the construction of haul roads and access roads).

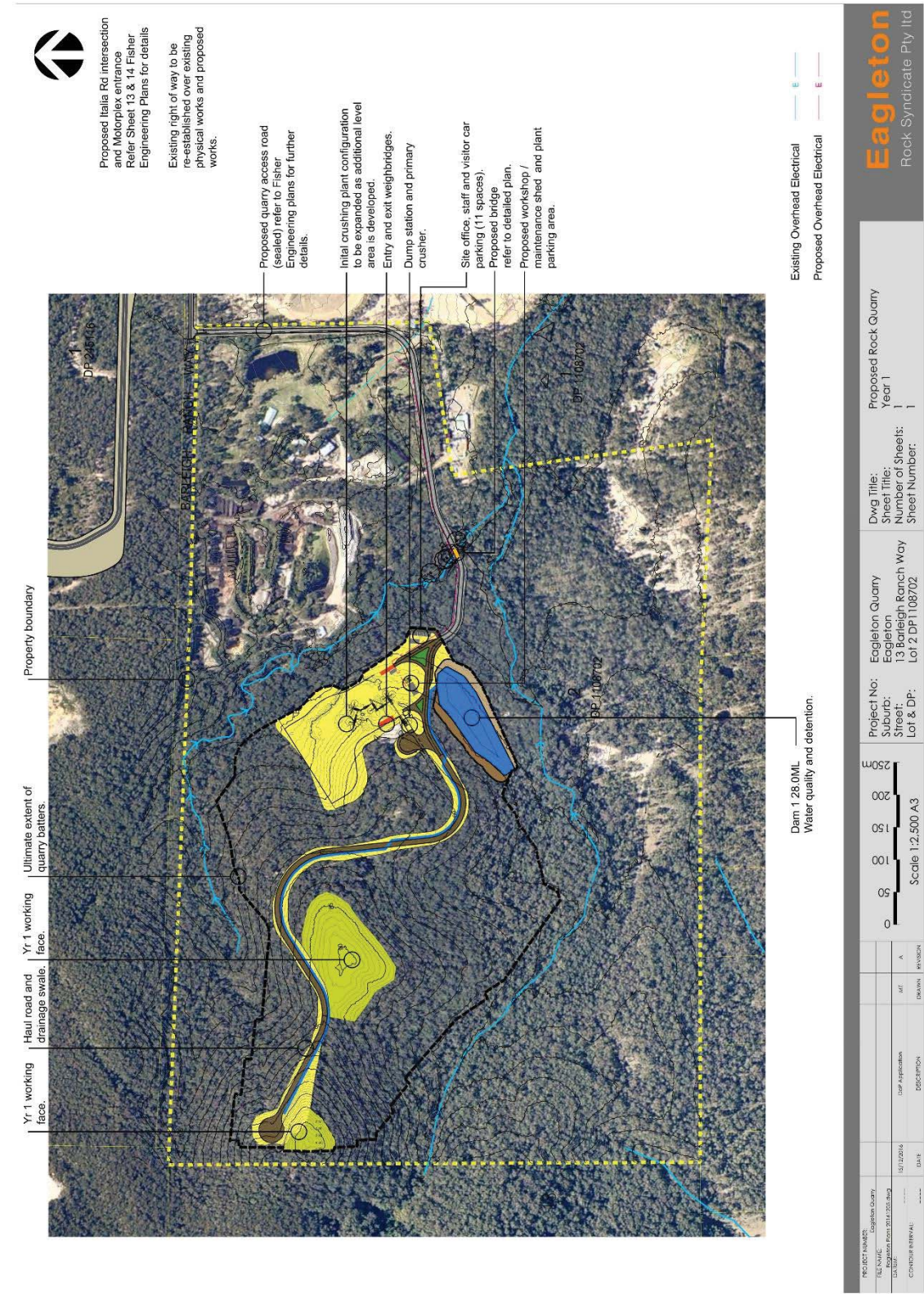


Figure 7 – Eagleton Quarry – Year 1
Source: Eagleton Rock

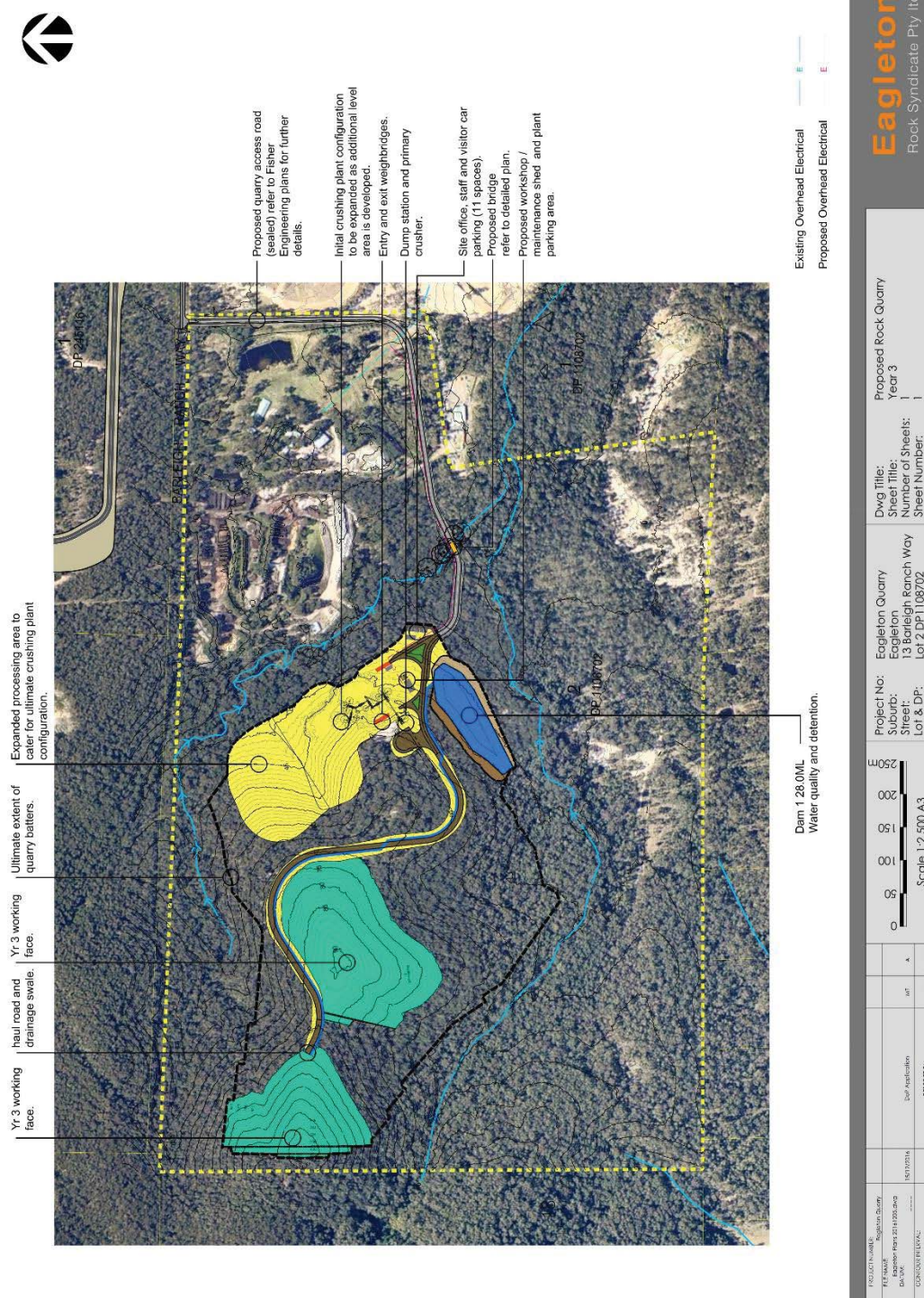


Figure 8 – Eagleton Quarry – Year 3
Source: Eagleton Rock



Figure 9 – Eagleton Quarry – Year 5
Source: Eagleton Rock

4.3 Site Access and Road Improvements

4.3.1 Barleigh Ranch Way and Right of Way

The proposal involves an upgrade to the intersection between the existing gravel road right of carriageway and Italia Road (see **Figure 4**). It is proposed to upgrade this intersection to a Major Access Driveway type intersection designed to provide for heavy road vehicles and articulated vehicles, as illustrated in Australian Standard AS 2890.2-2002.

As described in Section the existing gravel road is not located on the right of carriageway as shown in DP 115227, which is located approximately 50m to the east of the gravel road. It is intended to upgrade the existing gravel road in its current location, and to relocate the right of carriageway on the DP to reflect the location of the infrastructure. Negotiations are underway with the adjoining land owner to extinguish the existing easements, which are in the wrong location, and to establish new easements in the location of the existing access road.

The existing gravel road and the depicted length of Barleigh Ranch Way (approximately 350m) would be upgraded by improving alignment, pavement thickness, drainage and sealing the finished surface for the extents shown in **Figure 4** and **Appendix E**. The proposed sealed surface will be constructed to the relevant Port Stephens Council local road standards for a private rural road, being a 7m sealed road surface with 1m shoulders and table drains as required, and will provide an efficient access to the quarry allowing for minimal dust generation, minimal noise and minimal haulage times.

The approved MG Car Club motor racing facility will also take access from the right of way. Two access points have been approved under DA 16-2011-564-3 by Port Stephens Council. The first is located immediately south of the Italia Road intersection. The second is located approximately 650m south of the Italia Road intersection. Details of the intersection arrangements are provided in **Appendix E**.

4.3.2 Internal Site Roads

The internal site access road will be constructed to the relevant Port Stephens Council local road standards for a private rural road, being a 7m sealed road surface with 1m shoulders and table drains as required. The site access road will be established prior to the commencement of quarrying operations.

A new bridge or culvert crossing will be constructed over Seven Mile Creek. The bridge will be a 14.2m single span bridge, 7.0m wide (2 lane) with integrated kerb and handrail. The bridge will be clear of the 1:100 year flood level, and the footings will be located clear of the banks of the creek.

Haul roads within the quarry area will be unsealed gravel pavements. These unsealed roads will be maintained periodically via grading compaction rolling along with watering on as needs basis to minimise dust.

Detailed plans showing the alignment and form of the new internal site road and upgrades to existing roads are provided in **Appendix E**.

4.4 Administration Area

The administration area is located at the entrance to the main quarry on the southwestern side of Seven Mile Creek. The administration area will provide a defined entrance to the quarry, visitor car parking will be provided at this location with no unauthorised access beyond this point, only sales trucks and authorised contractors and quarry vehicles will be permitted beyond this point.

Within the administration area office accommodation, staff and visitor amenities and training room will be provided in a prefabricated/transportable form of construction. The administration area will be connected to mains power and telecommunications networks with water being collected from roofs and stored in tanks or alternatively topped up by a private supplier. Effluent disposal will be collected, treated and disposed of via a spray irrigation system onsite and will be subject to a separate Council approval or tanked offsite.

4.5 Processing Area

The processing area will comprise the working elements of the quarry where raw material will be feed into the crushing and screening plant and deposited into designated product stockpiles, mobile plant will be stored, maintained and refuelled and sales trucks will be loaded with product elements of the processing area will include the following:

- Weighbridge x 2 (way in and way out).
- Fuel storage comprising a 20 kilolitre diesel storage tank which will be designed and installed in accordance with *Australian Standard AS 1940–2004: Storage and Handling of Flammable and Combustible Liquids*, including being separately bunded to prevent any spillage from entering the surface water catchment. All tanks will have appropriate firefighting equipment and spill kits available. The storage tank will have its own integrated fuel bowser which will allow refuelling of mobile plant on a fully bunded impermeable apron. Crushing and screen plant which cannot be easily moved to the refuelling area will be refuelled via a 2,000l fully bunded fuel trailer which will be towed to the plant and refuelled in that location. The fuel trailer will have a spill kit fitted at all times.
- A maintenance shed will be installed with dimensions of 24m long x 12 m wide x 12m high. This shed will house tools, oxy acetylene gas equipment, welders, bearings, hardware, steel, screen cloths and general operation stock. This shed would also house small volumes of greases, oils and other chemicals (such as cleaner, degreasers and plant/equipment fluids).
- Processing plant as detailed in section 4.7.
- Silo for the storage a stabilising additives (cement or lime type products) for roadbase production.
- Product stockpiles.
- Sales truck circulation road.

4.6 Extraction and Processing

This proposal involves quarrying conglomerate, rhyodacite and rhyolite materials from a nominal starting volume of 150,000tpa to a maximum extraction rate of 600,000 tonnes per annum within the first 5 years of operation.

4.6.1 Drilling and Blasting

The quarrying process will involve traditional drill and blasting techniques to produce rock fragments suitable for haulage to the processing plant where further processing to reduce size and improve shape will take place.

It is proposed that the Eagleton Quarry would require approximately 1 blast per month (up to 12 per year). Blasting will take place during regular operating hours and only occur during favourable weather conditions to minimise impacts. Blasting would not take place on weekends or during the night time or evening periods (including early mornings).

It is proposed two working faces will be operational and the pit will develop as depicted in the quarry development plans working towards creating the ultimate pit landform which at the completion will be rehabilitated as per the rehabilitation plan.

Importantly, quarrying will advance generally in a north to south direction in 5 metre bench heights to ensure an operating face is maintained between the extraction area and receptors to the south. Sections illustrating this are shown in **Figure 10**.

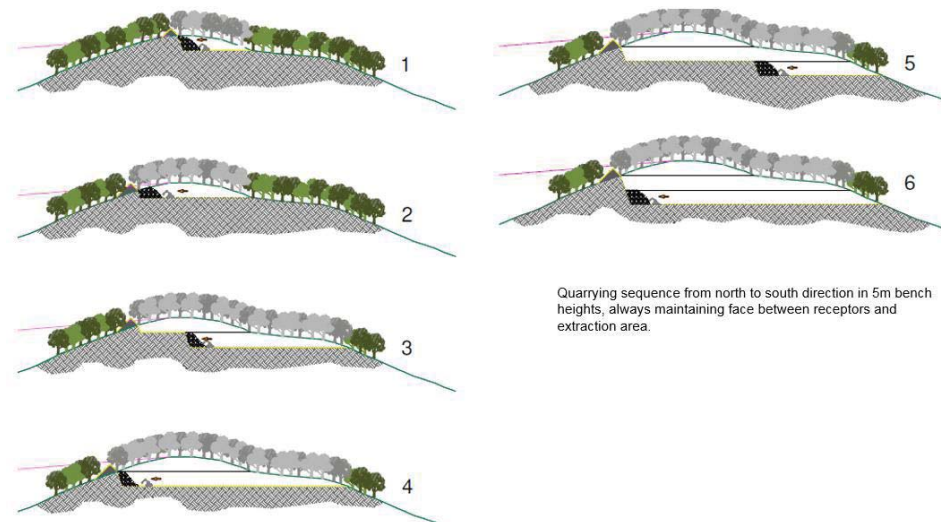


Figure 10 – Approach to Extraction
Source: *Eagleton Rock*

4.6.2 Processing

Blasted material will be loaded by excavator and hauled from the pits active faces with articulated dump trucks to the dump bin feed directly to the primary jaw crusher in the processing area.

Initially, the processing area will have limited space available for equipment. The initial quarry set up will therefore utilise mobile diesel powered processing equipment. The mobile diesel powered plant will be progressively phased out as processing area restrictions are relieved and replaced with modular equipment that will ultimately be electrically powered.

Processing equipment located within the processing area will include the following sequentially aligned plant:

- Dump station – a elevated dump bin where articulated dump trucks discharge quarried material which is then feed directly into the jaw.
- Jaw Crusher – Machine designed to crush and break up the materials in a vertical manner.
- Screens – Machinery used as a fines extract and grader of material then outputting clean graded material.
- Cone Crushers – Machines designed to crush and break up the material by squeezing and spinning the material.
- Screens – Machinery used as a fines extract and grader of material then outputting clean graded material.

- Pugmill (when required) – Machine designed to introduce additives to produce specific road base products.
- Impactor VSI – Machine that uses a rock lined spinning rotor to accelerate material before being impacted in a rock lined crushing chamber.
- Screens – Machinery used as a fines extract and grader of material then outputting clean graded material.
- Stackers – Machines used to convey material into stockpiles.

A water truck will operate throughout the site periodically to maintain moisture content in unsealed roads to minimise dust generation.

Figure 11 illustrates the proposed layout of the plant and equipment in the ultimate configuration (i.e. based on the electric equipment). **Figure 12** diagrammatically depicts the quarry product processing process. The processing equipment is optimised to produce materials of demand in an efficient and economical way.

To minimise impacts of noise emissions from the quarry noise barriers next to the jaw crusher and cone crushers have been included in the development proposal and are detailed within the Noise Impact Assessment report presented in **Appendix J**. Additional temporary noise barriers will be provided around the crushers during the initial diesel powered plant period.

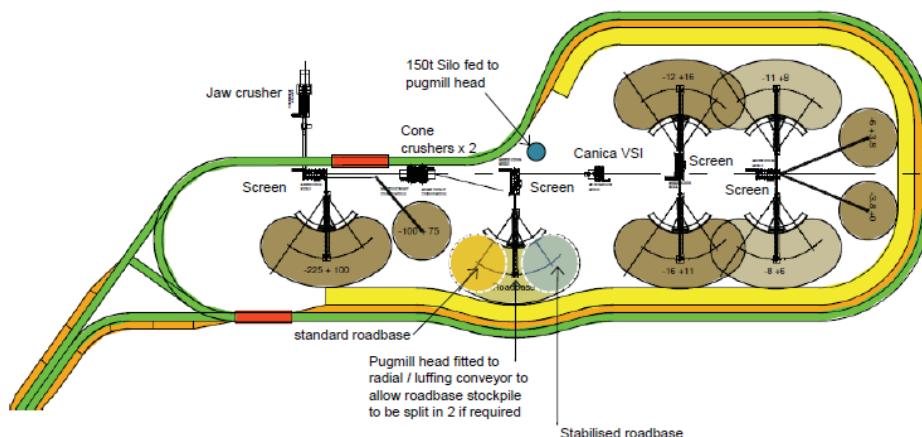


Figure 11 – Details of Processing Area (Ultimate Configuration)

Source: *Eagleton Rock*

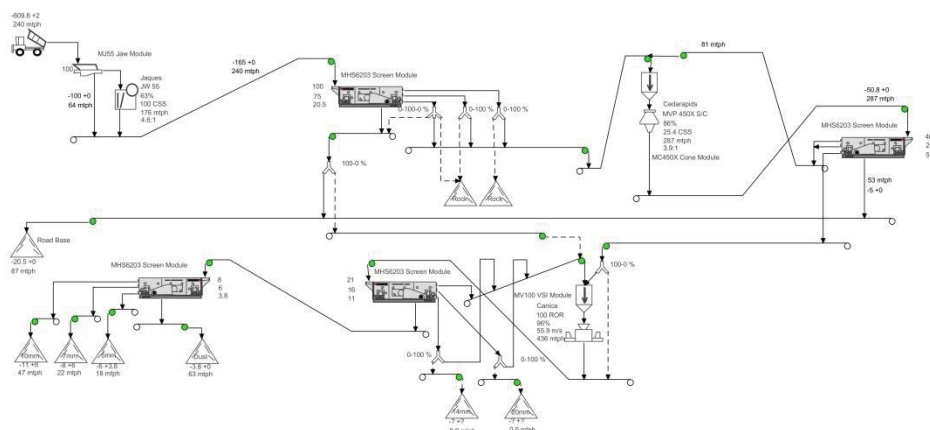


Figure 12 – Process Diagram

Source: Eagleton Rock

4.6.3 Sales and Maintenance

Processed materials will be loaded into sales trucks using two mobile loaders across the two processing areas.

4.7 Operation Hours

Operational quarry activities will be split into the following categories:

- **Extraction and Processing** – Includes all activities related to establishing, drilling and blasting, constructing, winning and processing material.
- **Sales** – The loading of processed materials from stockpiles into sales trucks and the management of existing stockpiles
- **Maintenance** – Related to scheduled and unscheduled maintenance of plant and equipment. Note this does not include civil or construction type maintenance.

Proposed processing and extraction activities are proposed as 7:00am – 6:00 pm Monday to Friday and 7:00am to 4:00pm Saturdays. Scheduled maintenance would generally be limited to processing hours. However, in the event of urgent unscheduled maintenance that cannot be completed within this period, maintenance works may need to be undertaken anytime 7 days per week.

Sales activities would be 5:00am to 10pm Monday to Friday and 5am-4pm Saturdays.

4.8 Services and Utilities

Electrical services to the site will be connected via an extension of the existing 11kva supply which currently services the property including the existing landscape supplies business. It is planned to extend this power to new administration and processing area via a new transmission line following the new internal site access road. An upgrade to this existing connection to provide additional capacity would involve the installation of a 750kw substation. The increased capacity will enable the quarry operation to consider the viability of converting the processing plant to electric power source, reducing fuel burn and switching to a cleaner more efficient power source.

The site is currently not serviced for disposal of effluent or potable water. Potable water needs will be met by purchased town water supplied by tanker trucks.

Effluent disposal will be either pump out or on site disposal via a treatment and spray irrigation system. These arrangements will be subject to separate Council approval prior to the commencement of quarry operations.

4.9 Water Management

A detailed Water Management Plan has been prepared by Umwelt Australia and is provided at **Appendix M**. The Eagleton Quarry has been designed to be self-sufficient in terms of water supply. Water running from all operational areas, including extraction areas, processing and sales, and haul roads, will be conveyed to stormwater dams.

The first dam will be installed during the initial construction period prior to any quarrying commencing

The second dam will be installed at the critical point of disturbed area which would trigger the requirement for additional volume for detention storage, this is at approximately year 5 of quarrying operations.

4.10 Employment

Site will be staffed by a combination of permanent employees and contractors. Generally, there will be around 10 staff working and 10 contractors on site at any given time including:

- 1 x Quarry Manager;
- 1 x Production Manager;
- 6 x Plant operators;
- 2 Office administrator / sales staff;

In addition, approximately 10 specialist contractors will be brought to the site on a needs basis to perform specific tasks i.e. hydraulic fitter, drill and blast and various technicians.

These figures do not include haulage operators which at a peak production of 600,000tpa would generate the need for approximately 20 - 25 additional full time jobs based on average 2-hour round trip.

4.11 Material and Vehicle Movements

The majority of daily vehicle trips generated by the proposed quarry development will be from sales and subsequent truck returns after delivery of quarry materials. These trips would be spread across a full day of quarry operations.

Vehicle movements to quantify traffic volumes are calculated based on sales estimates. Trucks picking up product generally average 32 tons in a truck & dog. Based on an output of 600,000 tonnes per annum approximately 18,750 heavy vehicles per year hauling product offsite would be required.

This equates to approximately 85 sales trucks dispatched per day, or approximately 170 truck movements per day (in/out). Most sales trucks are expected to be dispatched to locations within the Newcastle, Lower Hunter and Lower North Coast regions.

The site would also receive fuel and other supplies, notably bulk lime for pug mill operations, by regular truck deliveries. It is estimated that these would be up to 10 deliveries per week, or two per day on average.

Staff vehicle movements would result from the 10 (maximum) staff members arriving and leaving by car, 6 days a week. Operational and sales related staff vehicles would generally arrive before the sales trucks and leave after the sales activities for the day are complete, and so there would be minimal overlap.

An analysis of the potential impacts on traffic from the proposed development is provided in **Section 7.3**.

4.12 Quarry Development and Staging

The quarry will be progressively developed over an approximate life span of 30 years. The prepared development plans as presented in **Appendix D** sets out the proposed works and areas of disturbance over time as follows:

- Construction Phase – Quarry establishment period including the construction of access road, haul roads, intersections, stormwater devices, initial processing area, administration area.
- Operation Year 1 – Establishment of extraction areas involving clearing, drill and blast and extraction of material ready for haulage to the processing area via the haul roads established during the construction phase. See **Figure 7** for Year 1 quarry extent.
- Operation Year 1 to 5 – Expansion of the initial extraction areas through creating benches and faces and expanding the processing area to accommodate a more efficient plant layout and stockpile configuration. Processing area will transition from diesel powered processing equipment to electric powered processing equipment near the end of this period. Additional water quality and quantity control devices will be implemented including the construction of a second dam. See **Figure 8** for Year 3 quarry extent.
- Operation Year 5 onwards – Expansion of the initial extraction areas through creating benches and faces. **Figure 9** presents the Year 5 quarry extent along with the ultimate quarry footprint.

4.13 Closure and Rehabilitation

A Rehabilitation and Closure Management Plan has been prepared by SLR and is provided at **Appendix Q**. The Rehabilitation and Closure Management Plan will be progressively reviewed and updated over the life of the operation, and a Final Rehabilitation and Closure Plan will be completed at least three years prior to the planned completion of the operations.

The area is dominated by Seaham Spotted Gum – Ironbark Forest with Hunter Valley Moist Forest interspersed. The broad rehabilitation objective for the post-quarry landform is to establish a similar land use on the disturbed areas. **Figure 13** illustrates the final landform conceptual layout.

The proposed quarry operation will result in a final landform that comprises a series of 10 m wide and 15 m high benches at the western end of the quarry, in an amphitheatre configuration. Each stepped bench will be revegetated.

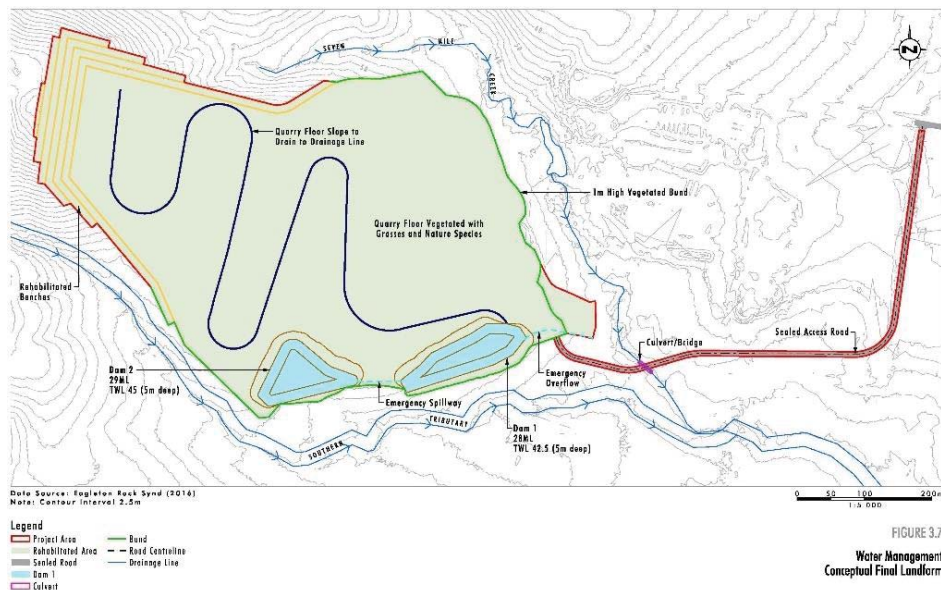


Figure 13 – Final Landform Water Management Plan
Source: Umwelt

The final pit/void will be approximately 28.6ha in area. Until such time that extraction has ceased, rehabilitation will occur around the perimeter of the pit only along the benches, and will not involve the pit floor.

Once operations have ceased, all buildings and infrastructure will be removed. These areas will be reshaped and ripped where necessary for topsoiling and revegetation. The pit floor (void area) will be vegetated with appropriate native species to create a stable wetland. The wetland will be formed as a shallow depression with the low point in the location of the final retention pond in the south-east corner of the void.

Elements such as drainage paths, contour drains and ridgelines will be shaped, as much as practical, to undulating profiles in keeping with natural landforms of the surrounding environment.

The floor of the quarry will have an overall slope of approximately 0.5% and will drain along varying drainage line alignment from the benched section at the western end of the quarry to the water storage dams at the south-eastern boundary of the extraction area. The floor of the quarry will be predominantly free draining and will not have a final void. Several minor depressions will however be created along the in the alignment of the drainage line. These minor depressions will help reduce erosion potential, enhance the sediment trapping capacity and in the longer term increase habitat value of the quarry floor which is to be vegetated with native species.

The minor depressions will also provide a passive mechanism for groundwater recharge into the underlying stratum. This will assist in offsetting the predicted 13.5 ML/year reduction groundwater recharge as a result of groundwater seeping from the elevated benched area the western edge of the proposed quarry onto the quarry floor.

In order to limit impacts to surface water systems it is proposed that the quarry water management system will remain in place until the water quality from the quarry area meets the target objectives. With the use of vegetation and only limited exposed inert rock, it is expected that there will be limited risk of impacts on surface water post-closure.

As part of decommissioning the quarry at the end of the Project, water management dams will either remain in use for identified and approved future land uses or will be removed. If the dams are to be retained, the required capacity of the dams will be assessed and modified as necessary.

Some of the proposed diversion drains and channels will remain in place as part of the final landform in circumstances where they are considered to be stable in the long term and where required to minimise erosion.

All areas disturbed by removal or modification of water management structures will be reshaped and revegetated. The measures required to effectively decommission the water management system and the water management controls required in the final landform will be considered in further detail as part of the detailed quarry closure planning process.

5.0 Legislative Framework and Strategic Context

5.1 Commonwealth Legislation

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) encompasses an assessment and approvals system for:

- Actions that have a significant impact on matters of National Environmental Significance (NES);
- Actions that have a significant impact on the environment of Commonwealth land; and
- Actions carried out by the Commonwealth Government.

An EPBC Act Online Database search has been undertaken for the project and the results are included at **Appendix G**. The matters of NES are listed below, and the relevance of each matter of NES is summarised as follows.

- World Heritage areas: There are no World Heritage Areas within the locality. The proposed proposal will therefore not affect any World Heritage Area.
- National Heritage Places: There were no National Heritage Places identified within the locality, so the proposal will not impact upon any National Heritage Places.
- Wetlands protected by international treaties (i.e. the Ramsar Convention): The closest Ramsar site is the Hunter Estuary Wetlands which includes Kooragang Nature Reserve. The proposed site is over 10km from the Kooragang Nature Reserve and will not impact upon the Hunter Estuary Wetlands or any other Ramsar site.
- Nationally listed threatened species and ecological communities: A total of 30 Threatened species listed under the *EPBC Act* have been identified by the *EPBC Act* online database Search as likely to occur within the locality. A number of these species, however, are confined to oceanic habitats (e.g. albatrosses and whales) and would therefore not occur within the subject site. All the 'non oceanic' Threatened species identified by the *EPBC Act* online database search as potentially occurring on the quarry site are addressed in Section 7.3. The assessment concludes that the proposed development is considered unlikely to have a significant impact on EPBC Act-listed threatened species and a referral to the Commonwealth is not required.
- Nationally listed Ecological Communities: The subject site does not support any Threatened Ecological Communities listed under the EPBC Act.
- Nationally listed migratory species (i.e. CAMBA, JAMBA agreements): While the subject site contains known and/or potential habitat for some migratory species, this habitat represents a very small area of habitat for migratory species in the context of available habitat in the locality and region. The vegetation proposed to be removed from the proposed extraction area could therefore not be considered to represent an important area of habitat for any migratory species and the proposal is considered unlikely to cause a significant impact on listed migratory species.
- All nuclear actions: The proposal does not constitute a nuclear action.
- The environment of Commonwealth marine areas: The proposal will not affect any Commonwealth marine areas as the site is located inland.

In addition to the matters of NES, other matters protected by the EPBC Act include the following:

- **Commonwealth Lands:** Seven items have been identified within the locality of the site, however these do not occur in close proximity to the site and will therefore not be affected by the proposal.
- **Commonwealth Heritage Places:** Two Commonwealth Heritage Places have been identified near the site, being the Salt Ash Weapons Range and Williamstown RAAF Base Indigenous Sites. These are located well away from the site and will not be affected by the proposal.
- **Places on the Register of the National Estate (RNE):** Six places listed on the RNE have been identified in the search area, being Seaham Swamp Nature Reserve, Salt Ash Weapons Range, Williamstown RAAF Base Indigenous Sites, Post Office (former), King Street Urban Conservation Area and Raymond Terrace Courthouse and Police Station. These are located well away from the site and will not be affected by the proposal.
- **Listed Marine Species:** No marine habitats occur within the site and the habitat proposed to be removed is unlikely to represent an area of important habitat for listed 'terrestrial marine' species. The proposal is therefore unlikely to cause a significant impact on listed marine species.
- **Whales and Other Cetaceans:** The site does not contain habitat for whales or other cetaceans.
- **Critical Habitats:** No critical habitats listed under the *EPBC Act* have been identified within the search area.
- **Commonwealth Reserves.** No Commonwealth Reserves have been identified within the search area.

The proposed development is not considered to be a 'controlled action' as no potentially significant impacts on matters of NES have been identified and the proposal will not impact the environment of Commonwealth land. As such, no referral to the Commonwealth is considered necessary.

5.2 Planning Legislation

5.2.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act) governs the approvals process for developments in the State. Part 4 of the EP&A Act provides the legislative framework for development requiring consent, including the preparation, assessment and determination of development applications.

Section 89C of the EP&A Act provides that a State environmental planning policy may declare development to be State Significant Development (SSD). As detailed in **Section 5.4.1** below, the proposed quarry development is a type of development declared by the S&RD SEPP to be SSD.

The Minister for Planning is the consent authority for SSD, however the Minister has established delegations meaning this development application will be determined by the Planning Assessment Commission or officers of the Department. Section 89H requires that the matters for consideration listed in section 79C of the EP&A Act are taken into consideration in determining a development application for SSD. This EIS provides an assessment that enables all of these matters to be considered by the Minister (or delegate).

Section 89J of the EP&A Act specifies legislative approvals that are not required in regards to an approved SSD. In particular, approvals under the following legislation are not required if the SSD application is approved:

- An Aboriginal Heritage Impact Permit under section 87 or section 90 of the National Parks and Wildlife Act 1974 (NPW Act) to affect or destroy an Aboriginal object.
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* to clear native vegetation.
- A controlled activity approval under section 91 of the *Water Management Act 2000*.

Section 89K of the EP&A Act specifies legislative approvals which must be applied consistently with a SSD consent. Approvals under the following legislation identified in Section 89K are expected to be required for the proposed Eagleton Quarry:

- Consent from Port Stephens Council under Section 138 of the *Roads Act 1993* to carry out works to a public road.
- An Environment Protection Licence issued by the Environment Protection Authority under Chapter 3 of the *Protection of the Environment Operations Act 1997*.

Approvals under the *Roads Act 1993* and the *Protection of the Environment Operations Act 1997* will subsequently need to be obtained if the Eagleton Quarry is approved.

5.2.2 Environmental Planning and Assessment Regulation 2000

The *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) sets out procedures that relate to preparation and submission of EISs. In particular, Schedule 2 of the EP&A Regulation sets out:

- The process for obtaining SEARs.
- Requirements relating to the form and content of an EIS.

This EIS has been prepared in accordance with Schedule 2 of the EP&A Regulation.

5.3 Other State Legislation

5.3.1 Roads Act 1993

The Eagleton Quarry project includes carrying out of works that affect public roads as follows:

- Improvements to Barleigh Ranch Way, being minor widening, grading, and creation of a bitumen sealed surface.
- Construction of an upgraded intersection connecting the existing Right of Carriageway with Italia Road.

Consent from Port Stephens Council under Section 138 of the *Road Act 1993* will be required for these works. However, as described above, the Section 138 Roads Act consent must be consistent with any SSD consent that is issued.

5.3.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) regulates operations which have the potential to harm the environment. The proposed development is a type of activity listed under Schedule 1 of the POEO Act as the quarry is expected to extract up to 600,000 tonnes per annum. Clause 19 of Schedule 1 of the POEO Act specifies that a land-based extractive industry involves the extraction, processing or storage of more than 30,000 tonnes of extractive material per year requires an Environment Protection Licence (EPL).

As such, the proposal would constitute a scheduled activity, and an EPL will be required. Section 89K of the EP&A Act establishes that if the Eagleton Quarry is approved then the EPL issued for the Eagleton Quarry is required to be consistent with the SSD consent.

5.3.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) regulates activities that are likely to impact on items of Aboriginal cultural heritage value or Aboriginal archaeological significance.

One Potential Archaeological Deposit will be impacted by the proposal, and this will be subject of sub-surface investigations prior to construction commencing in accordance with the OEH's *OEH Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales*.

However, as described above, Section 89J of the EP&A Act sets out that an Aboriginal Heritage Impact Permit is not required for an approved SSD.

5.3.4 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) identifies threatened species and populations, and endangered ecological communities which are protected in NSW. A number of these species are likely to occur or may possibly occur at the site, and these have been assessed in **Section 7.3** in accordance with the SEAs.

5.3.5 Water Management Act 2000

The Eagleton Quarry has been designed to minimise impacts on the surface water system. In particular, the area of proposed quarry operations has been selected in order to avoid the need to modify the existing site drainage channels, being Seven Mile Creek (to the east of quarry operations) and minor intermittent tributary to Seven Mile Creek located to the south of quarry activities.

Seven Mile Creek is identified a third order stream under the Strahler system, and its on-site tributary is identified as a category 1 stream. In accordance with the NSW Office of Water's *Guidelines for Riparian Corridors on Waterfront Land* the appropriate vegetated riparian corridor width on each side of the stream are 20m and 10m respectively. Quarry activities will generally be located outside of riparian corridor for these watercourses.

Notwithstanding the above, it is highlighted that the project involves the construction of a new road over Seven Mile Creek, which include the installation of a new bridge. The installation of the bridge and the carrying out of construction works for the internal onsite access road will require works within the vegetated riparian corridor of Seven Mile Creek. As such, but for Section 89J of the EP&A Act a controlled activity approval issued under Section 91 of the *Water Management Act 2000* from the NSW Office of Water would have been

required for such works. However, as described above, Section 89J provides that a controlled activity approval is not required for approved SSD.

The project is also expected to intercept groundwater. Groundwater within the proposed Eagleton Quarry site is managed by Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources under the *Water Management Act 2000*. The plan commenced in July 2016 and operates for a period of 10 years. The plan establishes rules for sharing water between different types of water and provides users with opportunities to trade water through separation of land and water.

An analysis of the consistency of the proposal with the Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources rules for this groundwater source area is provided in **Appendix M** indicates that the proposal is consistent with the rules.

The proposed quarry will penetrate the local aquifer through extraction operations, so an aquifer interference approval issued by the NSW Office of Water under Section 91 of the *Water Management Act 2000* will be required.

5.3.6 Water Act 1912

Whilst the *Water Act 1912* has been replaced in some parts of the State by the *Water Management Act 2000*, it still applies in certain areas and in relation to certain water resources.

In relation to the Eagleton Quarry, since the Water Sharing Plan for the Porous and Fractured Rock Groundwater Sources has commenced the groundwater resources in the vicinity of the site are no longer regulated under Part 5 of the *Water Act 1912*.

5.3.7 Summary of Other Approvals Required

In addition to development consent, the following approvals are expected to be required:

- An EPL from the EPA under the *Protection of the Environment Operations Act 1997*.
- An approval from Port Stephens Council as the Roads Authority under Section 138 of the *Roads Act 1993* for works to Italia Road and Barleigh Ranch Way.
- A, Aquifer Interference Approval issued by the NSW Office of Water under the *Water Management Act 2000* for works that impact on groundwater resources.

But for the application of Section 89J of the EP&A Act, the following approvals would have been required:

- A controlled activity approval issued under Section 91 of the *Water Management Act 2000* for controlled activity works on waterfront land.
- Aboriginal Heritage Impact Permit under the *National Parks and Wildlife Act 1974*.

5.4 Statutory Planning Instruments

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

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) was adopted on 1 October 2011 and identifies SSD. Pursuant to clause 7 of Schedule 1 of the SRD SEPP, the development of the Eagleton Quarry is declared to be SSD, because it would extract from a total resource (the subject of the application) of over 5 million tonnes.

Clause 11 of the SRD SEPP also states that development control plans do not apply to SSD. As such, the *Port Stephens Development Control Plan 2013* does not apply to the development.

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

Clause 12 of the SEPP requires that the consent authority consider the compatibility of the proposed extractive industry with the surrounding land uses – both existing land uses and likely future preferred uses. The existing surrounding land uses are described in **Section 2.4** and are generally limited to a quarry, rural industries, and entertainment facilities that are not sensitive land uses and would not be considered to be incompatible with the proposed quarry. The nearest off-site residential dwellings are located approximately 1km to the southwest of the site along Six Mile Road. The minimum lot size is 40ha, indicating that intensification is unlikely to occur in the near future. Environmental assessment through this EIS has determined that the quarry can operate without causing significant amenity impacts to these nearest residences. As such, the proposed Eagleton Quarry is considered to be compatible with existing and likely future surrounding land uses.

Clause 15 of the SEPP requires the consent authority to consider the efficiency or otherwise of the development in terms of resource recovery. The proposed quarry will extract the rock resource in an orderly and efficient manner over a period of 30 years, taking into account site environmental constraints.

Clauses 14, 16 and 17 relate to the requirement of the consent authority to consider the imposition of conditions relating to natural resource management, environmental management, transport and rehabilitation.

The site is not identified in Schedule 1 of the SEPP, which specifies land on which extractive industries are prohibited.

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

The site of the proposed quarry activities largely comprises native vegetation. Whilst agricultural uses are likely to have occurred in the past it is unlikely that any substantial ground contamination is present. A Phase 1 Contamination Assessment has previously been carried out for the adjacent Gardenland landscape supplies facility which included a review of historical information and searches of relevant databases.

Searches of databases identified that:

- The site is not listed on the EPA's Contaminated Sites Register.

- There is no record of the storage of dangerous goods at the site (Work Safe NSW).
- The Section 149 Certificate does not identify any critical habitats, conservation areas, mine subsidence issues or contamination notices at the site.

Based on a review of the available historical information, prior to its use as a landscape supplies facility the site appeared to be used for quarrying and prior to this it was vacant bushland. The aerial photography identifies that in 1958 the proposed quarry site was partially cleared, however by 1993 (when the area to the east of the creek was used for quarrying) the Eagleton Quarry area had been almost fully revegetated except for a series of tracks and trails running throughout the site.

Since the commencement of operations of the Gardenland facility in 2000 a small section of the proposed quarry site has been cleared – this is part of the section where the processing area is proposed to be located. Based on a site walkover this part of the site appears to have been subjected to the placement of reject ceramic tile fragments. It is proposed to validate the reject tile fragments in accordance with the criteria set out in the EPA's Recovered Aggregate Exemption 2010 and then to reuse them as crushed aggregate material for the purposes of internal site and haulage road construction and for ground preparation of the processing areas.

Based on the above there is no evidence to suggest that ground contamination is currently causing a risk of harm to the environment. Given that the proposed land use is consistent with the existing and previous uses on the land near the site (i.e. quarrying and landscape supplies) the site is considered to be suitable for the proposed quarry land use.

No remediation is considered necessary, or proposed.

The proposed development involves substantive land forming including relocation of topsoils and extraction of rock. If areas of ground contamination become apparent during the land forming activities, then the EPA will be notified and appropriate controls will be implemented to prevent impacts on the surrounding environment.

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

Preferred koala fee tree surveys identified that approximately 20% of the canopy trees in the woody vegetated area consist of *Eucalyptus punctata* (Grey Gum), which is listed under Schedule 2 of SEPP 44. The site is therefore determined to be potential Koala habitat.

Port Stephens Council has implemented a Comprehensive Koala Plan of Management (CKPoM) which identifies the Eagleton Quarry site as being Marginal Koala Habitat. Marginal Koala Habitat as defined by the Plan of Management as the lowest Community based survey category, essentially being all forested areas which are neither Preferred nor Supplementary Koala Habitat.

An assessment of potential impacts on koala is provided in **Appendix H**. The assessment was carried out in accordance with the CPKoM, with particular reference to the *Guidelines for Koala Habitat Assessments* set out in Appendix 6 of the CPKoM, and the performance criteria set out in Appendix 4.

Compliance with the provisions of the CKPoM will constitute compliance with the provisions of SEPP 44.

5.4.5 Port Stephens Local Environmental Plan 2013

The site is located within the Port Stephens Local Government Area (LGA) and as such the provisions of the *Port Stephens Local Environmental Plan 2013* (Port Stephens LEP) apply. The relevant clauses of the Port Stephens LEP are described below.

Under the Port Stephens LEP the site is zoned RU2 – Rural Landscape. The proposed development is permissible with consent under this zone.

Clause 5.9 relates to the preservation of trees. The proposal will require the clearing of vegetation, and consent the removal of this vegetation is sought by this Development Application. An assessment of the biodiversity impacts is provided in **Appendix H**.

Clause 7.1 relates to Acid sulfate soils. The site is classified as Class 5 under the LEP's Acid Sulfate Soils Map, and is not within 500m of Class 1, 2, 3 or 4 land. As such, this clause does not apply.

Clause 7.6 relates to the provision of services. The proponent has a strategy for delivering services to the site, as described in **Section 4.8**.

Clause 7.8 of the Port Stephens LEP relates to drinking water catchment. The site is located within the drinking water catchment for Grahamstown Dam. Clause 7.8 states that:

- (3) *Before determining a development application for development on land to which this clause applies, the consent authority must consider the following:*
 - (a) *whether or not the development is likely to have any adverse impact on the quality and quantity of water entering the drinking water storage, having regard to the following:*
 - (i) *the distance between the development and any waterway that feeds into the drinking water storage,*
 - (ii) *the on-site use, storage and disposal of any chemicals on the land,*
 - (iii) *the treatment, storage and disposal of waste water and solid waste generated or used by the development,*
 - (b) *any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*
- (4) *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*
 - (a) *the development is designed, sited and will be managed to avoid any significant adverse impact on water quality and flows, or*
 - (b) *if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*
 - (c) *if that impact cannot be minimised—the development will be managed to mitigate that impact*

Other controls within the Port Stephens LEP are not expected to be relevant to the proposed Eagleton Quarry.

5.4.6 Port Stephens Development Control Plan 2014

The *Port Stephens Development Control Plan 2007* (Port Stephens DCP) applies to all land within the Port Stephens Local Government Area. This document provides principles and controls for development in the Port Stephens area in relation to the development that requires consent under Part 4 of the EP&A Act. As the proposed development is SSD, the provisions of the Port Stephens DCP

do not apply. However, the proposed development is expected to be able to generally comply with the relevant controls of the Port Stephens DCP.

5.4.7 Port Stephens S94 Development Contributions Plan

The *Port Stephens S94 Development Contributions Plan 2007* (S94 Plan) provides for extractive industries and sets out a rate of contribution for road haulage from industries that cause heavy vehicle movements. Council has indicated that a Heavy Vehicle Haulage Fee will be required under the S94 Plan.

The contribution rate is to be established from a Transportation and Economic Assessment Study to be prepared by the proponent. This study is to identify the impact the increased traffic generated by the development will have on the local road system, with consideration of the existing condition of the specific road(s), its classification, the cost of road repairs on the specific length and the relative increase in heavy vehicle usage of the road generated by specific development.

The S94 Plan also provides that where a developer chooses not to undertake a Transportation and Economic Assessment Study, a nominal contribution of 4 cents per tonne per kilometre of haul route will be levied.

Eagleton Rock has not prepared a Transportation and Economic Assessment Study, and proposes to Council a Heavy Vehicle Haulage Levy of 4c per tonne per km for transportation of quarry products on Italia Road, between the Right of Carriageway and the intersection with the Pacific Highway (a distance of approximately 450m). Based on an annual output of 600,000 tonnes this equates to \$24,000 per annum.

In addition, Eagleton Rock would upgrade Barleigh Ranch Way at its own expense to ensure it meets the criteria for trafficable widths and other road safety requirements set out under the ARRB's *Unsealed Road Design Guidelines*, March 2009, and will maintain it as such for the life of the quarry operations.

This approach is considered to be consistent with the S94 Plan in that Council will receive a Heavy Vehicle Haulage Fee for haulage along public roads for which it is required to manage and maintain.

5.5 Strategic Framework

5.5.1 Hunter Regional Plan 2036

By 2036, an additional 130,00 people are expected to be living in the Hunter region. The *Hunter Regional Plan 2036* aims to guide the delivery of homes, jobs, infrastructure and services to support the growing and changing needs of the Hunter. The Regional Plan provides an overarching framework to guide development and investment in the Hunter region to 2036.

In preparing the Regional Plan the NSW Government has acknowledged the growing importance of Greater Newcastle and set the following regionally focused goals:

- The leading regional economy in Australia
- A biodiversity-rich natural environment
- Thriving communities
- Greater housing choice and jobs

The Hunter region has an estimated 322,000 jobs and this is projected to increase to 384,000 by 2036. The Plan aims to strengthen the region's economic resilience, protect its well-established economic and employment bases and build on its existing strengths to foster greater market and industry diversification.

In particular, the completion of the Pacific Highway upgrade has cut travel times offering opportunities for industries to expand and supply products to Greater Newcastle and Sydney. This will act as a catalyst for employment growth. Attracting new industries and growing existing industries that can leverage the accessibility provided by the Pacific Highway will support economic growth.

Direction 13 identifies that, whilst ongoing investment in rural and resource industries underpins the sustainable growth, economic prosperity and ongoing productivity of the Hunter region the continued growth of rural and resource industries can result in potential for land use compatibility issues to arise.

In particular, it identifies that there is also potential for conflict if new housing encroaches into rural and resource areas, leading to increased management costs. Conflict could also affect the potential to sustain or grow rural and resource industries. The expansion of rural and resource industries can also affect established urban activities if not managed appropriately. Land use planning can provide greater certainty for investment in rural and resource industries by establishing clear parameters and transparent processes to support new development.

The proposed Eagleton Quarry project is consistent with the relevant directions and actions associated with Goal 1 of the Regional Plan.

Direction 15 of the Regional Plan identifies the need to protect the quality and security of the region's water supplies. Planning to manage development is a priority within the Hunter's drinking water catchments to balance the needs of growing towns and villages, and rural and resource industries. The Eagleton Quarry site is located within the drinking water catchment, and a comprehensive assessment of water quality has been undertaken in consultation with Hunter Water, to ensure no adverse impacts to the water supply would result from the quarry.

5.5.2 Lower Hunter Regional Conservation Plan

The Regional Conservation Plan (RCP) sets out a 25-year program to direct and drive conservation planning and efforts in the Lower Hunter Valley. It seeks to establish a framework to guide conservation efforts in the Lower Hunter.

The RCP illustrates vegetation communities in the Lower Hunter and their conservation status. It identifies that the site is part of an area where the vegetation reservation target has yet to be met. It also identifies that the site is not part of a high priority regional conservation area, but that a biodiversity corridor passes through the land in the vicinity of the site. This biodiversity corridor represents a 'non-reservation' regional conservation priority, connecting Wallaroo National Park to the vegetation south of Grahamstown Dam.

Importantly, the Hunter Regional Plan supersedes the RCP, and identifies seven regionally significant biodiversity corridors, but does not include the Wallaroo – Grahamstown Dam link.

The RCP sets out that the mechanisms to be employed in offsetting biodiversity impacts in these areas is likely to include BioBanking, planning agreements or dedication of land for national parks or other conservation reserves. A BioBanking assessment has been carried out for the proposed Eagleton Quarry (see **Section 7.2** and **Appendix H**), and it is proposed that an appropriate amount

of Biobanking Credits will be secured and retired to account for the clearing required to develop and operate the quarry.

6.0 Consultation

In preparing the SEARs for the EIS, the Department of Planning and Environment consulted with:

- The Department of Industry –the division of Resources & Energy.
- The Department of Primary Industries (DPI).
- The Environment Protection Authority (EPA).
- The Office of Environment and Heritage – in relation to Biodiversity, Aboriginal Cultural Heritage, Historic Heritage, Water & Soils, Flooding.
- Roads and Maritime Services (RMS).
- Port Stephens Council

Comments and issues raised by these authorities have been considered in preparing the SEARs and have been taken into account in the design of the proposed development and addressed where relevant in this EIS. Subsequent to the issue of the SEARs Hunter Water Corporation provided the Department with requirements in relation to the Grahamstown Dam catchment. These additional requirements were notified to Eagleton Rock and have been addressed in the proposed development.

In the SEARs, the Department also required Eagleton Rock to consult with the following:

- OEH (including the Heritage Branch).
- EPA;
- Division of Resources and Energy within the Department of Industry.
- The Department of Industry –the division of Resources & Energy.
- The Department of Primary Industries (DPI).
- DPI (including the DPI Water, NSW Forestry, Agriculture and Fisheries sections and Crown Lands division);
- RMS.
- NSW Rural Fire Service.
- Hunter Local Land Services.
- Port Stephens Council.
- Community groups.

The issues raised by the council, agencies and the community are detailed below, including how these issues have been taken into account in planning for the development, and where they are addressed in the EIS.

The proposed development will be placed on public exhibition for 30 days in accordance with clause 83 of the *Environmental Planning and Assessment Regulation 2000*. During the public exhibition period Council, State agencies and the public will have an opportunity to make submissions on the project.

6.1 Matters Raised by Council

Council provided input into the preparation of the SEARs. The matters raised by Council in this correspondence are listed in **Table 1**, along with a summary of the response to the issue, and where in the EIS the issue has been addressed in more detail.

Table 1 – Issues Raised by Council

Issues/discussion	Comment/response
Legislation policies and strategies.	The EIS addresses relevant strategic and statutory plans in Section 5.
Engineering requirements, including: - Water management - Access, transport and traffic - Natural resource management - Environmental health	The development will comply with Council's specified engineering policies, standards and requirements.
Biodiversity conservation	A detailed biodiversity assessment has been carried out and is provided in Appendix H .
Land use conflict with Kings Hill Urban Release Area	The Kings Hill residential area is located over 1km south of the Eagleton Quarry site. At its most northerly extent the future R1 zoned residential area is limited to land within approximately 500m of the Pacific Highway. The visual impact assessment (Appendix P) identifies that there is a substantial ridgeline between the future residential area and the quarry site – meaning that there will be no visual intrusion caused by the quarry. Air quality (Appendix K) and noise impact (Appendix J) assessments demonstrate that the quarry would not result in unacceptable impacts to future residents of the residential area.
Bushfire	Bushfire hazards have been addressed in Section 7.13 .
Hunter water special catchment area (Grahamstown Dam)	A detailed water resources assessment has been provided in Appendix M , which has been prepared in consultation with Hunter Water, and demonstrates that the project can comply with Hunter Water's requirements in relation to management of water quality within the Grahamstown Dam catchment.

Eagleton Rock consulted further with Council representatives in May 2016. Key issues discussed during this additional consultation were:

- Access to site from Italia road is of concern to Council.
- Ecology was also noted, specifically koala populations understood to be present at the site, therefore biodiversity offset strategy is important.
- Kings Hill Estate (located south of Six Mile Road) have two Development Applications in which are likely to go through this year once the VPA relating to a new Highway interchange has been finalised.

These issues have been addressed in the relevant sections of the EIS. Potential impacts to the future Kings Hill residential estate are addressed in the sections for air quality (see **Section 7.6**), noise (see **Section 7.4**) and visual amenity (see **Section 7.10**).

6.2 Matters Raised by Agencies

The matters raised by the agencies in their correspondence supporting the SEARs are listed in **Table 2**, along with a summary of the response to the issue, and where in the EIS the issue has been addressed in more detail.

Table 2 – Matters raised by Agencies

Issues/discussion	Comment/response
RMS	
Traffic study to include: ▪ Details of access routes ▪ Traffic counts. ▪ Details of anticipated generated traffic ▪ Assessment of impacts on road network, including cumulative impacts. ▪ Identification of road network upgrades to maintain existing level of service. ▪ SIDRA analysis. ▪ Construction impacts ▪ Road safety risk assessment of the Pacific Highway / Italia Road intersection.	Eagleton Rock has had ongoing and extensive consultation with the RMS in relation to access to the Eagleton Quarry via the Italia Road / Pacific Highway intersection. The most recent meeting was in August 2015. Section 3.4.4 sets out alternative access options that have been discussed with the RMS, including why the proposed access arrangements are preferred. A traffic study has been provided in Appendix I and summarised in Section 7.3, which includes the outcomes of consultation with the RMS. The traffic study demonstrates no significant impact to level of service or safety issues at relevant intersections. Section 4 and Appendix E provide details of the improvements proposed to local road infrastructure.
Department of Industry	
EIS should include a resource assessment that: ▪ Documents the size and quality of the resource and demonstrates that both have been adequately assessed; and ▪ Documents the methods used to assess the resource and its suitability for the intended applications.	Eagleton Rock contacted the Department of Industry in December 2016, confirming the requirements for assessment. No further issues were raised for assessment. A resource assessment is provided in Appendix F.
Department of Primary Industries (Office of Water)	
Annual volumes of surface water and groundwater proposed to be taken by the activity from each surface and groundwater source as defined by the relevant water sharing plan.	Eagleton Rock contacted the Department of Industry in December 2016, confirming the requirements for assessment. No further issues were raised for assessment. A detailed Water Resources assessment is provided in Appendix M which provides a detailed assessment of the issues specified by the Office of Water.
Assessment of any volumetric water licensing requirements	

Issues/discussion	Comment/response
The identification of an adequate and secure water supply for the life of the project.	Appendix M includes a table which provides for a cross-reference for each of these issues within the Water Resources Assessment report. Section 7.8 of the EIS provides a summary of the Water Resources Assessment.
A detailed and consolidated site water balance.	
A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.	
Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	
Full technical details and data of all surface and groundwater modelling, and an independent peer review.	
Proposed surface and groundwater monitoring activities and methodologies.	
Proposed management and disposal of produced or incidental water.	
Details of the final landform of the site, including final void management and rehabilitation measures.	
Details on buffer requirements to watercourses in accordance with the requirements of DPI Water's Guidelines for Controlled Activities on Waterfront Land (2012).	
Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.	
Consideration of relevant policies and guidelines.	

Issues/discussion	Comment/response
Assessment should include: ▪ Surface water assessment. ▪ Groundwater assessment ▪ Groundwater dependent ecosystems ▪ Watercourses and riparian land. ▪ Landform rehabilitation	
Department of Primary Industries (Crown Lands)	
No issues raised in SEARs.	Eagleton Rock contacted the Department of Industry (Crown Lands) in December 2016. Crown Lands advised that the proposal was reviewed in October 2015 and found there to be no Crown land issues as the proposed development does not require the use of the Crown Road located on the north-western boundary of the site.
Department of Primary Industries (NSW Fisheries)	
No issues raised in SEARs.	Eagleton Rock contacted the Department of Industry (NSW Fisheries) in December 2016. No issues raised for assessment in the EIS.
Department of Primary Industries (NSW Agriculture)	
No issues raised in SEARs.	Eagleton Rock contacted the Department of Industry (NSW Agriculture) in December 2016. No issues raised for assessment in the EIS.
Department of Primary Industries (NSW Forestry)	
Did not provide input into the SEARs.	Eagleton Rock contacted the Department of Industry (NSW Forestry) in December 2016 and provided a summary of the project. NSW Forestry advised that there were no relevant NSW Forestry issues required to be assessed in the EIS.
EPA	
Eagleton Rock contacted the EPA in December 2016, confirming the requirements for assessment. No further issues were raised for assessment. The issues raised by the EPA in the SEARs and the cross-reference to the relevant section of the EIS is provided below.	
Air quality impact assessment to be prepared in accordance with the <i>Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW</i> including a specific description of proposed dust management strategies.	An air quality impact assessment (Appendix K) has been prepared in accordance with the <i>Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW</i> .
Noise and vibration assessment to be provided in accordance with the <i>Industrial Noise Policy</i> .	An acoustic assessment has been carried out in accordance with the <i>Industrial Noise Policy</i> and is provided in Appendix J and summarised in Section 7.6 .

Issues/discussion	Comment/response
Water management.	Section 7.8 and Appendix M provide a detailed water management system for the project including measures to prevent the pollution of waters.
Waste management.	Section 7.14
Provide details of the storage and handling of dangerous goods	Dangerous goods proposed to be stored on site are identified in Section 7.11 . Assessment of the storage and handling (including transportation) of these dangerous goods is provided in accordance with the DPE's <i>Applying SEPP</i> guideline.
Monitoring programs to be provided	The EIS includes details of proposed monitoring programs to manage potential dust, noise and water quality impacts.
OEH	
Aboriginal heritage to be assessed in accordance with Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation.	Appendix O includes a due diligence assessment prepared in accordance with <i>Due Diligence Code of Practice</i> and the <i>Archaeological Code of Practice</i> , and includes a description of consultation with the Aboriginal Community in accordance with the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> .
Historic heritage assessment of impacts to State and local heritage items, conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, and trees.	The site does not contain any local or State heritage items, and is not in the vicinity of any heritage items, or conservation areas. No impacts to any historic heritage is anticipated. Note that the Heritage Division of OEH has specifically advised that the site is not in the vicinity of any State Heritage Listed sites, and as such, consultation with the Heritage Council is not required. Eagleton Rock further contacted the Heritage Division who have confirmed that no further consultation is required.
Water and soils including: ▪ Identification of ASS, watercourses, groundwater and groundwater dependent ecosystems, and water intake/discharge locations. ▪ Background conditions. ▪ Assessment of water quality. ▪ Assessment on hydrology.	A detailed Water Resources Assessment is provided in Appendix M and is summarised in Section 7.8 of the EIS.
Flood assessment including: ▪ Full water balance for the site. ▪ Risk assessment of silt basins with consideration of the PMF. ▪ Changes to waterflows.	A detailed Water Resources Assessment is provided in Appendix M which includes assessment of flood impacts.

Issues/discussion	Comment/response
Biodiversity assessment in accordance with the Framework for Biodiversity Assessment. Specific requirements include assessment of <i>Pterostylis chaetophora</i>.	Eagleton Rock has undertaken ongoing consultation with OEH during the biodiversity investigation and reporting process. A Biodiversity Assessment Report prepared in accordance with the Framework for Biodiversity Assessment is provided in Appendix H and summarised in Section 7.2 of the EIS. Appendix H particularly sets out survey results for <i>Pterostylis chaetophora</i>. Appendix G also includes a Biodiversity Offset Strategy prepared in accordance with the NSW Biodiversity Offsets Policy for Major Projects.
NSW Rural Fire Service	
No issues raised in SEARs.	Eagleton Rock contacted the NSW Rural Fire Service in December 2016. The NSW Rural Fire Service has raised no issues requiring assessment in the EIS. The NSW Rural Fire Service requested that prior to commencement of operations they are provided with a site induction to understand access, water supply, contact details, evacuation and workplace health and safety matters.
Hunter Local Land Services	
No issues raised in SEARs.	Eagleton Rock contacted the Hunter Local Land Services in December 2016. The Hunter Local Land Services has raised no issues requiring assessment in the EIS, indicating that they will review the EIS once it is placed on public exhibition.
Hunter Water	
No issues raised in SEARs. Eagleton Rock held a meeting with Hunter Water in May 2016. Key issues raised by Hunter Water for assessment in the EIS were: ▪ Flood mitigation/design needs to consider greater than 100 year ARI storm events ▪ The design outcome for the site needs to be neutral or beneficial to Grahamstown Dam water quality. ▪ Hunter Water will contribute to conditions on EPL. ▪ A Peer review of the Water Resources Report would be undertaken by Hunter Water.	A detailed Water Resources assessment is provided in Appendix M which provides a detailed assessment of the issues specified by Hunter Water. Section 7.8 of the EIS provides a summary of the Water Resources Assessment.

6.3 Consultation with the Local Community

A community consultation program was coordinated by Umwelt Australia during 2016, and a detailed Consultation Report is provided in **Appendix R**. The focus of consultation was on proximal and potentially impacted landholders such as those adjacent landholders and businesses and near neighbours located in the area along Six Mile Road, Italia Road, Barleigh Ranch Way and Winston Drive.

In total, 66 stakeholders were provided an opportunity to participate in the program. Of those contacted, a response rate of 32 per cent was obtained, 11 residents, 8 local businesses and 2 agencies. Surrounding businesses included Port Stephens Gardenland, Boral's Seaham Quarry, the MG Car Club, Hunter Valley Paintball, MX Central – Motor Cross, Kings Hill Estate Development and Eagleton Ridge and Songbirds.

Key issues raised in relation to the proposal included are listed in **Table 3**, including a reference where the issue is assessed in the EIS. Nearly half of those interviewed (47%) saw no benefits of the Eagleton Quarry going ahead; however, for those that did identify benefits there was some recognition that it would result in local employment, economic contribution, population increase and potential road upgrades.

Table 3 – Summary of Issues Raised and Response

Key Issue	Response
Noise	Noise impacts are assessed in Appendix J and Section 7.4.
Dust	Dust impacts are assessed in Appendix K and Section 7.6.
Blasting	Blasting impacts are assessed in Appendix J and Section 7.5.
Traffic movements	Traffic is assessed in Appendix I and Section 7.3.
Environmental impacts	Environmental impacts are assessed in Section 7 of the EIS, and mitigation measures proposed to manage potential environmental impacts are set out in Section 8.
Impacts on property values	The EIS has determined that the quarry will not result in significant impacts to human health or amenity. Further, there is already an existing quarry and a number of rural industries / entertainment facilities in the locality. It is therefore not expected that the proposed quarry would impact property values.
Loss of rural lifestyle and livelihood	The EIS has determined that the quarry will not result in significant impacts to human health or amenity. The quarry is compatible with existing rural land uses.
Reducing operating hours to mitigate noise and blasting impacts were also suggested.	Blasting will occur infrequently and only during daytime hours. See also
Sealing Six Mile road was suggested as an opportunity to mitigate the effects of road traffic, noise and dust on local residents	Quarry traffic will not use Six Mile Road. Site access roads will be sealed, including Barleigh Ranch Way.
Improvements to the intersection with the Pacific Highway was also identified as a means of assisting to address potential access difficulties	Improvements to the intersection with the Pacific Highway are not warranted. See Section 7.3 and Appendix I.
Habitat protection, through the development of wildlife corridors.	The proposed onsite offset site will include revegetation of small areas of cleared grassland on the north-east part of the site to ensure habitat connectivity is maintained and improved within the study area. See Appendix H.

In addition to minimising project impacts where possible, keeping residents informed through greater communication and showing them consideration and involvement in management strategies and monitoring were highlighted as project improvement opportunities. Further and ongoing communication was also seen as important, with the majority of near neighbours favouring direct consultation with the company to further discuss implications of assessment outcomes and project planning.

Eagleton Rock has committed to ongoing consultation with the local community in order to achieve the identified communication and engagement objectives.

6.4 Access Road Consultation

Negotiations are underway with the land owner of Lot 2 DP 1158962 and Lot 1 DP 245116 to extinguish the existing access road easements, which are in the wrong location, and to establish new easements in the location of the existing access road.

Consultation with the owner of the land has confirmed that there is no constraint to the use of the right of carriageway for providing access to the proposed Eagleton Quarry, subject to appropriate improvement works being implemented.

7.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the proposed DA. It addresses the matters for consideration set out in the SEARs. The consolidated list of mitigation measures at Section 7 complement the findings of this section.

7.1 Secretary's Environmental Assessment Requirements

In accordance with section 89G of the EP&A Act, the Secretary of the Department of Planning and Environment issued the requirements for the preparation of the EIS on 6 November 2015. A copy of the Secretary's Environmental Assessment Requirements (SEARs) is included at **Appendix A**.

Table 4 provides a detailed summary of the individual matters listed in the SEARs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 4 – Summary of consistency with SEARs

Requirement	Location in Environmental Assessment	
General		
The Environmental Impact Statement (EIS) for the development must comply with the requirements in Clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> .	Environmental Impact Statement	
A full description of the development - Site layout and extraction plans - Resource Assessment - Rehabilitation strategy	Section 4 - Appendix D - Appendix F - Appendix R	
List of approvals to be obtained before the development can commence	Section 5.3.7	
An assessment of the likely impacts of the development on the environment	Section 7	
A consolidated summary of all the proposed environmental management monitoring measures, identifying all the commitments in the EIS.	Section 8	
Consideration of the development against all relevant environmental planning instruments (including Part 3 of the <i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i>);	Section 5.4	
The reasons why the development should be approved having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development.	Section 9	
The development application must be accompanied by a signed report from a suitably qualified expert that includes an accurate estimate of the: • capital investment value (as defined in Clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>) of the development, including details of all the assumptions and components from which the capital investment value calculation is derived; and • jobs that would be created during each stage of the development.	Under separate cover	
Key Issues	Report / EIS	Appendic
Biodiversity	Section 7.2	Appendix H
Traffic & Transport	Section 7.3	Appendix I
Noise	Section 7.4	Appendix J
Blasting & Vibration	Section 7.5	Appendix J

Requirement	Location in Environmental Assessment	
Air Quality	Section 7.6	Appendix K
Land Resources	Section 7.7	-
Water	Section 7.8	Appendix M
Heritage	Section 7.9	Appendix O
Visual	Section 7.10	Appendix P
Hazards	Section 7.11	-
Social & Economic	Section 7.12	Appendix S
Rehabilitation	Section 4.13	Appendix Q
Consultation		
Government and Agency Consultation	Section 6	Appendix R

7.2 Biodiversity

A Biodiversity Assessment Report has been prepared by Kleinfelder and is included at **Appendix H**. The Biodiversity Assessment Report provides an assessment of the biodiversity values on the proposed development site and the potential impacts of the proposal on these values in accordance with the Framework for Biodiversity Assessment (FBA). The biodiversity assessment focusses on the quarry site and internal access road. Works outside of the site are limited to road upgrade works along the existing cleared road corridors of Barleigh Ranch Way and the right of carriageway. A summary of the assessment and proposed mitigation measures are provided below.

7.2.1 Existing Environment

Survey Effort

The existing ecological environment has been assessed through a number of surveys including:

- Targeted searches for threatened flora carried out by Orogen (now PDA Services) in October 2011.
- Floristic surveys carried out in accordance with the BioBanking Assessment Methodology by Orogen in March 2012.
- Further habitat assessment and targeted threatened flora species searches were carried out by GHD in September 2012.
- A bird species survey for threatened birds was carried out in November 2011.
- Targeted searches for fauna species, including anabat recording, spotlighting, call playback and stag watching, were carried out by GHD in September 2012.

Additional systematic flora surveys were conducted in December 2012 and 2013 and the vegetation mapping was reviewed in 2016 to ensure stratification of vegetation zones is consistent with the FBA.

Additional fauna surveys were conducted in January/February 2013 and January 2016.

A further survey was conducted for *Pterostylis chaemophora* on 18 October 2016, to correlate with the flowering period for this species.

A full description of the survey effort is described in **Appendix H**. The results of these surveys are summarised below.

Native Vegetation

The majority of the site is made up of undulating forested terrain with a mix of mature trees and regeneration. Past logging is evident by regrowth, old logging camps and stumps. Additionally, there are cleared areas within the site that consist of tracks, buildings and dams associated with Port Stephens Gardenland.

The Eagleton quarry site supports two native vegetation communities:

- MU12 Hunter Valley Moist Forest (19.9 ha) – which generally follows the creek lines and riparian corridors.
- MU16 Seaham Spotted Gum-Ironbark Forest (64.3ha) – which generally covers the remainder of the site (except for the cleared areas).

The Seaham Spotted Gum – Ironbark Forest is closely related to the *Lower Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion* Endangered Ecological Community (EEC). The vegetation within the study area was not considered to form part of the *Lower Hunter Spotted Gum – Ironbark Forest* EEC due to its distribution and floristic composition.

The SEARs also indicate that based on existing regional vegetation mapping, vegetation consistent with the *Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions* may be present on the site. No vegetation consistent with the structure or floristic composition of dry rainforest was identified in the study area during the surveys.

The vegetation community on the site is not considered to be an EEC under the *Threatened Species Conservation Act 1995* (TSC Act) or a Threatened Ecological Community under the Commonwealth EPBC Act.

Flora

Table 5 provides a list of flora species identified as having potential habitat in the study area (i.e. targeted threatened flora species). No threatened flora species were identified during the field surveys.

Table 5 – Targeted Threatened Flora Species Identified as Possibly Occurring at the Site

Species	Common Name
<i>Angophora inopina</i>	Charmhaven Apple
<i>Asperula asthenes</i>	Trailing Woodruff
<i>Callistemon linearifolius</i>	Netted Bottle Brush
<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid
<i>Cynanchum elegans</i>	White-flowered Wax Plant
<i>Diuris pedunculata</i>	Small Snake Orchid
<i>Eucalyptus glaucina</i>	Slaty Red Gum
<i>Grevillea guthrieana</i>	Guthrie's Grevillea
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea
<i>Maundia triglochinosoides</i>	
<i>Melaleuca biconvexa</i>	Biconvex Paperbark
<i>Persicaria elatior</i>	Knotweed
<i>Pterostylis chaetophora</i>	-
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid
<i>Tetradlea juncea</i>	Black-eyed Susan

One threatened flora species (*Pterostylis chaetophora*) is listed in the SEARs by OEH as a matter for further consideration under the FBA. The study area contains potential habitat for this species. As requested in the SEARs targeted searches for species were undertaken across the quarry site when the known reference population was confirmed that to be flowering in the locality. The survey firstly confirmed that the reference population of the species as provided by OEH was in flower on the 18th October 2016, and then surveyed the entire Eagleton Quarry site through systematic parallel transects at approximately 10 m apart in accordance with the NSW Guide to Surveying Threatened Plants. The species was not observed at the site.

Fauna

Table 6 provides a list of the threatened and migratory fauna species identified as occurring in the vicinity of the site. Of the 12 candidate fauna species identified under the Framework for Biodiversity Assessment only two were determined to be present at the site – the Koala and the Southern Myotis.

Table 6 – Threatened and Migratory Fauna Species

Species	Common Name	TSC Act Status	EPBC Act Status
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V
<i>Circus assimilis</i>	Spotted Harrier	V	-
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	-
<i>Falco subniger</i>	Black Falcon	V	-
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-
<i>Miniopterus australis</i>	Little Bentwing-bat	V	-
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-
<i>Myotis macropus</i>	Southern Myotis	V	-
<i>Phascolarctos cinereus</i>	Koala	V	V
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Migratory
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V	-

Notes: V = Vulnerable, E = Endangered, CE = Critically Endangered, T = Threatened

The *Port Stephens Council Comprehensive Koala Plan of Management* (CKPoM) and SEPP44 apply to the site. The *Koala Habitat Planning Map of Port Stephens Local Government Area*, which accompanies the CKPoM, showed that most of the site was mapped as marginal Koala habitat, with only a small portion of habitat mapped as preferred Koala habitat in the south of the site.

Field surveys were conducted to determine the extent of preferred Koala feed trees (including those listed under the CKPoM and SEPP 44) across the site.

Appendix 6 of the CPKoM, *Guidelines for Koala Habitat Assessments* were used to assess the Koala habitat and impact that the proposed development will have on the study site and surrounding potential koala habitat and/or populations. Compliance with the provisions of the CKPoM will constitute compliance with the

provisions of SEPP 44. Appendix 4 of the CKPoM, *Performance Criteria for development applications* was also followed to achieve its aims and objectives.

Biodiversity Corridors

The Hunter Regional Plan identifies seven biodiversity corridors that connect key habitat areas and support ecological processes for plants and wildlife movement, providing habitat and improving the ability of species to adapt to changes in habitat and climate. The site is not located within or as part of any regionally significant biodiversity corridors. The closest biodiversity corridor is the Watagans to Stockton Link which is shown in the Biodiversity Corridors Map as being located east of the Pacific Highway.

Aquatic Habitat

The stream comprises mainly of sand and silt although some areas contained large cobbles. The stream banks were relatively stable in most areas, with low levels of erosion of the banks occurring in some areas (particularly at bends in the stream).

Some macroinvertebrates were observed including Water Striders (*Gerridae*) and Whirligig Beetles (*Gyrinidae*), which suggests that the creek rarely dries up entirely. No fish or large crustaceans were observed. Species of these taxa are likely to be largely absent due to the ephemeral characteristics of the habitat.

No threatened freshwater species, endangered populations and endangered ecological communities listed under the *Fisheries Management Act 1994* have been recorded within 5km radius of the site. It is considered unlikely that any threatened aquatic species would occur in the study area.

Riparian Corridors

The majority of the riparian habitat within the study area is intact and is occasionally dissected by access tracks. The riparian vegetation consists of the *Hunter Valley Moist Forest* vegetation community. Terrestrial fauna habitat within the riparian zone includes the associated vegetation, hollow bearing trees, rocks, woody debris and a range of substrates. The riparian vegetation is healthy. No dieback is evident and no major weed infestations occur. No infestation of aquatic weeds or other Macrophytes was observed.

Groundwater Dependent Ecosystems

One terrestrial vegetation community variant was identified as ground water dependent – the Hunter Valley Moist Forest. This ecosystem is typically associated with Shallow Alluvial Groundwater Systems which are associated with the drainage lines and creeks.

7.2.2 Impact Assessment

Ecosystem and Species Impact Summary

For the purposes of assessment under the Biobanking Assessment Methodology, both of the vegetation communities occurring at the site are determined to comprise one plant community type as HU804 Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest.

The proposed development will remove approximately 28.4ha, requiring a total of 1,628 ecosystem credits.

In addition, the number of species credits required to compensate for the impacts of the proposed development on threatened species is 334 credits for the Southern Myotis and 276 credits for Koala.

The credit report for the site is provided as part of **Appendix H**.

Assessments of Threatened Flora Species

No threatened flora species were recorded in the study area during the surveys by, and no targeted flora species are considered likely to occur at the site following targeted surveys and habitat assessments.

Assessments of Threatened Fauna Species

A total of 18 threatened fauna species were assessed under the TSC Act 1995 *Assessment of Significance guidelines*. Of these, none had a high likelihood of impact as a result of the proposed development. However, the following species were identified as potentially being the most impacted:

- Koala (*Phascolarctos cinereus*) – The Koala was identified as occurring at the site. Field studies determined that Koalas were using a range of tree species throughout the study area, but the level of activity is considered to be low use range and therefore the use by Koalas is “likely to be transitory”. The CKPoM Koala habitat mapping for the study area shows only a very small area of preferred Koala habitat in the south-west, with the remainder of the site mapped as marginal habitat. Detailed assessment of Koala feed tree density across the study area identified a total of 53.50 ha of suitable Koala habitat as defined under SEPP 44. Of this, 10.62 ha of suitable Koala habitat occurs within the impacted quarry development area. The proposed development would avoid the majority of suitable Koala habitat in the study area (approximately 80%). These retained areas of suitable Koala habitat (42.88 ha) would be protected and managed in-perpetuity under a biobanking agreement.
- The Southern Myotis was recorded at one location along Seven Mile Creek in the eastern part of the site. Breeding habitat for the Southern Myotis includes hollow-bearing trees, bridges, caves or artificial structures within 200 m of riparian zone. Hollow-bearing trees are present (albeit in low to moderate abundance) throughout the forest vegetation in the study area. All areas of HU804 (moderate-good) within 200 m of the dams and the 2nd and 3rd order streams on the eastern part of the site were mapped as suitable breeding habitat for this species. The remaining 1st order drainage lines in the study area are highly ephemeral and do not contain suitable foraging habitat (i.e. streams and pools). A total of 49.49 ha of Southern Myotis habitat occurs in the study area. Of this, 15.18 ha of Southern Myotis habitat occurs in the impacted quarry development area. The proposed development would avoid the majority of Southern Myotis breeding habitat in the study area (approximately 69%). These retained areas of Southern Myotis habitat (34.31 ha) would be protected and managed in-perpetuity under a biobanking agreement.

Assessments under Commonwealth EPBC Act

Six species were assessed under the EPBC Act assessment of significance guidelines, as follows:

- Regent Honeyeater (*Anthochaera phrygia*) and Swift Parrot (*Lathamus discolor*). Neither species is known to occupy the site, although feed tree species are present. Approximately 28.40 ha of open forest containing suitable foraging habitat for these species would be removed. The vegetation within the study area likely provides opportunistic foraging habitat and supplementary foraging areas in times of low nectar resources in core foraging areas. As such, it is unlikely that the 28.40 ha of potential foraging habitat within the development site is critical to the survival of these species. As both of these species are highly mobile, the proposed action will not fragment any populations of these species. As the proposed development

area will be progressively rehabilitated, there is the potential for these species to utilise the area as foraging habitat once the rehabilitation reaches a suitable age. Proposed offset measures will include both the provision and long-term protection of habitat containing feed tree species.

- Spotted-tailed Quoll (*Dasyurus maculatus*) was not recorded during surveys, however the site contains foraging and marginal denning habitat for this species. The native vegetation proposed for removal is not considered to represent critical habitat for this species. Given the relatively small area of suitable habitat for the Spotted-tailed Quoll that will be removed compared to the extent of suitable habitat in the study area and surrounding lands, the minor impediment the development would pose to movement of this species and the management actions proposed, it is unlikely that the proposal would lead to a long-term decrease in the size of a local population or causing fragmentation of any populations of this species.
- The Grey-headed Flying Fox (*Pteropus poliocephalus*) was not recorded roosting or foraging during surveys, however the study area has been identified as providing opportunistic foraging resources. The habitat present within the development area is not considered critical to the survival of this species. Given the relatively small area of suitable habitat for these species that will be removed compared to the extent of suitable habitat in the study area and surrounding lands, the minor impediment the development would pose to movement of these species and the management actions proposed, it is unlikely that the proposal would lead to a long-term decrease in the size of any local populations or causing fragmentation of any populations of this species.
- The large-eared Pied Bat (*Chalinobolus dwyeri*) was recorded on site. A precautionary approach was taken and this species was assessed under the guidelines. Findings indicated that due to the lack of maternal roosts such as caves, rocky cliff and outcrops, this species may be utilising the site for foraging purposes only. The habitat present within the development area is not considered critical to the survival of this species. Given the relatively small area of suitable habitat for these species that will be removed compared to the extent of suitable habitat in the study area and surrounding lands, the minor impediment the development would pose to movement of these species and the management actions proposed, it is unlikely that the proposal would lead to a long-term decrease in the size of any local populations or causing fragmentation of any populations of this species.
- The Koala (*Phascolarctus cinereus*) was recorded onsite. The proposal has the potential to impact part of the home range of one adult Koala. This impact is unlikely to be significant due to the large area of similar forest habitat that is contiguous with the quarry development area. Koala activity is relatively low at the site, compared to surrounding areas. As such, it is unlikely that the 10.62 ha of foraging habitat within the development area is critical to the survival of this species.

Six listed migratory species were assessed under the EPBC Act guidelines.

- Oriental Cuckoo (*Cuculus optatus*)
- Rainbow Bee-eater (*Merops ornatus*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Yellow Wagtail (*Motacilla flava*)
- Satin Flycatcher (*Myiagra cyanoleuca*)
- Rufous Fantail (*Rhipidura rufifrons*)

Vegetation at the site represents suitable foraging habitat for these species, however, only one of these species, the Rufous Fantail (*Rhipidura rufifrons*), was recorded on site during surveys. The proposal would reduce habitat connectivity for these migratory species within the study area. However, the proposed development will incorporate corridors in the central and north-east parts of the study area to maintain connectivity. The vegetation to be retained in the southern part of the study area will remain well connected to adjoining vegetation. As such, the proposal is considered unlikely to isolate or substantially fragment any important habitat for these species in the study area.

No significant impacts have been identified in relation to threatened species or communities or migratory species listed under the Commonwealth EPBC Act, and no referral to the Commonwealth has been made.

Riparian Corridors and Aquatic Habitats

The proposed development would directly impact on riparian habitat associated with three 1st order streams occurring within the footprint. The project also has the potential to have indirect impacts on other drainage lines adjoining the development site during the construction and operation phases through erosion, sedimentation and contaminants in stormwater run-off.

The proposal would also involve construction of a new bridge or culvert across Seven Mile Creek for the haul road. This would directly impact a small section of riparian vegetation during construction, and has the potential to have indirect impacts downstream during the construction phase through erosion and sedimentation, and introduction of weeds.

Whilst the occurrence of fish species is unlikely given the creek is ephemeral, the bridge will be designed so as to maintain connectivity and ensure movement of aquatic fauna would not be impeded.

Potential Impacts to Groundwater Dependent Ecosystems

The groundwater dependent ecosystem identified at the site, being the Hunter Valley Moist Forest community, has been assessed as facultative and is considered to use groundwater opportunistically or to a very limited extent based on the underlying geology and species composition within these communities.

Therefore, it is not expected that the proposal will influence groundwater levels or quality such that there will be any significant impact on the GDE's (outside of the project disturbance) within the study area, during both the construction and operation phases provided appropriate controls are implemented.

Details for monitoring of management actions will be contained within the above management plans.

7.2.3 Mitigation Measures

The proposed development would not impact on any threatened ecological communities, critical habitat, riparian areas of 4th order or higher, important wetlands, estuaries, or significant biodiversity links. The proposed development will require the removal of native vegetation, with impacts to Koala and Southern Myotis. The Biodiversity Assessment Report identifies the following mitigation measures as being necessary to ensure biodiversity impacts are minimised and ensure that biodiversity values are maintained or improved:

- Avoidance and retention of 58.81 ha of native vegetation within the study area. This retained vegetation is proposed to be secured under a biobanking agreement as part of the offset to provide in-perpetuity protection and management of this native vegetation and threatened species habitat. The proposed onsite offset site will include revegetation of small areas of cleared

grassland on the north-east part of the site to ensure habitat connectivity is maintained and improved within the study area.

- Avoidance of 2nd and 3rd order streams and the associated riparian buffers in the study area, with the exception of a small area for the proposed haul road. Haul road design and construction to ensure existing hydrological regimes for Seven Mile Creek are maintained.
- Retention of vegetation corridors on the southern, central and north-east parts of the study area. Connectivity through the eastern corridor would be enhanced through revegetation of grassland areas.
- The development site should be delineated with permanent wildlife-friendly fencing, and include signage to identify 'no-go' areas.
- Speed limits on traffic using access roads to 40 km / hr (in accordance with CKPoM 2002) will reduce potential for death or injury to wildlife as well as reduce noise and pollution levels.
- Preparation of Flora and Fauna Management Plan (F&FMP), to provide detailed measures and protocols to minimise potential impacts upon wildlife and ensure protection of vegetation immediately adjacent to the development site during the construction phase of the project. The Flora and Fauna Management Plan would include the following:
 - Weed Management Plan and Pest Management Plan;
 - Pre-clearing fauna surveys;
 - Clearing protocols:
 - Hollow-bearing tree clearing protocol;
 - Fauna translocation protocol; and
 - Vegetation clearing protocol.
- Landscape and Rehabilitation Management plan to detail the short and long term measures that would be implemented during the construction and operation phases of the project to minimise impacts on native vegetation and fauna on the site, and ensure the development site is progressively rehabilitated with self-sustaining native vegetation. The Landscape and Rehabilitation Management Plan would include the following:
 - Weed management within the development site during operations;
 - Management of any retained vegetation within the development footprint during operations;
 - Measures to protect areas of native vegetation and fauna habitats occurring adjacent to the development site;
 - Details of traffic-calming measures and signage to be installed within the site to reduce the risk of vehicle strike to Koalas and other native fauna;
 - Details of proposed rehabilitation and revegetation (including timing, target species composition, rehabilitation methods, and ongoing monitoring);
 - Details on appropriate soil handling processes, including topsoil management for later use in any rehabilitation areas;
 - Details on the salvage, storage and redistribution of habitat features (e.g. hollows and logs) within the rehabilitation areas;
 - Fire management;
 - Vertebrate pest control within the development site;

- Details of maintenance, monitoring and performance criteria to assess the condition and functioning of the adjoining vegetation and fauna habitats, and to evaluate progress of rehabilitation works.

7.2.4 Biodiversity Offset Assessment

A Biodiversity Offset Assessment has been prepared and is provided as part of the Biodiversity Assessment Report at **Appendix H**. The biodiversity offsetting requirements have been assessed using the Framework for Biodiversity Assessment under the NSW Biodiversity Offsets Policy for Major Projects.

It is proposed that the majority of land not subject to development for the quarry within Lot 2 DP 1108702 be secured as a biobank site as part of the offset for the project. The proposed offset site is 60.83 ha and occupies the southern and eastern parts of the study area (but not including the Pt Stephens Gardenland landscape supplies area).

Retirement of biodiversity credits requires certain management actions to be implemented that underpin the predicted improvements to biodiversity values on the biobank site. Specific details on the management actions to be undertaken at the biobank site would be provided as part of the biobanking agreement.

The BioBanking calculator was run to assess both the number of ecosystem and species credits that could be generated by the proposed offset site. A total of 630 ecosystem credits, 304 Koala credits and 244 Southern Myotis credits would be generated by biobanking the undeveloped parts of the site. As such, based on the biobanking calculations an additional 998 ecosystem credits and 90 Southern Myotis credits are required for the proposed development.

At this stage, Eagleton Rock intends to secure the remaining 998 ecosystem credits and 90 Southern Myotis species credits by purchasing suitable credits from existing biobank sites. For example, the biobank site under biobanking agreement no. 96 has HU804 ecosystem credits that are currently available for purchase and retirement. Eagleton Rock will pursue negotiations to purchase the required credits from existing biobank sites should the project be approved.

However, if the required credits are unavailable at existing biobank sites at the time, the proponent may also secure an offsite offset site under a biobanking agreement to satisfy the credit requirements. Approximately 26,300 ha of freehold land containing the appropriate plant community types is predicted to be present within the sub-region. This vegetation would also provide suitable breeding habitat for the Southern Myotis. As such, it is considered that there is sufficient land available that could be secured as a biobank site to generate the quantity of ecosystem and species credits required for the development, should the credits be unavailable for purchase at existing biobank sites.

7.3 Traffic and Transport

GHD has carried out a Traffic Impact Assessment which is provided at **Appendix I**, and is summarised below.

7.3.1 Access Roads and Existing Traffic

The key access roads to and from the proposed quarry are the Pacific Highway, the major arterial route through the area, and Italia Road, a prominent local road connecting the Seaham area to the highway.

Pacific Highway

The Pacific Highway is the major arterial route connecting Sydney and Newcastle to northern NSW and south-east Queensland. The section between Raymond Terrace and Karuah was upgraded from a two lane road to a four lane dual carriageway in the period from 1999 to 2002. On the subject section, approximately 12 km north of Raymond Terrace, the highway is in flat to undulating terrain, with large radii horizontal curves and gradients of between 1% and 3%.

The highway is not a full motorway over this length and as such direct access is permissible for local roads and property frontages, mostly restricted to left turns only. Major intersections are provided for more substantial road connections at Italia Road and Medowie Road and there are u-turn facilities for turning traffic. The speed limit of the highway on this section is 100 km/h, which is in keeping with the access standard of the highway over this length.

Management responsibility for the highway rests with the NSW Government through Roads and Maritime Services.

Italia Road

Italia Road is a two way, two lane road that connects the rural communities of East Seaham and Seaham to the Pacific Highway over a length of approximately 10 km. There are a number of prominent land uses off Italia Road, just west of the Pacific Highway, most notably an existing hard rock quarry operated by Boral. The speed limit on Italia road is 90 km/h. Italia Road is classified as a local road under the control of Port Stephens Shire Council.

Pacific Highway / Italia Road Intersection

The Italia Road and Pacific Highway intersection is a t-intersection, with Italia Road meeting the Pacific Highway on the western (or northbound) side of the highway. The intersection was constructed as part of the highway upgrade, completed approximately 2002 as a seagull type, at-grade intersection (see **Figure 14**). Access to Italia Road off the highway is provided by dedicated left and right turn bays for turning traffic from the south and north respectively.

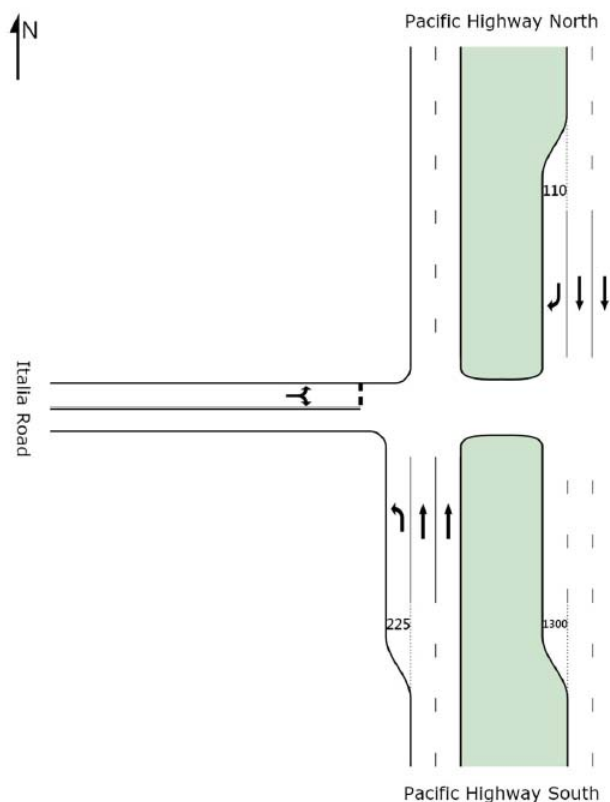


Figure 14 – Italia Road / Pacific Highway Intersection Layout

The intersection allows a two stage process for southbound right turn access to the highway from Italia Road. This is by way of an initial crossing of the northbound carriageway for the right turn movement into an acceleration lane and then a left hand merge for integration with highway traffic. The acceleration lane is approximately 1.3 km in length, allowing heavy vehicles to attain highway speed prior to merging.

The historical use of Italia Road by quarry vehicles and the length of this acceleration lane confirms that the intersection would have been specifically designed for heavy vehicle movements turning right from Italia Road.

Right of Way

Access to the proposed quarry development site is currently available via a formed gravel road connecting Italia Road with Barleigh Ranch Way. The gravel road intersects with Italia Road approximately 500 metres west of the Pacific Highway as a t-intersection. The existing access road does not have a formal road reserve, it is a Right of Way across private property. The gravel road formation is two lanes wide but is unsealed. It currently provides access to a number of properties and recreational businesses in the area, including attractions such as MG car club, Hunter Valley Paintball and Hunter MCC raceway.

Existing Traffic

There are several traffic generators that rely on the Italia Road / Pacific Highway intersection. Of these traffic generators, the dominant heavy vehicle generator is the Boral hard rock quarry which has been in operation for up to 30 years. The Boral quarry access on Italia Road is approximately 1.4 km from the Pacific Highway, or about 900 metres from the first access intersection, to be used for the proposed quarry.

It is also noted that the more localised traffic generators are entertainment facilities (i.e. the MG car club, Hunter Valley Paintball and Hunter MCC raceway) that are mostly weekend based operations, and so would have little concurrent traffic generation with the proposed quarry development.

Existing traffic volumes on the Pacific Highway and Italia Road are calculated or estimated as follows:

- Pacific Highway: 21,500 Average Annual Daily Traffic, 1,350-1,550 peak hour volume, and approximately 23% heavy vehicles.
- Italia Road: 1,350 daily volume, 100-120 peak hour volume, and approximately 31% heavy vehicles.

Peak hour traffic movements through the intersection have also been calculated, and are summarised as follows:

- 1,314 vehicles travelling through the intersection on the Pacific Highway in the AM peak and 1,512 in the PM peak (northbound or southbound).
- 48 vehicles turning into Italia Road from the Pacific Highway during the AM peak, 29 turning right from the southbound carriageway and 19 turning left from the northbound carriageway. In the PM peak, it was 53 vehicles, 32 turning right from the southbound carriageway and 21 turning left from the northbound carriageway.
- 60 vehicles turning out of Italia Road onto the Pacific Highway during the AM peak, 29 turning left and 21 turning right. In the PM peak, it was 58 vehicles, 28 turning left and 30 turning right.

The most recent accident history for the intersection show a total of three traffic incidents from 2010 to 2014, as follows:

- A heavy vehicle entering the Pacific Highway from Italia Road collided with a cyclist who was travelling northbound on the highway.
- A light vehicle left the Pacific Highway and collided with a signpost near the Italia Road intersection.
- A four-wheel drive vehicle travelling northbound on the Pacific Highway struck another four-wheel drive vehicle that was completing a left turn manoeuvre onto the highway from Italia Road.

There were two injuries and no fatalities recorded as a result of these incidents. It is apparent from the nature of the incidents that none occurred solely due to the geometric layout of the intersection, with human error likely playing a role in each of the crashes. In general terms the intersection is considered to have a low accident rate.

7.3.2 Traffic Generation

Potential traffic generation has been calculated based on the projected yearly extraction and expected hours of operation of the quarry. The sales hours for the Eagleton Quarry are proposed as 5 am to 10 pm weekdays and 7 am to 4 pm on Saturdays, with a total of 10 staff on-site at any one time.

GHD has estimated that there will be approximately 192 daily vehicle movements generated by the quarry, comprising 20 movements associated with the arrival/departure of staff, 2 movements associated with support/supply vehicles and the remained (170 vehicles movements) from sales trucks varying rock product.

This equates to approximately 31 vehicles movements during the peak hour periods – 21 in/10 out during the AM peak and 10 in/21 out during the PM peak. A total of 10 trucks (or 20 movements) are expected during each peak hour period.

7.3.3 Internal Roads and Parking

The Port Stephens Council Car Parking Policy within the Port Stephens Development Control Plan 2007 does not include any requirements for parking specific to the use of a quarry. A total of 11 spaces have been provided for staff and visitor parking. There is also provision for short term truck parking and an overflow area for additional parking if necessary.

7.3.4 Potential Traffic Impact

Italia Road

The interaction of the proposed quarry traffic with the existing traffic on Italia Road is expected to be seamless. The number of trucks per hour is very small on a short (500 metre) section of Italia Road; integration with a regular traffic stream of up to 65 vehicles per hour in each direction will involve large gaps and a relatively low density traffic stream.

Italia Road / Pacific Highway Intersection

Cumulative traffic volumes have been calculated. The expected increase on Italia Road represents a 13% increase in daily traffic and up to a 40% increase in peak period volumes, albeit with small absolute numbers at one vehicle every two minutes.

The peak volumes need to split with the likely directional priorities for travel on the Pacific Highway. The additional peak hour volumes have been assumed to be predominantly to / from the south. As such 80% of the traffic generation is assumed to be left in / right out movements at Italia Road. Notwithstanding this, it results in minor increases in overall turning traffic with the dominant flows on the Pacific Highway.

A capacity assessment of the Italia Road intersection has been undertaken using the SIDRA intersection analysis package. The SIDRA modelling shows that the Italia Road intersection is expected to perform poorly in 2026 PM peak period irrespective of the proposed quarry with potentially greater delays and resultant queue increases. The addition of Eagleton Quarry traffic does not further reduce the Level of Service rating. In addition, it is understood that the neighbouring Boral quarry is likely to cease to operate within approximately 10 years and as such the SIDRA results for 2026 are conservative.

7.3.5 Traffic Safety Assessment

Italia Road / Access Road Intersection

The existing access road intersection is positioned on a straight, flat section of Italia Road, providing in excess of 200 metres of sight distance in each direction. Sight distance improvements could be made with the removal of trees within the road reserve on the western side of Italia Road, either side of the access intersection.

This proposed intersection upgrade would include pre-construction and post construction road safety audits as part of the design, construction and certification processes. As such a full safety assessment is not warranted at present because the intersection will be fundamentally changed as part of future works.

Italia Road / Pacific Highway Intersection

A preliminary safety assessment has been undertaken for the Italia Road / Pacific Highway intersection. An assessment of available sight distance to and from the intersection is considered the primary safety parameter. The required sight distance for the intersection can be broken into two cases.

- Safe intersection sight distance (SISD) for approaching vehicles to be able to observe a vehicle at the intersection and take necessary action to avoid a collision, stopping if necessary. This is the minimum sight distance which should be provided on the major road at any intersection.
- Minimum gap sight distance (MGSD) is the distance corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. This is the key decision parameter for the driver entering the major road.

Based on Austroads Standards, the SISD is 262m. The downhill grade of approximately 3% is factored in as it increases the required distance for a vehicle to stop safely. This is an additional 10m, increasing the SISD for the intersection to 272m for car to car observations. This is reduced by 28 metres to 244 metres using the shorter reaction time of 1.5 seconds. SISD was also calculated for heavy vehicles using empirical formulas. This returned a required SISD of 354m for trucks, the additional distance for extra braking requirements. The MGSD is calculated as between 167m and 250m for cars, and between, 365m and 420m for trucks.

Actual site distances are as follows:

- Car to car (1.1 m driver eye height to 1.1 m vehicle height) 275 m
- Car to truck (1.1 m driver eye height to 2.4 m truck height) 310 m
- Truck to truck (2.4 m driver eye height to 2.4 m truck height) 385 m

A comparison of these survey results to the theoretical SISD and MGSD calculations shows that the actual sight distance is marginal in a number of circumstances. A generalised description of these circumstances is provided as follows

- An approaching car has adequate sight distance for a waiting car or truck at the intersection.
- The calculations show that an approaching truck requires more distance to stop (354 m) than is available (310 m) but the differential is not critical in that a shorter reaction time reduces the distance required and the driver would have time to slow substantially to avoid a collision.
- The minimum gap sight distance for a car turning right is met (250 m versus 275 m) for the base calculation of 9 seconds decision and intersection clearance time.
- The minimum gap sight distance for a loaded truck has been calculated as 420 metres taking into account decision and intersection clearance time (15 seconds) but there is only 385 metres available. The time assumptions are critical in these circumstances because a 2 second reduction in gap acceptance reduces the requirement to 365 metres which is available.

An independent road safety audit was also carried out on the Italia Road intersection. The principal concerns of the audit team relate to the following issues:

- There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction. This is a Medium-High Risk Rating.
- SISD between the northbound highway travel lanes and the Italia Road junction is marginal for a car to car scenario, improved for a car to truck scenario. This is a Medium Risk Rating.

Eagleton Rock would undertake minor improvements to Italia Road to address the condition of the intersection identified in the first issue, which is expected to be limited to additional traffic signs and line-marking to reinforce the current operating arrangement.

In relation to the second audit issue, it is noted that rectification works to improve sight distance would involve adjusting the vertical alignment of the northbound lanes of the Pacific Highway, which would incur significant cost. The medium risk is deemed to be acceptable given the high cost of rectification works.

7.3.6 Construction Traffic Impacts

Construction traffic impacts are expected to be limited to the delivery of plant, quarry operation equipment and building materials, including ready mix concrete for infrastructure and site facilities.

It is expected that the construction based traffic generation would be less than the future operational traffic volumes as previously outlined. There may be more light vehicles in peak hour for construction personnel (estimated at 20) but these employees are more likely to travel in groups. Heavy vehicle arrivals would be more spasmodic across the day as building materials arrive during working hours.

A construction traffic management plan is not considered necessary for the Italia Road intersection with the Pacific Highway as it would operate as normal.

The proposed quarry access intersection with Italia Road would require some form of interim traffic control during working hours only.

It is proposed that the preparation of a construction traffic management plan would be prepared prior to the establishment of the site access and associated facilities.

7.3.7 Conclusions and Recommendations

The Traffic Impact Assessment has determined that the development will not have any adverse impact on the surrounding road network or operation of surrounding intersections.

The assessment also confirms that suitable design parameters have been adopted for the internal access roads, traffic circulation and on-site car parking.

Safety of the Italia Road, Pacific Highway intersection has been assessed geometrically in relation to sight distance and gap acceptance criteria for the intersection. The analysis shows that the intersection generally meets the required criteria and that sight and stopping distance are satisfactory.

7.4 Noise

An Acoustic Assessment has been prepared by Global Acoustic and is provided at **Appendix J**. Global Acoustic has undertaken an assessment of the existing noise environment, and has conducted an assessment of the proposed quarry operations against the relevant criteria.

Also note that this section does not assess blasting vibration and overpressure, which are assessed in **Section 7.5**.

7.4.1 Relevant noise assessment criteria

Operational Noise

The principal criteria applicable to the operation of the proposed development are contained within the EPA's *Industrial Noise Policy* (INP).

The INP establishes methods of determining the intrusiveness and amenity limits for noise. Whilst the intrusiveness criteria are established on existing background noise levels, the amenity criteria provide a cap for industrial noise based on the character of the existing environment with adjustments for areas subject to high existing industrial noise or road traffic noise levels.

The project specific noise criteria are established by identifying the lowest of the intrusiveness and amenity criteria to ensure that a conservative assessment is achieved. It is noted that in this case, the intrusiveness criteria has been selected as it falls below the amenity criteria. The intrusive criteria are established by measuring the existing background noise level and adding 5 dBA. **Table 7** sets out the criteria which will be used to assess the potential impact of the proposal during operations.

The two groups of residential receptors are those located on Six Mile Road and the dwelling located on Italia Road. These two areas have different background noise levels, and so different intrusive noise assessment criteria have been generated. For receptors on Six Mile Road a single background noise measure was taken, located at 266 Six Mile Road. This address is located almost equidistant between Pacific Highway and New Line Road, and therefore represents a conservative background noise level since it is unlikely to be affected by existing road traffic noise.

Table 7 – Project specific operational noise assessment criteria

Period	Receptors on Italia Road		Receptors on Six Mile Road	
	Measured Background Noise Level (L _{A90} dBA) ³	Project Specific Noise Level (L _{Aeq} dBA) ²	Measured Background Noise Level (L _{A90} dBA) ³	Project Specific Noise Level (L _{Aeq} dBA) ²
Morning Shoulder ¹	38	43	35	39
Day	44	49	36	41
Evening	43	48	34	39
Night	31	36	34	39

Notes:

- 1) The morning shoulder (5.00am to 7.00am) has been adopted as the midpoint between day and night periods, as per section 3.3 of the INP.
- 2) The governing criteria for the Project Specific Noise Level are the Intrusiveness Criteria.
- 3) Measured background noise level used for calculating criteria is the Rating Background Level (RBL).

In addition to the two groups of off-site residential receptors described above and in **Table 7**, there is a residential receptor located as part of the adjacent Port Stephens Gardenland landscape supplies facility, which is used by the manager of that facility. The same project specific noise criteria have been applied to this residence as for the Six Mile Road residential receptors, even though its existing background noise levels would be higher than the Six Mile Road receptors because it is located closer to all existing noise sources – being located immediately adjacent to the landscape supplies facility and the MX Central – Motor Cross track.

In addition, the INP establishes operational noise criteria for nearby commercial and industrial land uses, which apply when the facility is in use:

- Commercial receivers: $L_{Aeq, period}$ 65 dBA is acceptable, 70 dBA is maximum.
- Industrial receivers: $L_{Aeq, period}$ 70 dBA is acceptable, 75 is maximum.

Construction Noise

The NSW Interim Construction Noise Guidelines (ICNG) specifically relates to construction, maintenance and renewal activities. The guideline suggests that for short-term construction (not more than three weeks), a qualitative assessment will suffice and for longer-term construction, a quantitative assessment is required, with comparison to relevant criteria.

Six stages of construction are proposed for quarry establishment. These stages will be undertaken at separate times so that cumulative noise from more than one activity does not result. However, in total the proposed construction period exceeds three weeks, so a quantitative assessment has been prepared.

The ICNG recommended noise levels for the nearest residences in relation to work undertaken during standard construction hours are the measured background noise level (i.e. the RBL) plus 10dB. A threshold of 75dBA is also established as 'highly noise affected' as this is considered to represent the point above which there may be strong community reaction to noise. Standard construction hours are 7am-6pm Monday to Friday, 8am-1pm Saturdays, with no work on Sundays or public holidays.

Construction noise criteria for nearby residential receptors are set out in **Table 8**.

Table 8 – Project specific construction noise assessment criteria

Criteria	Receptors on Italia Road	Receptors on Six Mile Road
Rating Background Level (RBL)	44	36
Noise Affected Criteria	54	46
Highly Noise Affected Criteria	75	75

Road Traffic Noise

The NSW Road Noise Policy applies different noise limits dependent upon the road category and type of project or land use. Italia Road and the Pacific Highway are considered to be a sub-arterial road and a freeway respectively. The road traffic noise assessment criteria for these roads are the same as each other, as follows:

- Day time (7am-10pm): 60 dBA $L_{Aeq, (15 \text{ hour})}$
- Night time: (10pm-7am): 55 dBA $L_{Aeq, (9 \text{ hour})}$

Sleep Disturbance

To assess the possibility of sleep disturbance, the OEH *Road Noise Policy Guidelines* (RNP Guidelines) have been consulted to determine suitable criteria. The RNP criteria suggest that sleep disturbance is not likely when $L_{A1,1\text{minute}}$ (or maximum noise level) does not exceed the existing background levels by more than 15dBA.

In this instance, when 15 dBA is added to the existing background level, the criteria would be 46 dBA for receptors on Italia Road and 49 dBA for receptors on Six Mile Road.

Cumulative Noise Criteria

The cumulative impact of more than one development can be compared against the amenity criteria provided in the Industrial Noise Policy. The amenity criteria act like an overall cap on industrial noise levels at any receptor, but need to be adjusted to take into account existing industrial noise sources.

Existing noise levels from these other industrial facility is unknown. For the purpose of this assessment it has been assumed that logged period L_{Aeq} have been generated by road traffic at the Italia Road location, and, existing industry at the Six Mile Road location. In accordance with the INP the standard Rural Amenity Criteria have therefore been adjusted downwards by 2-4 dBA for Six Mile Road receptors to account for existing industrial noise, and upwards by between 1 and 6 dBA for the Italia Road receptor to account for existing highway traffic noise. Calculated cumulative noise criteria for residential receptors are shown in **Table 9**.

Table 9 – Cumulative noise criteria ($L_{Aeq, \text{period}}$)

Period	Italia Road Residential Receptors	Six Mile Road Residential Receptors	Commercial Receptors	Industrial Receptors
Morning Shoulder ¹	55	41	55	60
Day	58	46	55	60
Evening	53	43	55	60
Night	52	36	55	60

7.4.2 Impact Assessment

Noise Assessment Methodology

Noise levels were calculated using DataKustik CadnaA noise modelling software. The CONCAWE methodology was used to determine the acoustic impact of operational activities at selected receptor locations.

The modelling included consideration of the topography of the site and its surroundings as well as with consideration of meteorological data available from the Bureau of Meteorology weather station at Williamstown. Data analysis showed no prevailing meteorological condition as majority of wind speeds recorded were in excess of 5 m/sec. Therefore, the noise modelling was carried out for neutral atmospheric conditions only.

Road traffic noise calculations were performed using the CoTRN methodology.

Construction Noise Assessment

Six construction activities were identified for noise modelling, as follows:

- Vegetation clearing and stripping.
- Construction of access roads and intersection improvements.
- Site preparation for civil works.
- Civil works, including construction of haul roads, bridge crossing and dams.
- Installation of infrastructure.
- Road sealing.

Modelling assumptions and parameters for each construction activity is described in **Appendix J**.

Predicted construction noise levels were modelled for each receiver location for the six construction activities identified. Predicted noise results are compared to construction noise criteria. No exceedance of construction noise criteria is predicted for any construction task.

For Six Mile Road residential receptors, the highest modelled construction noise level is $L_{Aeq, 15-min}$ 41 dBA, well below the 46 dBA criterion. For the Italia Road residential receptor, the highest modelled construction noise level is $L_{Aeq, 15-min}$ 50 dBA, well below the 54 dBA criterion.

No exceedance of construction noise criteria is predicted for any construction task, with the exception of the manager's residence for the landscape supply operation where construction noise activities may exceed the construction noise management level by up to 5 dBA (but would remain below the highly noise affected criterion). Eagleton Rock is negotiating a private agreement with the owner of this property, who is also the owner of the Eagleton Quarry site.

Noise Generation from Operational Activities

Three operational scenarios were assessed summarised – being production at full capacity up to 600,000 tonnes per annum, for operational years 1, 5 and 10. Year 10 of the quarry operations is representative of the quarry operations from Year 10 to Year 30.

Within each of the three primary scenarios, a series of secondary scenarios were assessed, considering the various modes of operation proposed. Each mode of operation consists of various activities, some of which will operate concurrently

depending on the mode of operation. The seven activities included in the various quarrying operational modes are:

- Vegetation clearing and stripping.
- Drilling and blasting.
- Extraction.
- Processing. Note that acoustic barriers will be constructed adjacent nominated processing plant items (generally limited to crushers), and have been provided for in the noise model.
- Sales (i.e. including delivery trucks on the internal site access road extending along Barleigh Ranch Way and the right of way to the intersection with Italia Road).
- Maintenance / road building.
- Rehabilitation.

Modelling assumptions and parameters for each construction activity is described in **Appendix J**. Importantly, quarrying will advance generally in a north to south direction in 5 metre bench heights to ensure an operating face is maintained between the extraction area and receptors to the south.

It is also highlighted that the operational scenarios modelled include some of the same activities as have been modelled during construction (such as clearing and stripping, drill rig, excavators etc.). As such, whilst the construction and operational noise modelling scenarios are separate, the on-site activities associated with the modelled scenarios potentially represent a combination of construction and operational activities. Where this is the case the scenario has been assessed as an operational noise scenario and assessed against the operational noise criteria, which is a conservative approach to the noise impact assessment.

The comparison of the modelled noise impacts of worst-case operational activities for the residential receptor on Italia Road is summarised in **Table 10**. As can be seen in the table there would be no exceedances of the project specific noise criteria.

Table 10 – Impact assessment for Italia Road residential receptor

Period	L _{Aeq,period} (averaged over the period)			
	Project Specific Noise Level	Year 1	Year 5	Year 10
Day	49	37	38	37
Morning Shoulder	36	33	33	33
Evening	48	27	27	27

The comparison of the modelled noise impacts of worst-case operational activities for the residential receptors on Six Mile Road is summarised in **Table 11**.

Table 11 – Impact assessment for Six Mile Road residential receptors

Year	Receiver	Morning Shoulder (dBA LA,eq, period)	Day (dBA LA,eq, period)	Evening (dBA LA,eq, period)
Project Specific Noise Levels (dBA LA,eq, period)		39	41	39
Year 1	R3	33	39	28
	R6	34	40	29
	R7	35	41	31
	R8	34	40	29
	R9	33	38	29
	R10	35	39	30
	R13	34	38	29
Year 5	R3	35	39	30
	R6	37	40	32
	R7	37	41	32
	R8	37	41	32
	R9	36	40	31
	R10	35	39	30
	R13	35	39	30
Year 10	R3	35	39	30
	R6	37	41	32
	R7	37	41	32
	R8	37	41	32
	R9	36	40	31
	R10	35	40	30
	R13	35	40	30

There would be no exceedances of the project specific noise criteria at any receptor, with the exception of the manager's residence for the landscape supply operation where operational noise impacts may exceed the project specific noise criteria by up to 12 dBA. Eagleton Rock is negotiating a private agreement with the owner of this property, who is also the owner of the Eagleton Quarry site.

Road Traffic Noise

An assessment of the potential impact in traffic noise on Italia Road has been undertaken and the results are set out in **Table 12**. It is illustrated from the results that the proposal will not result in an exceedance of the established criteria. An assessment of the potential impact on the Pacific Highway has been considered unnecessary due to the high level of traffic on this road and the minor level of traffic which will be contributed by the proposal.

Table 12 – Predicted traffic noise on Italia Road (LAeq15hr(dBA))

Receptor	Day Limit	Year 1-5		Year 5-30	
		Peak Hour	Non-Peak Hour	Peak Hour	Non-Peak Hour
R01	60	58	56	58	56

Sleep Disturbance

An assessment of the potential impact of the proposal during the night has been assessed, noting that sleep disturbance results apply to the morning shoulder period. No exceedances of sleep disturbance criteria are predicted.

At the Italia Road residential receptor, $L_{A1,1\text{-minute}}$ noise was predicted to be 42 dB, below the 46 dB criterion. At the Six Mile Road residential receptors, the highest $L_{A1,1\text{-minute}}$ noise level was predicted to be 48 dB, below the 49 dB criterion.

At the manager's residence at the Port Stephens Gardenland landscape supplies facility night time noise impacts may exceed the sleep disturbance criterion by up to 9 dBA. Eagleton Rock is negotiating a private agreement with the owner of this property, who is also the owner of the Eagleton Quarry site.

Vacant Land Assessment

An assessment of vacant lot area is a requirement of the *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments*.

Assessment of vacant land in this policy is through evaluation of recommended maximum noise levels rather than project specific noise levels. Recommended maximum noise levels for a rural area are $L_{Aeq,period}$ 55 dB and 50 dB for the day and evening periods respectively.

Noise predictions for the Eagleton Quarry have been conservatively based on $L_{Aeq,15\text{-min}}$ which are generally 2-3dB higher than the $L_{Aeq,period}$ criteria. The noise modelling provided in Appendix J shows that neither the 55 dB (daytime) or the 50 dB (contour) extend significantly into any of the surrounding rural residential properties, and that the noise levels do not exceed these criteria over more than 25 percent of vacant lot area for any stage or time period.

Cumulative Assessment

For all of the residential receptors the cumulative noise criteria is higher than the project specific noise criteria. As such, compliance with the project specific noise criteria indicates compliance also with the cumulative noise criteria. No exceedances of the cumulative noise criteria for any residential receptor are predicted, except for the manager's residence at the Port Stephens Gardenland landscape supplies facility. Eagleton Rock is negotiating a private agreement with the owner of this property, who is also the owner of the Eagleton Quarry site.

7.4.3 Mitigation and Management

The results of the assessment have identified that there will not be any exceedance of the established criteria during normal production up to 600,000 tonnes per annum.

The noise modelling has assumed that noise barriers are located within 2m of nominated processing plant equipment. To ensure the noise modelling assumptions are reflected in the implementation of the quarry, the acoustic barriers would need to be of minimum height 4.8 metres, be of impervious construction (except for minimal openings required for conveyor pass through), and have minimum density of 20 kg/m². Barriers would need to be constructed within 2 metres of specific plant items, as follows:

For the initial diesel powered plant configuration, barriers would be required on the:

- West side of the Jaw Crusher, minimum length 12 metres. Barrier to extent as far south as practical without impeding the excavator;

- South side of the Northern Cone Crusher, minimum length 18 metres;
- South-west side of the North-eastern Cone Crusher, minimum length 12 metres; and
- West and south sides of the VSI Crusher (an 'L' shaped barrier), 18 x 6 metres with long leg oriented north/south.

For the ultimate electric powered plant configuration, barriers would be required on the:

- South side of the Jaw Crusher, minimum length 12 metres; and
- Western side of the Secondary and Tertiary Crushers (entire length of feed tower structures, with 5 metre extension to south).

7.5 Blast Vibration and Overpressure

An assessment of blast vibration and overpressure has been included as part of the acoustic report, provided in **Appendix J**.

7.5.1 Assessment Criteria

Blast vibration and overpressure criteria have been adopted from the Australian and New Zealand Environment and Conservation Council (ANZECC) publication '*Guidelines to minimise annoyance due to blasting, overpressure and ground vibration*'. These guidelines specify the following levels of peak particle velocity (PPV) from ground vibration:

- Not exceed 5mm/s for more than 5% of the total number of blasts over 12 months;
- Maximum level should not exceed 10mm/s at any time; and
- 2mm/s should be a long term regulatory goal.

ANZECC also recommend the following guidelines for air blast overpressure:

- Not exceed 115 dBA L_{peak} for more than 5% of the total number of blasts over a period of 12 months; and
- Maximum level should not exceed 120 dBA L_{peak} .

Furthermore, the guidelines state that blasting should generally be limited between 9:00am to 5:00pm on Monday to Saturday and should not take place on Sunday or public holidays.

Blast overpressure at sufficiently high levels in the range of 133 dB and above may cause structural damage to some building elements such as windows. However, this is well in excess of annoyance criteria specified above.

For assessment of damage due to ground vibration, Australian Standard AS2187.2-1993 Explosives – Storage, Transport and Use contains an appendix specifying recommended levels for peak vibration velocity to protect typical buildings from damage. These are:

- Structures that may be particularly susceptible to ground vibration – 5mm/sec;
- Houses and low rise residential buildings; commercial not included below – 10mm/sec; and

- Commercial and industrial buildings or structures of reinforced concrete or steel construction –25mm/sec.

Blast overpressure of 133 dB has been adopted as the project specific criterion for structural damage. For ground vibration, a PPV criterion of 10 mm/sec has been adopted for residential buildings, and a PPV of 25 mm/sec has been adopted for commercial and industrial buildings.

7.5.2 Impact Assessment

It is proposed to have 12 blasts per year, an average of one per month, with 100 holes per blast.

Three receptors closest to the blasting area were selected for assessment, other receivers further from the blast location should experience noise and vibration levels lower than predicted for those nearest.

The allowable maximum instantaneous charge (MIC) mass per blast to comply with the blast vibration and overpressure levels was calculated. The limiting MIC for private residences for all the blasts would be overpressure related.

The landscape supplies facility manager's residence and nearest commercial buildings are approximately 300 metres from the active quarry area at the closest point. MIC limits to ensure blast criteria are met have been calculated at these receptors. The maximum allowable MIC will be vibration related for these receptors. Higher MIC will be possible when blasting at greater distances.

Power lines are located north, south and east of the quarry, with the closest power lines located approximately 900 metres from the nearest blast area. Due to the distance to power lines, and the higher 25mm/s PPV threshold, limiting MIC to allow compliance at residences will, by default, provide compliance for power lines.

7.5.3 Mitigation and Management

Careful blast design and shot firing will be employed to ensure that the quarry would be operated to comply with Blast MIC levels and avoid possible blast impacts. Multiple blast monitors will be used for initial blasting to establish site-specific K and B constants. This will allow more accurate blast vibration predictions and therefore optimisation of the allowable MIC. Dilapidation surveys will be conducted at any potentially affected receivers prior to initial blasting activities.

7.6 Air Quality

An Air Quality and Greenhouse Gas Assessment has been undertaken by Pacific Environment and is provided at **Appendix K**. Pacific Environment has examined the existing air quality environment and has undertaken detailed modellings of the expected emissions to be released as part of the quarry operations. From these investigations an assessment of the potential impacts has been carried out and recommendations to be implemented during the construction and operational phase of the proposed development identified.

7.6.1 Relevant assessment criteria

PAE Holmes has identified the relevant criteria are required be adopted in the assessment of the potential emissions from the proposed development. The identified criteria have been developed by the Environmental Protection Authority (EPA) and are health based. The relevant criteria include:

- *EPA Air Quality Standards for Particulate Matter Concentrations*; and

- *EPA Criteria for Dust (Insoluble Solids) Fallout.*

Under the EPA Air Quality Standards for Particulate Matter Concentrations, the emissions will be assessed against criteria for Total Suspended Particulates (TSP) and Particulate Matter less than 10 microns (PM₁₀). The emissions will be assessed against the EPA standard for an averaging period as follows:

- TSP – 90 mg/m³ Annual Average
- PM₁₀ – 50mg/m³ 24-Hour Average
- PM₁₀ – 30 mg/m³ Annual Average

The above EPA criteria are consistent with the *National Environment Protection Measure for Ambient Air Quality* (Ambient Air-NEPM 1988), yet include further measures of air quality such as dust deposition.

Acceptable criteria for deposition of dust relate to an incremental increase of 2g/m²/month and a total maximum dust deposition rate of 4g/m²/month.

7.6.2 Existing environment

Meteorology

The local meteorological conditions are a major influence in the air quality environment. Generally, winds are predominantly from the west north west, except for summer, where winds predominantly arrive from the north east to the south. A wind rose of the existing environment is provided in the Air Quality and Greenhouse Gas Assessment at **Appendix K**.

Air Quality

The existing PM₁₀ concentrations for the area were assessed at three different sites which are publicly accessible (Beresfield, Newcastle and Wallsend). The average annual PM₁₀ concentration for the closest monitoring site (Beresfield) was 20.4 µg/m³. Due to the surrounding residential and industrial sites in Beresfield, this is a highly conservative estimate of PM₁₀ concentrations at the proposed Eagleton Quarry site.

As with Pm10, the closest monitoring site for PM2.5 is at Beresfield, which recorded a background annual average PM2.5 concentration of 7 µg/m³.

No TSP concentration data has been available for analysis. Despite this, an annual average of TSP concentration can be ascertained from assuming that 40% of the TSP is PM₁₀. As such, it is considered that the existing annual average TSP concentration is approximately 50 µg/m³.

The locality is already impacted by the existing Boral Quarry. However, the Boral Quarry does not monitor dust, and no other local data that characterised this location for dust deposition has been identified. As such, data from Lynwood quarry were used. The median of the monthly values identified at Lynwood Quarry was 1.8 g/m²/month, which is the figure which will be adopted at the site.

In summary, the existing air quality environment at the site is estimated to consist of the following factors:

- Annual average PM₁₀ concentration of 20 µg/m³;
- 24-hour PM₁₀ concentrations – daily varying;
- Annual average PM2.5 concentration of 7 µg/m³;
- Annual average TSP concentration of 50 µg/m³; and

- Annual average dust deposition of 1.8 g/m²/month

7.6.3 Quarry Emission Sources

Construction Phase Emissions

PAE Holmes has identified that dust and particulate matter emissions will be the principal emissions during the construction phase of the proposed development. The following activities have been identified as potentially causing emissions:

- Site preparation works including vegetation clearing, bulk earthworks and access road construction;
- Excavation and stockpiling of excavated material;
- Movement of heavy plant and machinery within the site;
- Graders / scrapers working access road construction; and
- Wind erosion from exposed surfaces.

Operational emissions

A number of sources of emissions have been identified. **Table 13** summarises the annual dust emissions expected to be generated during the maximum throughput scenario of 600,000 tonnes per annum, with processing activities limited to daytime hours.

Table 13 – Estimated Annual Dust Emission

Activity	TSP (kg/y)	PM ₁₀ (kg/y)	PM ₁₀ (kg/y)
Extraction Area			
Drilling rock	1,328	690	40
Blasting rock	1,304	678	39
Excavator loading	622	294	45
Hauling to Processing area	24,818	6,377	638
Processing Area			
Unloading at processing area	311	147	22
Rehandle rock to hopper	311	147	22
Primary Crushing	360	162	30
Secondary Crushing	360	162	30
Tertiary Crushing	360	162	30
Crushing (Fines)	900	360	21
Screening (controlled)	660	222	15
Fines Screening (controlled)	1,080	660	660
Pug Mill	180	110	110
Stacking stockpiles - aggregate	311	147	22
FEL loading trucks - aggregate	622	294	45
Hauling product to site boundary	12,409	3,188	319
Hauling product to Italia Road	36,370	6,981	1,689
Grading roads	1,412	1,412	1,412
Wind Erosion			
WE - Extraction Area	26,798	13,399	2,010
WE – from conveyors	27	14	2
WE - Processing Area (stockpiles)	416	208	31
Total	110,959	35,816	7,232

Emission estimates have been conservatively based on diesel processing equipment being used. The ultimate arrangement using electrically powered processing equipment will result in lower emissions as a result of less diesel combustion at the site.

It is highlighted that best practice management and controls have been assumed in establishing operational emissions, including:

- Use of water carts/trucks to control emissions from haul roads.
- Enforcement of speed limits onsite and on right of way.
- Progressive rehabilitation of exposed areas.
- Application of water at the crusher and on conveyor transfer points.
- Minimising drop height of material during truck loading and unloading.
- Use of water sprays when drilling.
- Sheltering of stockpiles and transfer points where possible.
- Proper blast design.
- Management of dust generating activities during unfavourable meteorological conditions.

7.6.4 Impact assessment

Construction Dust Assessment

It has been considered that these emissions will be significantly lower than the emissions experienced in the operational phase of the development. As such, Pacific Environment has conducted a risk assessment. Where there is risk of an impact, then site-specific mitigation will be required in proportion to the level of risk. This risk assessment concludes that the risk of dust soiling, human health and ecological impacts during earthworks are assessed as being medium. Impacts caused by construction and track-out are considered to be low.

Pacific Environment provides a number of recommendations to minimise dust emissions during construction, noting that most of the recommended measures are routinely employed as 'good practice' on construction sites. At Eagleton Quarry, particular attention should be paid to controlling dust generated by earthworks due to the risk level of this activity compared to construction and track-out risks.

These recommendations and any further management/mitigation measures will be included in a Dust Management Plan. However, even with a rigorous Dust Management Plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time. There is the risk that the on-site office buildings as well as the small number of residential properties and businesses in the immediate vicinity of the site boundary might experience some occasional dust soiling impacts. This does not imply that impacts are likely, or that if they did occur, that they would be frequent or persistent. Given the distances between the construction sites and the receptors, overall construction dust is unlikely to represent a serious ongoing problem. Any effects would be temporary and relatively short-lived, and would only arise during dry weather with the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are not being fully effective. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the residual effects will be 'not significant'.

General Modelling Results

The Air Quality Assessment has been undertaken in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Department of Environment and Conservation, 2005). The CALMET/CALPUFF modelling system has been selected to perform the modelling which takes into account meteorological conditions. Modelling has been conservatively based on emissions occurring between 7am-6pm, noting that no extraction or processing will occur after 6pm.

Modelling has identified that no privately owned receivers are predicated to experience ground level concentrations above the relevant assessment criteria for PM₁₀ concentrations, PM_{2.5} concentrations, TSP concentrations and dust deposition levels.

The predicted incremental ground level concentrations at the receptor locations have all been shown to fall below the relevant criteria, including at the manager's residence for the adjacent Gardenland landscape supplies facility. The largest off-site ground level concentration will occur at the closest off-site receptor, located south of the site on Six Mile Road. The concentration at this receptor will be significantly below the relevant criteria. **Table 14** summarises the modelled air pollutant concentrations for the most affected receptors, all of which are well below the relevant criteria. In the table, receptor R34 is the Italia Road residential receptor. The other 5 receptors are located on Six Mile Road.

Table 14 – Predicted ground level concentrations at key receptor locations

Receptor ID	PM ₁₀		PM _{2.5}		TSP	DD
	24 Hour	Annual	24 Hour	Annual	Annual	Annual
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	g/m ² /month
Criteria	50	30	8	25	90	2
R34 (Italia Road)	5.5	0.4	1.3	0.1	1.0	0.1
R7	5.2	0.4	1.1	0.1	0.6	0.04
R6	4.4	0.3	1.0	0.1	0.5	0.03
R8	4.2	0.3	0.9	0.1	0.5	0.03
R5	4.1	0.3	1.0	0.1	0.4	0.03
R4	3.4	0.2	0.8	0.1	0.4	0.03

In addition to dust emissions, blasting causes the emission of nitrogen oxide. Due to low amounts of ANFO proposed to be used at the Eagleton Quarry and the historical analysis of Hunter Valley mines which shows that 80% of blast plumes do not result in NO₂ levels above the ambient levels, it is considered that that there is minimal risk of adverse NO₂ impacts due to blasting at the quarry.

Kings Hill Area

The potential impact on the Kings Hill area has been assessed due to the potential for an increased residential community. The Kings Hill area, located up to four kilometres south of the site, has an approved rezoning for up to 4,500 residencies. The above modelling has demonstrated that future residents in this area will not experience adverse air quality conditions as a result of the proposed development.

Cumulative Impact Assessment

The cumulative assessments of PM₁₀ and PM_{2.5} concentrations at the worst impacted receptors have been plotted in **Appendix K** showing the cumulative 24-hour average concentration compared with the assumed background. Pacific Environment's analysis of these plots is that the addition of the project would be unlikely to result in any days over the impact assessment criteria level, and that the project has a very minimal impact on current PM₁₀ and PM_{2.5} concentrations.

The predicted pollutant concentrations, including the emissions from Gardenland, at each of the sensitive receptors have been added to the adopted background levels. There are no privately owned receivers that are predicted to exceed the annual average assessment criteria when existing background concentrations are included.

7.6.5 Mitigation and Management

As described in Section 7.6.3, the Eagleton Quarry would implement a number of best practice mitigation measures on-site to ensure that dust impacts are minimised. These measures have been assumed in the dust modelling, and would need to be implemented to ensure the development is consistent with the modelling.

In addition to these measures, Eagleton Rock will commit to the installation of an air quality monitor at a location representative of nearby receptors.

7.6.6 Greenhouse Gas Assessment

An assessment of the predicated greenhouse gas emissions has been carried out to determine the potential impact of the proposed development. The greenhouse gas emissions have been separated into three distinct categories, consisting of:

- Direct greenhouse gas emissions;
- Energy product use indirect greenhouse gas emissions; and
- Other indirect greenhouse gas emissions.

Pacific Environment has estimated that the average annual greenhouse gas emissions generated by the proposed development would be 0.04 Mt CO₂-equivalents representing approximately 0.0003% of Australia's average annual commitment under the Kyoto Protocol. This is considered to be a very small portion of Australia's commitment, and an even smaller portion on a global scale. This estimate is based on concurrently use of diesel and electricity to operate the processing plant. In reality, the emissions will be significantly lower as the plant will not be operated as diesel and electricity at the same time.

7.7 Land Resources

7.7.1 Soils and Land Capability

The potential for erosion exists due to the relatively high dispersiveness of the soils in the broader Seven Mile Creek catchment, particularly in the lower parts of the catchment (i.e. downstream of the site). Provision has been made for erosion protection downstream of the creek crossing.

There is currently no known contamination at the site, and contamination is not expected due to the lack of development that has occurred. Prior to final closure, a preliminary investigation into potential sources of contamination including additional Phase 1 sampling and analysis will be undertaken. This will be used to determine whether a detailed assessment (for example, Phase 2 sampling and

analysis) should be conducted to quantify the amount of contaminated material that may require remediation.

Where possible all identified sources of contamination will be remediated during the operational phase of the site. In some cases, this may not be possible and in these circumstances the remediation will be undertaken following closure and during the decommissioning phase.

7.7.2 Landform and Geotechnical Stability

Landform design and modelling will be undertaken during closure planning. Areas of rehabilitation will be designed to achieve a stable final landform commensurate with the surrounding environment. The proposed quarry operation will result in a final landform that comprises a series of 10 m wide and 15 m high benches at the western end of the quarry.

The final landform must provide long-term stability. Overall slopes will be no greater than 1:3 (V:H), achieved by re-contouring overburden or using in situ material. Elements such as drainage paths, contour drains and ridgelines will be shaped, as much as practical, to undulating profiles in keeping with natural landforms of the surrounding environment.

To ensure the safety of the final void, the surrounding final slopes should be left in a condition where the risk of slope failure is minimised. This may require the benches to be battered back from the vertical to enable a stable overall slope angle. Prior to closure, investigations will be undertaken to confirm a range of geotechnical criteria, including:

- Height and inclination of slope and number and spacing of intermediate benches;
- Shear strength of the highwall soils and rocks;
- Density and orientation of fractures, faults, bedding planes, and any other discontinuities, and the strength along them; and
- The effects of the external factors, such as surface runoff.

The floor of the quarry will be predominantly free draining and will not have a final void. Several minor depressions will however be created along the in the alignment of the drainage line. These minor depressions will help reduce erosion potential, enhance the sediment trapping capacity and in the longer term increase habitat value of the quarry floor which is to be vegetated with native species.

The geotechnical stability of the final landform would be monitored annually to identify any landform slumping, and to assess any features that could impact on the performance of the final surface water management system.

7.7.3 Farmland and Rural Industries

The Eagleton Quarry site is located near the top of a heavily vegetated ridge. Land to the north comprises the existing Boral Seaham Quarry. West of the site is a continuation of the vegetated ridgeline. South of the site is also a continuation of the vegetated landscape, with the land falling away to Six Mile Road, which contains rural residential properties, some of which may be carrying out smaller agricultural activities.

To the east of the site is an existing composting facility and a range of entertainment land uses including paintball and car racing.

There is no significant farmland or agriculture taking place at the Eagleton Quarry site, or in the immediate vicinity of the site.

7.7.4 Land Use Compatibility

Clause 12 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* requires that the consent authority consider the compatibility of the proposed extractive industry with the surrounding land uses – both existing land uses and likely future preferred uses.

The existing surrounding land uses are described in Section 2.4 and are generally limited to a quarry, rural industries, and entertainment facilities that are not sensitive land uses and would not be considered to be incompatible with the proposed quarry.

The nearest off-site residential dwellings are located approximately 1km to the southwest of the site along Six Mile Road. The minimum lot size is 40ha, indicating that significant intensification is unlikely to occur in the near future along Six Mile Road.

The Kings Hill residential area is predicted to result in significant residential intensification. However, the closest future development areas of Kings Hill are located over 1km south-east of the quarry, and area generally limited to land within 500m of the Pacific Highway. An existing ridgeline exists between these parts of Kings Hill and the quarry site, indicating that any visual or acoustic impacts to these future residential areas would be lower than the impacts at the closest existing residents on Six Mile Road.

Environmental assessment through this EIS has determined that the quarry can operate without causing significant amenity impacts to the existing residences on Six Mile Road. As such, the proposed Eagleton Quarry is considered to be compatible with existing and likely future surrounding land uses, including the future residential areas of Kings Hill.

7.8 Water Resources

A Surface Water Assessment has been prepared by Umwelt (Australia) Pty Ltd and provided at **Appendix M**. This Assessment has examined the potential water resource impacts of the proposed development through an analysis of the existing environmental conditions and the projected operation of the development. A number of strategies and mitigation measures have been suggested to manage the potential impacts of the proposed development.

7.8.1 Existing Environment

Landform and Catchments

The surface water characteristics of the site are dominated by Seven Mile Creek which runs through the site from north to south. Seven Mile Creek originates to the west of the site, with the watershed at an elevation of close to 130 m AHD. The upper slopes of the Seven Mile Creek catchment area are hills with grades of between 10 per cent and 20 per cent.

The Seven Mile Creek catchment is typically steep with undulating hills covered with woodland areas and some pastoral grasses. The vegetation within the catchment exhibits considerable variation in the density of the undergrowth.

The initial creek gradients are relatively steep, but becoming flatter further downstream. Adjacent to the proposed quarry, Seven Mile Creek has stream width of typically 1 to 3 metres in extent with an average bed slope of approximately 1 per cent. However, the bed slope is variable with a mixture of pools and riffles along its length. Seven Mile Creek is characterised by a diverse bed matrix, including side bars in areas of deposition comprising well rounded

pebble sediments in a light brown sandy clay matrix, together with branches and debris from the woodland area.

Downstream of the site, Seven Mile Creek flows in a south easterly direction through woodland area, under the Pacific Highway and down to Grahamstown Dam approximately 2km to the southeast of the site.

Seven Mile Creek is a third order watercourse according to the Strahler system for classifying watercourses. In the part of the site relevant to the proposed quarry, there are two second order watercourses, and four first order drainage lines.

Seven Mile Creek flows intermittently and is therefore not a major stream in terms of catchment yield, but the water quality is of significance given the presence downstream of Grahamstown Dam. Grahamstown Dam supplies a significant proportion of the Lower Hunter region's potable water requirements, varying from 30 per cent to 75 per cent, depending on the rainfall. Grahamstown Dam has a direct catchment of 115 square kilometres (or 11,500 ha), of which the Seven Mile Creek catchment comprises 2.6 per cent.

The 30 hectare extraction area for the Eagleton Quarry therefore represents only 10% of the Seven Mile Creek catchment and less than 0.3% of the Grahamstown Dam catchment.

Existing Water Quality

Water quality in Seven Mile Creek is of significance given the presence downstream of Grahamstown Dam. Hunter Water Corporation note in its *Catchment Management Plan* that the use of the land for grazing within the Seven Mile Creek catchment can result in sediment and nutrient loading issues. It is also noted that Boral's Seaham Quarry occupies approximately 35 ha of the upper most section of the Seven Mile Creek catchment, and discharges to Seven Mile Creek in accordance with its Environment Protection Licence.

Hunter Water Corporation has monitored water quality data in Seven Mile Creek approximately 100m downstream of the Pacific Highway and the nearby Nine Mile Creek downstream of the Pacific Highway. A summary of these water quality results is provided in **Table 15**.

Project specific water quality monitoring was also carried out for the proposal, and the data obtained is summarised in **Table 15**. All on-site tests were analysed for Total Petroleum Hydrocarbons, BTEX, Polycyclic Aromatic Hydrocarbons, Organochlorine Pesticides and Organophosphorus Pesticides. No detectable concentrations of these chemicals were recorded in any samples.

Existing water quality data are compared against the criteria set out in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Lowland coastal flowing rivers in NSW (ANZECC criteria) in **Table 15** below. As can be seen in the table, water quality in Seven Mile Creek is frequently outside the trigger values. This indicates that site-specific values will need to be determined for assessment of potential impacts.

Table 15 – Existing water quality and ANZECC guideline values

Water Quality Variable	Monitoring Data – Average of HWC monitoring data		Project Specific Water Quality Monitoring Seven Mile Creek	ANZECC Guidelines Trigger Values
	Seven Mile Creek	Nine Mile Creek		
Total Phosphorus (mg/L)	0.12	0.08	0.04 – 0.41	0.025
Total Nitrogen (mg/L)	1.04	0.97	0.6 – 3.7	0.35
Ammonia (mg/L)	0.06	0.08	-	
Conductivity (µS/cm)	475	226	144 – 610	125 – 2,200
Turbidity (NTU)	161	62	-	
Total Suspended Solids (mg/L)	-	-	<5 – 870	40
Total Dissolved Solids (mg/L)	-	-	271 – 336	
pH	7.2	6.5	6.85 – 8.03	6.5 – 8
<i>E. coli</i> (MPN/100mL)	1,470	153	-	
Enterococci (col/100 mL)	365	234	-	

Notes: 1) Sample not analysed to charge balance, Total Dissolved Solids (TDS) based on major cations and anions only

Existing Flooding Regime

The flooding characteristics of Seven Mile Creek catchment were modelled for the 100 year ARI 9-hour storm event, using a hydrodynamic model which simulates natural rainfall-runoff processes and the performance of natural systems. Flooding extents, peak flow rates and peak velocities were calculated by the model.

The flood modelling indicated that the peak velocities within the creek system are not excessive, typically within the range of 1.0 to 1.6 m/s, and that there are no areas of significance currently impacted by flooding.

As shown in **Figure 15**, the extent of flooding around Seven Mile Creek in the vicinity of the site is very localised to the river channel. Downstream towards the flood extent becomes more substantial. The potential impact of the proposal is assessed in **Section 7.8.5** below.

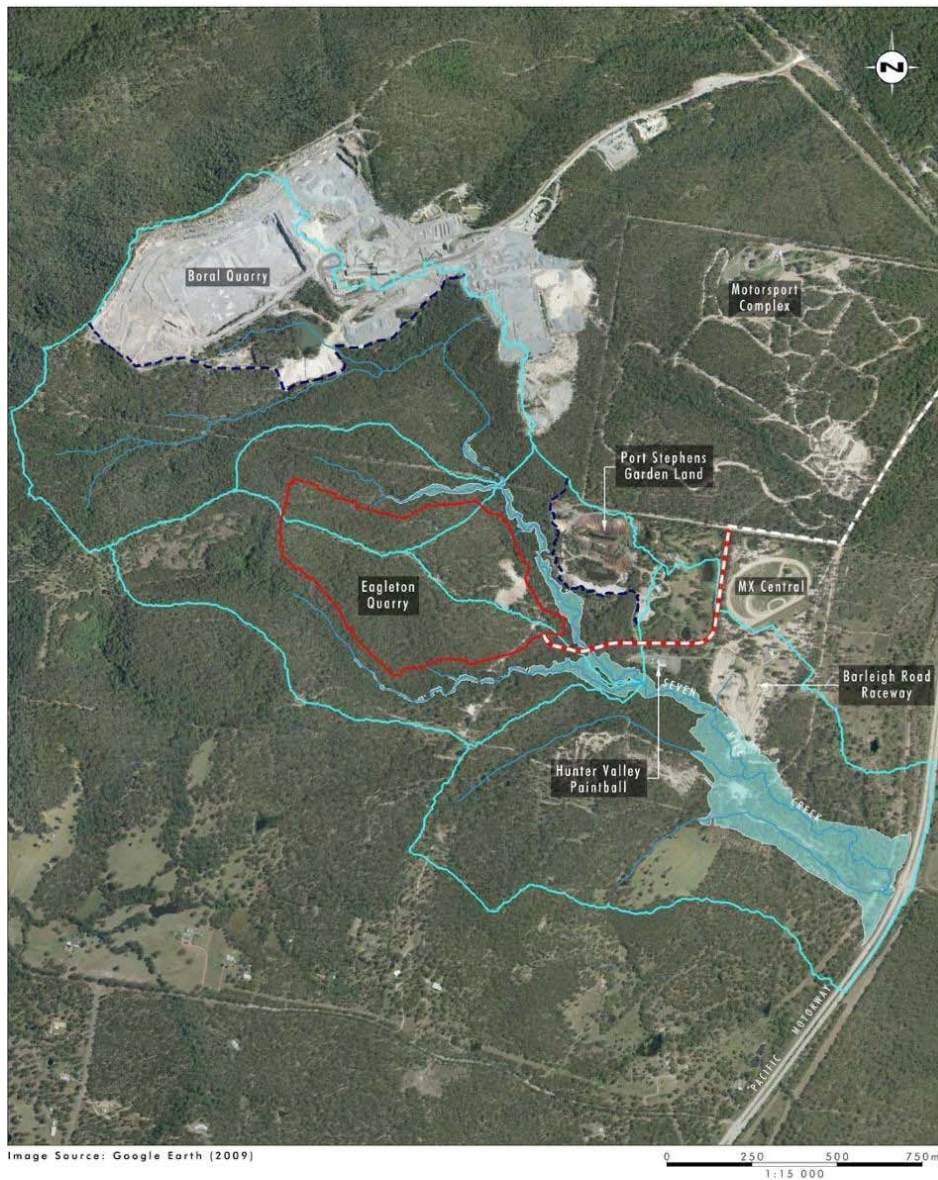


FIGURE 2.6
100 Year Flood Extents
Seven Mile Creek

Figure 15 – 100 Year Flood Extents of Seven Mile Creek and its tributaries
Source: Umwelt

Water Access Licencing

The site is located within the Sydney Basin – North Coast Groundwater Source. Based on the NSW Office of Water website there are 149 Water Access Licences within this groundwater source with a total licenced volume of over 57,000 ML/year. The long-term average annual extraction limit for the groundwater source has been established as 90,000 ML/year. The total volume of unassigned water is 3,453 ML/year.

7.8.2 Water Management System

The proposed construction and operational activities for the Eagleton Quarry are located upslope of Seven Mile Creek, with the potential to impact on the existing watercourse system and downstream water bodies. Under Section 120 of the *Protection of the Environment Operations Act 1997*, it is an offence to pollute waters or cause harm unless licensed to do so. Inherent in the concept of not causing harm is the need to manage the risk of spilling from water management dams or related infrastructure.

It should be noted that the relatively steep topography and the requirement to remain outside of the 40 metre creek buffer zone has resulted in limited space available in the immediate vicinity of the quarry for water management works. Particularly, the extent of the quarry extraction area has been contained to the north and the south by the two second order watercourse. Further, due to the location of this site on the upstream edge of the catchment, only a limited amount of clean water diversion is required.

The Water Management System is intended to contain runoff from the quarry area to prevent impacts on the water quality of the downstream catchment, and includes the following:

- a clean water diversion channel on the western side of the quarry to keep clean water out of the quarry, although with a very limited catchment estimated at around 0.2 hectares;
- dirty water catch drains constructed on the perimeter of the quarry extraction and infrastructure area, being primarily channels excavated in rock or with a grassed invert and rock erosion protection, depending on the founding conditions.
- two primary water management dams located downstream of the dirty water catch drains outside of the quarry extraction area providing a total water storage capacity of around 57 ML;
- an additional channel sediment trap constructed on the dirty water catch drain at the change in grade;
- excavation during the operational phase of additional deep “sumps” excavated into the quarry floor by creating a slope of approximately 2.5% away from the central access road, with a 1 to 1.5m high bund maintained around the perimeter of the extraction area.

The design criteria for the components of the water management system are:

- Clean water diversion – 100 year ARI.
- Quarry operational areas – contain runoff from Quarry during a 100 year ARI 24 hour flood event. All dirty water catch drains will be sized for the 100 year ARI event.
- Rehabilitated areas – 95th percentile 5 day rainfall event.
- Whole of quarry – safe conveyance of runoff up to the Probable Maximum Flood.

The water management system has been designed so that no discharge from the site is expected to occur during events up to the 100 year ARI 24 hour storm event.

For the internal site access road crossing Seven Mile Creek the bridge been designed with a conveyance capacity that can accommodate the peak runoff in Seven Mile Creek from the 100 year ARI nine hour storm event before overtopping. The surface of the access road crossing Seven Mile Creek will drain

towards the south-western side of the creek, where runoff will be contained in the access road sediment dam. Water will be abstracted from this facility for dust suppression to ensure the risk of spilling is in line with the WMS design requirements.

A schematic representation of the Water Management System is provided in **Figure 16**, and plans of the Water Management System are provided in **Figure 17**, for Year 1 of quarry operations, and **Figure 18** for Year 5 and onwards.

The proposed water management system will be largely put in place at the commencement of quarrying activities and will remain in place over the 30 year life of mine with minimal changes.

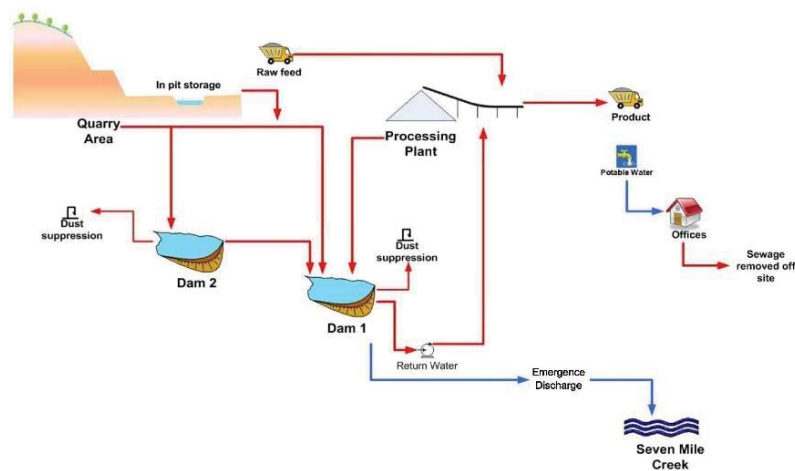


Figure 16 – Schematic Water Management System

Source: Umwelt

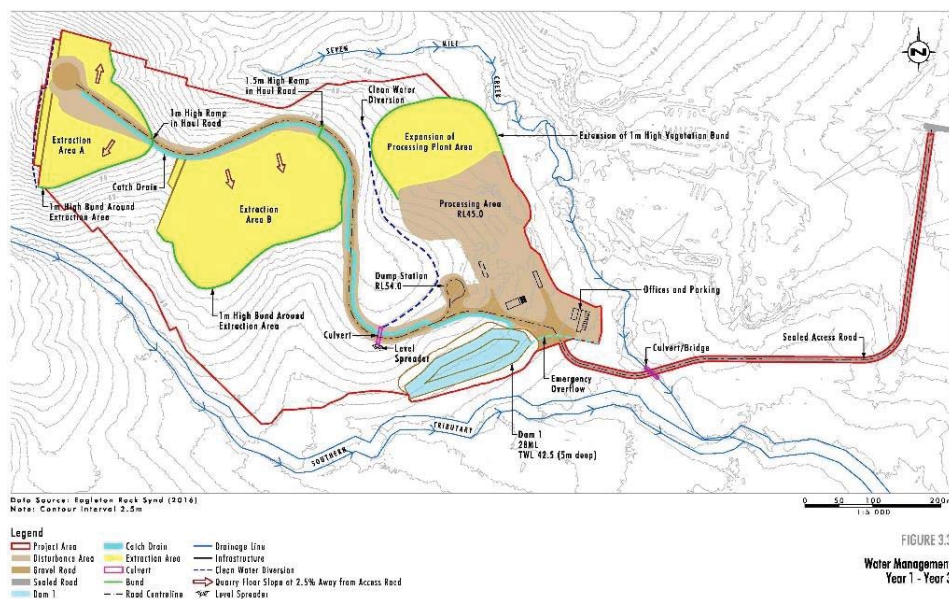


Figure 17 – Water Management System Plan – Years 1-3

Source: Umwelt

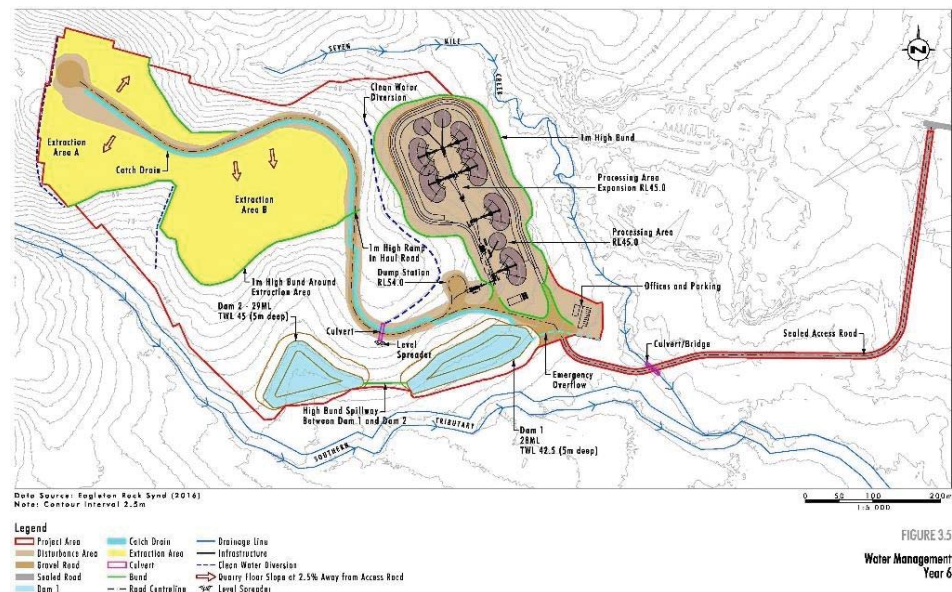


Figure 18 – Water Management System Plan – Year 6

Source: Umwelt

7.8.3 Site Water Balance

A detailed predictive site water balance has been prepared for the site, based on consideration of a number of factors including, rainfall, historical evapo-transpiration rates for the site, and the nature of existing catchments and watercourses.

After an examination of surrounding Bureau of Meteorology stations, Umwelt has identified that the average yearly rainfall is 1,126.7 mm. An analysis of evaporation rates in the area has also identified that the average yearly evaporation is 1,731 mm, once adjusted to account for site characteristics. From this analysis, it is expected that the proposed quarry site will only have a surplus rainfall over evaporation for two months of the year (May and June).

The availability of water on-site and ability to contain runoff on-site has been analysed for a range of operational stages using 43 years of daily rainfall and runoff data. The predictive water balance model shows that the availability of water for processing and dust suppression and the volume of water stored on-site vary significantly. However, the analysis shows that the quarry could be operated without the need to import significant volumes of water for processing and dust suppression and without the need for discharges from the site to Seven Mile Creek.

7.8.4 Groundwater Modelling

In February 2014 URS undertook a hydrogeological investigation for Eagleton Hard Rock Quarry. The URS report provides the baseline data to inform the groundwater modelling and assessment, and is provided at **Appendix L**.

In accordance with SEARS for the project, the groundwater report was peer reviewed by Brian Rask of SLR and the findings of the peer review set out in a report dated 9 February 2016 is provided in **Appendix M**. The peer review raised a number of issues in regard to the 2014 URS report. The conceptual geological model that was used by URS has been revised and a new groundwater model built for the site by Umwelt.

Details of the conceptual geological model that was developed and the revised groundwater model are set out in the report 'Numerical Groundwater Model for Eagleton Quarry (October 2016)' which is provided in **Appendix M**.

The revised numerical groundwater model was subject of a further full technical peer review by Brian Rask of SLR in October 2016, which concludes that the groundwater modelling, and associated impact assessment, is fit for purpose to address the requirements of the SEARs and Aquifer Interference Policy. A copy of the Peer Review of the Umwelt groundwater model is provided at **Appendix N**.

Based on the revised geological model, simulation of groundwater conditions and changes to the groundwater regime of the 30 year life of the quarry was undertaken and groundwater inflow rates at various times over the life of the quarry estimated. Inflows varied from 3 ML in year 1 of quarry operations to 7.7 ML in year 24.

Modelling indicates that maximum drawdown of the groundwater table as a result of the proposed quarry is limited to the site with the relatively slow extraction progress over 30 years reducing the impact of drawdown significantly.

Modelling also shows that there is limited impact of drawdown outside of the site with a drawdown of less than 1m likely to extend to approximately 200 m to the west, north and south of the quarry extraction area.

Modelling indicates that the potential for cumulative impact is minor based on the limited propagation of drawdown outside of the property boundary with depressurisation of 1 m or less in the underlying fractured rock aquifer predicted within the property boundary.

7.8.5 Impact Assessment

Water Quality

The water management measures including storage and containment of potentially affected water, reuse of water and the management of the overall water balance are intended to prevent uncontrolled spillage of water affected by quarry operations.

The water management system includes significant water storage volume in order to prevent spilling for events at least up to the 100 year ARI 24 hour storm event. The water balance indicates that the quarry can be operated without the need to discharge.

In addition to the storage dams and in-pit storage for the management of water from operational areas, the following is proposed:

- Internal treatment systems will be installed to contain and treat TSS and hydrocarbons should oil spillages occur.
- Sewage will be contained within a pump out system and removed off site.

With the implementation of the proposed water management system, it is estimated that there is a low risk of impacting on the water quality of the downstream watercourses.

The site is located within Grahamstown Dam catchment. In accordance with Hunter Water Corporation's recently prepared guidelines, 'Protecting our Drinking Water Catchments: Guidelines for developments in the drinking water catchments' the proposed development is required to demonstrate Neutral or Beneficial Effect on water quality which is defined as:

- Having no identifiable potential impact on water quality.

- Will contain any water quality impact on the development site and prevent it from reaching any water course, water body or drainage depression on the site.

As discussed above, the proposed Eagleton Quarry will be operated with effectively a closed water management system and can be operated without discharging to Seven Mile Creek and Grahamstown Dam during storm events up to and including the 100 Year ARI 24 hour event. Water balance modelling using 43 years of daily rainfall and evaporation data shows that the proposed water management system can accommodate without discharge back to back 100 Year ARI 24 hour storm events as occurred at Eagleton on 21 and 22 April 2016. It is therefore considered that the proposed development has no identifiable potential impact on water quality and will contain any water quality impact on-site meeting the Neutral or Beneficial Effect on water quality as required.

Flow Volumes to Grahamstown Dam

The Eagleton Quarry has the potential to impact on annual flow volumes due to the need to control runoff from disturbed areas, including quarry extraction areas and the various rock processing areas. The quarry would reduce the catchment area of Seven Mile Creek and Grahamstown Dam for the life of the quarry with the net loss in catchment area being small relative to the total catchment of Grahamstown Dam. The direct catchment of Grahamstown Dam typically contributes approximately 50% of the total water make to the Dam with the remainder of the water being pumped to the dam from Williams River via Balickera Canal. The direct loss in yield is estimated to be less than 0.3% of net runoff into Grahamstown Dam.

Flooding

Based on the flood extents modelled for the catchment and an anticipated reduction in catchment area, no significant change to the downstream flooding risk are expected. Some small changes are expected due to the slightly reduced catchment area to Seven Mile Creek, and the presence of an access road crossing Seven Mile Creek.

It is also noted that the bridge proposed for the creek crossing can accommodate the 100 year critical duration flood without overtopping the access road. Erosion protection is proposed downstream of the bridge to reduce the risk of erosion. There are no areas of significance upstream of the bridge that may be impacted by increased ponding upstream of the structure.

Groundwater

The proposal to extract rock down to 45 mAHD will result in groundwater above this elevation seeping to the floor of the excavation. This will cause drawdown within the connected groundwater source. Maximum predicted drawdown is 15 m at the end of 30 years of extraction. Relatively slow extraction progress over 30 years would reduce the impact of drawdown significantly.

The closest private bore is located about 400 m to the south-east of the site, installed at 20 m depth. The next closest private bore is located approximately 1.4 km south-west of the site, installed in fractured rock aquifer and used for stock and domestic purpose. The prediction simulation indicates that drawdown outside of the site boundary is zero; therefore negligible impact is predicted at any of the surrounding private bores.

In terms of impact on baseflows, discharge to Seven Mile Creek calculated for three segments in the groundwater model indicates that Seven Mile Creek is mainly ephemeral and loses water in its upper reaches however does receive minor baseflow contribution from groundwater mainly in its lower reach. Results from predictive simulations indicate that there is minor baseflow loss to Seven

Mile Creek as a result of the proposed quarry with a decrease of 0.75 m³/day (0.27 ML/year) over the period of 30 years of the project.

The Aquifer Interference Policy requires that proponents demonstrate that specified minimal impact considerations can be met. For the purposes of this assessment the groundwater source category at Eagleton Quarry is defined as being 'less productive', based on the yield data from surrounding groundwater bores. Key outcome of this assessment is that the project will meet all conditions and as such have a minimal impact on the aquifer at the site, for the following reasons:

- There are no high priority groundwater dependent ecosystems within proximity to the site or that could be affected by drawdown from the quarry.
- There are no listed high priority culturally significant sites within proximity to the site or that could be affected by drawdown from the quarry.
- Groundwater modelling indicates that there will be no impacts to any offsite water supply works.
- Groundwater modelling indicates the variation in water table as a result of the proposed quarry development would be less than 10% at the project site boundary.
- Groundwater modelling indicates that the drawdown in the water table will not extend to or impact adversely on any surrounding groundwater supply bores.
- Predicted pressure head decline is less than 1.
- The proposed quarry will not use groundwater and is highly unlikely to affect groundwater quality or the beneficial use category of the area.

Impacts on Watercourses and Associated Ecosystems

Seven Mile Creek is a diverse ephemeral creek system with areas of ponding associated with erosion and deposition on Seven Mile Creek. The creek includes small gravel bars, and pools that are likely to provide useful ecological habitats.

The loss of yield predicted for Seven Mile Creek will potentially impact on the drying and wetting cycles within the creek, however the reduction in yield is well within the normal seasonal and yearly rainfall variations. As such, the change in flow is unlikely to dramatically alter the flow regime and existing habitats.

There are no known ecosystems within the ephemeral creeks that are dependent on environmental flows. Consequently, it is considered that there is no need for any special provisions for environmental flows within Seven Mile Creek.

The proposed bridge over Seven Mile Creek will be constructed so as to not impede flows or fish passage.

Water Licencing

Eagleton Quarry will require extraction from the Sydney Basin – North Coast Groundwater Source of up to a maximum of 7.7 ML/year (in year 24 of quarry operations). Considering the small volume of water that will be extracted as a result of quarrying operations, in the context of the long-term average annual extraction limit for the groundwater source (90,000 ML/year), and the currently unassigned water (3,453 ML/year), it is considered that sufficient groundwater access licences would be available to Eagleton Rock. A Water Access Licence application has been submitted to the NSW Office of Water and is currently being processed.

7.8.6 Mitigation and Management Measures

Operational Water Management Strategy

The proposed water management strategy is as follows:

- Construct sufficient storage initially to accommodate surplus water as predicted by the water balance model. A total storage dam capacity of 57 ML is proposed to be constructed, to be supplemented by though provision of in-pit storage. This will contain runoff from in excess of a 100 Year ARI 24 hour storm event.
- Retain sufficient water for one year's supply to the processing plant.
- Operate water management dams with a freeboard equivalent to the 100 year ARI 24 hour storm event at all times, except immediately after an equivalent or more extreme event. Dam levels will then be drawn down through the treatment and discharge of the water.

Erosion and sediment control strategies will also be implemented during the operational phase of the quarry, including:

- Identifying and delineating disturbance areas and ensuring that these are minimised (e.g. where clearing vegetation ahead of quarry extraction activities).
- Limiting the number of roads and tracks on undisturbed areas, outside of the quarry extraction area.
- Reviewing the performance of the sediment dams in terms of the volume of sediment collected, and ensuring compliance of the water quality during spill events.
- Assessing the adequacy of the maintenance on the sediment control system, including channel maintenance, frequency of desilting of dams, and related issues that could impact on the performance of the water management system.
- Managing erosion on topsoil stockpiles and other disturbed areas, including a review of the rehabilitation practices both on a regular basis and when issues are identified.

Surface Water Monitoring

A Surface Water Monitoring Program will be prepared and implemented for the Project. The ANZECC guidelines will be used to inform review of monitoring data, assisting in the assessment of any areas of concern. However, monitoring will also compare upstream and downstream qualities.

Surface water quality monitoring will be undertaken at upstream and downstream locations on Seven Mile Creek. For the Project, ongoing surface water quality monitoring will aim to:

- Record and document the water qualities upstream and downstream of the Project so as to highlight any areas of concern or impact. The parameters and frequency of sampling will be monthly sampling of pH, EC, TSS, Total Phosphorus and Total Nitrogen.
- Monitor the performance of the water management systems and associated sediment control measures monthly and after major storm events. Flow monitoring of Seven Mile Creek will be undertaken by visual observation during water quality sampling, the visual flow data observations will be used to inform the assessment of water quality data.

- Document rainfall depths, water usages, dam volumes and discharges (during extreme events) together with other data that will facilitate updating of water balances, assessment of spill risk and associated water management requirements.
- Review and monitor the performance of erosion and sediment controls at construction areas, including the creek crossing and associated water management measures.
- Undertake dam safety and maintenance checks biennially (every two years) on all water management dam walls to assess structural integrity and maintenance requirements, including removal of any trees and shrubs that may impact on the integrity of the walls, and ensuring adequate erosion protection is in place.
- Report results of surface water monitoring activities in the Annual Environmental Review which will be distributed to the relevant government agencies and made available to the public. All monitoring data will be retained in an appropriate database.

Groundwater monitoring

All existing bores will continue to be monitored until they are disturbed or quarried through. A network of bores will be maintained through the life of the quarry. It is proposed to monitor groundwater levels at these bores quarterly and the following water quality parameters six monthly:

- pH
- Conductivity
- Total Dissolved Solids
- Chloride
- Arsenic
- Total Phosphorus
- Total Nitrogen, NO_x, Ammonia.

Groundwater level and quality results will be analysed, compared with groundwater model predictions and reported annually.

Construction

The erosion and sediment control strategies and measures to be implemented for construction activities will include:

- ensuring that the water management dams required for sediment control are constructed downstream of proposed construction areas prior to other construction activities in order to prevent sediment movement off site;
- use of sediment fences, catch drains and other appropriate collection and interception measures during the construction of the water management dams and other components of the water management strategy;
- addition of gypsum to disturbed soils to reduce their dispersivity as and where required prior to the rehabilitation of the soils; and
- ongoing inspection and maintenance on the sediment control measures, including improvements to the rehabilitation of areas that are eroding, de-silting activities, and other general maintenance.

Particular attention will be paid to areas outside of the quarry water management system such as the entrance road and associated creek crossing. Any contractor undertaking work on Project will be required to prepare a detailed construction

Erosion and Sediment Control Plan which meets the requirements of the *Blue Book Volumes 1 and 2* (Landcom, 2004 and DECC, 2008).

7.9 Heritage

7.9.1 Indigenous Heritage

An Indigenous Archaeological Assessment has been undertaken by McCardle Cultural Heritage Pty Ltd (MCH) to identify the potential for aboriginal artefacts and any required management or mitigation measures in regards to these artefacts. The heritage assessment focusses on the quarry site. Works outside of the site are limited to road upgrade works along the existing cleared road corridors of Barleigh Ranch Way and the right of carriageway. The Indigenous Archaeological Assessment is provided in **Appendix O**.

Consultation

MCH has undertaken consultation with the relevant stakeholders in accordance with the SEARs. This consultation was separated into four stages as set out below:

- Stage 1 – Notification of project proposal and registration of interest
- Stage 2 – Presentation of information about the proposed project
- Stage 3 – Gathering information about cultural significance
- Stage 4 – Review of Draft Cultural Heritage Assessment

Archaeological Potential

Knowledge from previous assessments suggests that the potential for isolated finds and/or artefact scatters is influenced by waterways and the landform.

It is considered that there is a high potential for isolated finds and/or artefact scatters on the site due to presence of Seven Mile Creek. A moderate potential for finds is also considered along the second order streams to the south of the site, and a low potential across other areas due to the distance to reliable water and also the steep landform.

It was noted by MCH that a large majority of the site has been subject to past land use activities and environmental factors which have disturbed the land. These past land uses and environmental factors include the old quarry area (currently a landscape supplies facility), motorcycle and walking tracks, fencing, clearing and general erosion. As such, the potential significance of a large portion of the site has been reduced.

MCH and Aboriginal representatives surveyed the site to identify the potential significance of the site. From this survey, two Potential Archaeological Deposit (PAD) sites were identified due to their environmental characteristics. These sites include a creek bed and extend 50 metres beyond the creek bed on either side. Vegetation cover across the site hampered the survey and as such, these areas have been selected to be further surveyed in the future to ensure any significant artefacts are identified. The two PAD sites and their environmental features are shown in **Figure 19** and are described as follows:

- PAD 1 – follows Seven Mile Creek.
- PAD 2 – follows the east-west tributary which flows into Seven Mile Creek.

One isolated find was encountered within a creek bed on a site which is located within PAD 2. This find consisted of a mudstone flake which has been visibly weathered, and was assessed as being of very poor integrity and having low research potential and scientific significance.

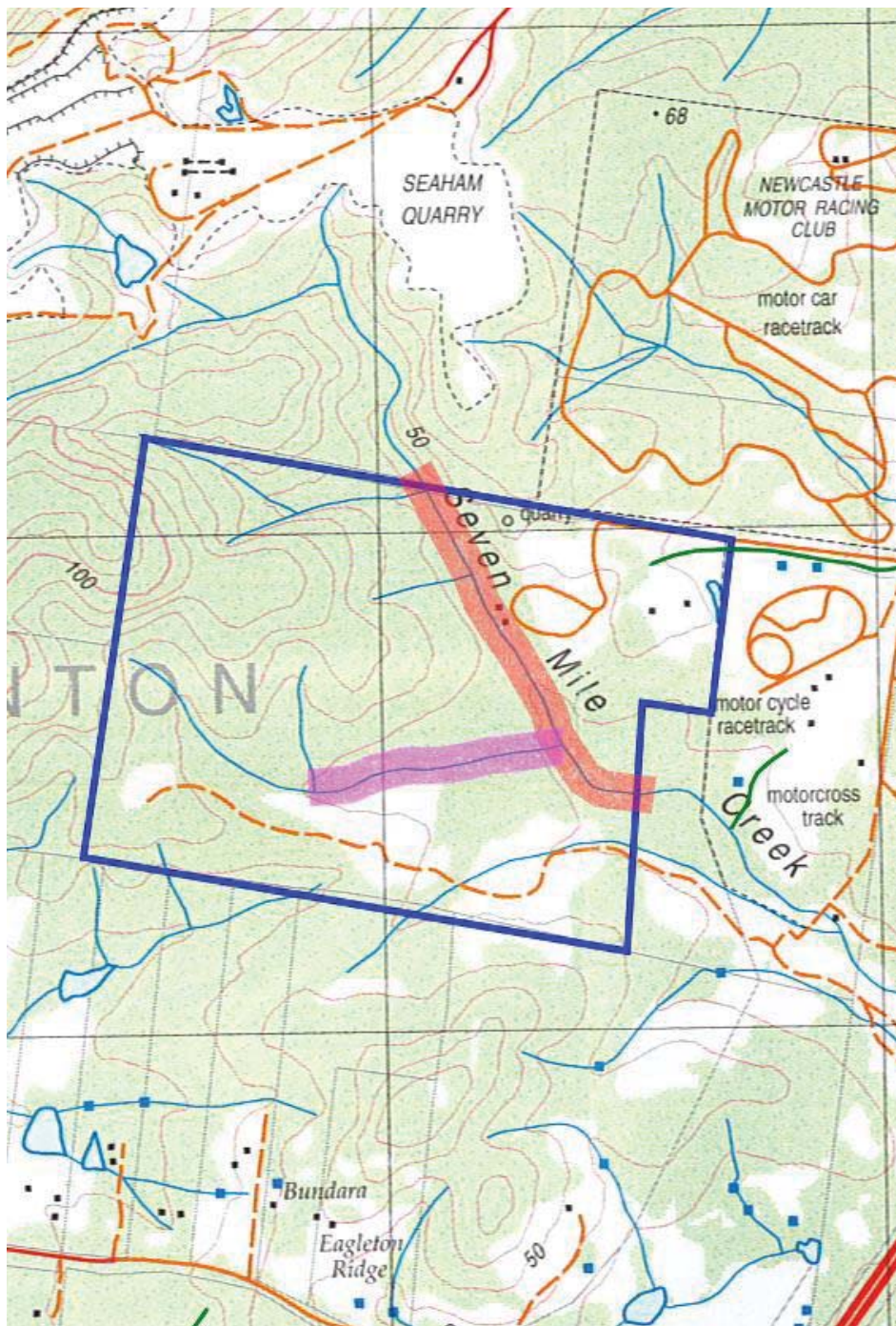


Figure 19 – Location of Aboriginal Heritage PADS
 Source: McCardle Cultural Heritage

Impact Assessment

The *OEH Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* has been consulted to assess the potential impact of the proposed development on the identified sites of potential archaeological significance.

PAD 1 will be partially impacted by the proposed development, especially through the construction of roads and bridges during the construction of the

quarry. The consequence of this impact would be a partial loss of value. Whilst no Aboriginal items have been discovered in this PAD, there is a high potential for both surface and subsurface cultural materials to be present.

Subsurface testing is appropriate when a PAD has been identified, and it can be demonstrated that sub-surface Aboriginal objects with potential conservation value have a high probability of being present, and that the area cannot be substantially avoided by the proposed activity. As such, the area where the proposed internal site access road will cross Seven Mile Creek will need to be subject of subsurface testing in order to establish whether any items of Aboriginal cultural heritage are present.

The area of PAD 2 will not be impacted by the proposed quarry development, as a 20m vegetated riparian buffer will be provided between the quarry operations and the creek line.

A limited cumulative impact is considered to result from the proposed development due to a number of considerations. These include:

- The net development footprint is small and does not affect a high proportion of any particular landform present within the site;
- The location of the development footprint away from reliable water sources and within the disturbed context ensures the cumulative impacts are focused in areas of low potential;
- Comparable landforms (creeks and slopes) to the site contain a similar archaeological resource occur in multiple contexts within the local area and throughout the Hunter Valley;
- Identified deposits occur outside the development footprint; and
- The PADs have been subject to long term past land uses (clearing, fencing and erosion) that have resulted in a disturbed landscape and therefore the potential value of the archaeological resource is lessened.

Mitigation and Management Measures

Following the above assessment, MCH has provided several recommendations for the ongoing archaeological management of the site and potential mitigation measures to be adopted. Overall MCH has suggested that decisions in regards to the management of the site and potential archaeological deposits should be made in consultation with the local Aboriginal community.

Part of PAD 1 will be impacted by the construction the site access road so a subsurface investigation will be undertaken prior to construction works in accordance with the *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW*.

A strategy of conservation and protection has been recommended as the preferred option for the identified PAD sites considering the high potential for cultural materials on the sites. This strategy includes the following measures:

- The persons responsible for the management of the site will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010*, under the *National Parks and Wildlife Act 1974*;
- The involvement of the registered Aboriginal stakeholders in the ongoing management of the Aboriginal cultural materials within the project study area will be promoted and included in the Environmental Management Plan; and

- A cultural awareness program will be included as part of the site induction program and developed with the registered Aboriginal stakeholders and form part of the Environmental Management Plan.

7.9.2 Non-Indigenous Heritage

The closest non-indigenous heritage listed site is 'Balickera House', located at 303 Italia Road, which is over 2km to the north of the Eagleton Quarry site. This item is listed as Item I3 under the *Port Stephens Local Environmental Plan 2013*, and as being of local heritage significance.

Importantly, the existing Boral Seaham Quarry is located immediately adjacent to the heritage item and in-between the heritage item and the Eagleton Quarry site. Given the existing quarry land use in the locality, a new quarry at Eagleton, further away from the heritage item than the existing Boral Seaham Quarry, is not considered to impact on any aspect of the item in any way.

Consultation with the Heritage Office has indicated that there are no State Heritage items in the vicinity of the site. Review of the State Heritage Register identifies that the closest State Heritage Items are:

- SHR No. 00023: Seaham Quarry – a geological site located over 6km west of the Eagleton Quarry site, in the village of Seaham.
- SHR No. 00558: Courthouse and Site – a built heritage site located at Clarence Town over 11km north of the Eagleton Quarry site.

Based on the EPBC Act Protected Matters Report (see **Appendix G**), dated October 2016, there are no World Heritage Properties, National Heritage Places and no Commonwealth Heritage Places within the vicinity of the Eagleton Quarry site. The closest Commonwealth listed site being the Williamstown RAAF Base, which is a Commonwealth Heritage Place, located over 12km to the south-east of the Eagleton Quarry site.

With consideration of the above results from database searches it is considered that the proposed Eagleton Quarry will not impact on any known built heritage items.

Further, there are currently no known built structures on the site, and the site remains almost entirely vegetated, except for a series of recently made tracks and trails running throughout the site. As such, the risk of historic heritage items being present on-site is considered to be low and no site survey by a heritage specialist is considered to be warranted.

7.10 Visual

A Visual Impact Assessment has been carried out by JBA and provided at **Appendix P**. This assessment has examined the potential visual impact of the proposed quarry operations on existing surrounding residents and from significant view points in the surrounding area.

Eight significant viewpoints have been identified and an analysis from these points has been provided. From this analysis it has been made apparent that existing environmental features such as ridge lines and trees shield the site from view.

A sectional analysis from the surrounding residential properties to the site has also been carried out. On these sections it is evident that many of the sight lines from surrounding properties are not directed towards the proposed quarry. Furthermore, where sight lines are partially directed towards the site of the

proposed quarry, environmental elements such as dense vegetation provided screening.

It has been concluded that dense wooded vegetation cover the slopes surrounding the site, and therefore provide a level of screening. Significant view corridors and views from surrounding residential properties will not be adversely impacted by the proposed quarry due to the location of the site beyond existing sight lines, and also the existing environmental factors such as the ridge line and trees.

7.11 Hazards

7.11.1 Stored Dangerous Goods

The quarry will store and use small quantities of a range of dangerous goods, as listed below in **Table 16**. All dangerous goods would be stored in suitable containers in the maintenance area.

Table 16 – Dangerous Goods stored on-site

Dangerous Good	Volume Stored	Storage Volumes and Container Type	Dangerous Goods Class and Packaging Group	Purpose
Diesel Fuel	20 kL	2*10kl tanks Or 1*20kl tank	C1	Plant fuel
Diesel Fuel	2.4 kL	Fuel cart 1* 2.4kl tank	C1	Plant fuel
Petrol fuel	50 L	Small 20 litre and 10litre drums	3 (PGII)	Mowers and Whipper snippers.
Engine oil	400 L	200 litre drums	N/A	Diesel engines
Hydraulic Oil	800 L	200 litre drums	N/A	Hydraulic systems
Transmission Oil	200 L	20 litres drums	N/A	Plant transmission
Diff Oil	200 L	20 litres drums	N/A	Plant diffs
Degreaser	20 L	20 litres drums	3 (PGII or III)	Cleaning engines for repair
Grease	100 L	20 litres drums	N/A	Lubricate pins and bushes
Coolant	200 L	20 litres drums	3 (PGIII)	Plant engine cooling systems
Cleaning Agent	20 L	20 litres drums	8 (PGII or PGIII) or 5.1	Cleaning general
Pesticide	20 L	20 litres drums	6.1	Weed control
Acetylene (part of oxy acetylene kit)	48 L	compressed gas tank	2.1	Maintenance and repair welding

7.11.2 Impact Assessment (Storage)

The Department of Planning's guideline Applying SEPP 33 sets out the thresholds at which the storage of dangerous goods needs to be considered in more detail through a Preliminary Hazard Analysis. The intention of the guideline is to establish thresholds below which a development is not considered to represent a significant risk to the health and safety of surrounding people and the surrounding environment.

Under Applying SEPP 33 the following needs to be considered:

- All dangerous goods of the same class need to be assessed together if they are stored in the same location. If dangerous goods of the same class are stored together then they are all taken to be the most hazardous Packaging Group.
- If class C1 and/or class C2 combustible liquids are present on site and stored with other flammable liquids, they are to be treated as Class 3 PGIII, because under these circumstances they may contribute fuel to a fire.

Table 17 below sets out the assessment of the combined dangerous goods classes against the thresholds set out in Applying SEPP 33 (except for Class 3 dangerous goods). Class 3 materials are assessed below.

Total Class 3 materials are petrol (50L), degreaser (20L), and coolant (200L). In addition, as described above, Class C1/C2 materials stored with Class 3 dangerous goods need to be considered as Class 3 PGIII dangerous goods for the purposes of assessment under SEPP 33. The total volume of C1/C2 materials to be stored at the site is 22,400L. Making the volume of Class 3 dangerous goods for the purposes of the assessment a combined total of 22,670L. The most hazardous Packaging Group is PGII. As such, Figure 9 of *Applying SEPP 33* applies to the project.

Figure 9 of Applying SEPP 33 sets out a relationship between the volume of Class 3 PGII dangerous goods at the site and the distance to sensitive receptors. For 22,670L stored a distance to sensitive receptors of between 10m and 11m is required. Given that the distance between the dangerous goods storage areas at the site and the closest site boundary is over 300m it is not considered that the storage of Class 3 dangerous goods represents any potential for off-site impact.

Table 17 – Hazards screening assessment

Dangerous Goods Class	Volume Stored	Threshold
Class 5.1	20L	2 tonnes
Class 6.1	20L = 0.02m ³	0.5 m ³
Class 8 PGII or PGIII	20L = 0.02m ³	PGII = 25m ³ , PGIII = 50m ³
Class 2.1 (not LPG)	48 L = 0.048 m ³	5m ³

As demonstrated by **Table 17** and the Class 3 analysis the storage of dangerous goods does not exceed the thresholds set out in Applying SEPP 33. As such the storage of dangerous goods does not represent any potential for off-site impact.

It is highlighted that 20kL diesel storage tank will be separately bunded to prevent any spillage from entering the quarry's surface water system.

7.11.3 Impact Assessment (Transport)

Table 2 of Applying SEPP 33 sets out screening thresholds for the number of transport movements for dangerous goods associated with the development. The relevant screening thresholds are:

- Class 3: 30 per week or 500 per year.
- Class 2.1: 30 per week or 500 per year
- Class 5.1: 30 per week or 500 per year.
- Class 6.1: All movements, but with a minimum load of 1 tonne.
- Class 8: 30 per week or 500 per year.

The proposed Eagleton Quarry will have transport requirements substantially less than the thresholds, in particular it is not expected that delivery of diesel or petrol will be no more than 1 per week and other dangerous goods combined would not be expected to exceed once per week on average.

7.11.4 Explosives

It is highlighted that whilst explosive materials will be periodically used on site for blasting, there will be no storage of explosive materials at the site outside of these times. Explosive material would be brought to the site on an as-needs basis by the specialist contractor, and would be handled and used in accordance with relevant Australian Standards.

7.12 Socio-economic

7.12.1 Economic Benefits

The main economic benefit of the proposed Eagleton Quarry would be the security of supply of aggregate to Newcastle and the Hunter region. The Hunter Regional Plan forecasts that an additional 70,000 dwellings will be needed in the region by 2036, and that an additional 60,000 jobs will be created. The ongoing building and infrastructure development associated with these forecasts will create strong demand for the hard rock gravel materials proposed to be extracted and processed at the Eagleton Quarry. In addition, the strategic location of the quarry will also make it viable to supply aggregate to the Port of Newcastle for the continued expansion of port facilities, as well as for infrastructure projects throughout the Hunter region.

Cement Concrete and Aggregates Australia identified in its 2015 submission to the Commonwealth Government's Australian Infrastructure Audit:

- One kilometre of highway uses up to 25,000 tonnes of crushed rock.
- One kilometre of suburban roadway requires 5,000 tonnes of crushed rock,
- One kilometre of railway requires 2,000 tonnes of aggregate.
- A high-rise building can use up to 1,000 tonnes of aggregate per floor.
- Construction of a typical house, including driveway and landscaping, uses about 110 tonnes of aggregate.

Based on these estimates, the construction of 70,000 new dwellings within Newcastle and the Hunter region would require over 7 million tonnes of aggregates, in addition to requirements for local and regional infrastructure.

It is also highlighted that the Eagleton Quarry could supply the Greater Sydney Metropolitan area, where there is continuing strong pipeline of new

development, as well as a significant infrastructure improvement program underway via a range of major road and rail projects. In its 2015 Policy Priorities Cement Concrete and Aggregates Australia further identified that:

- WestConnex will require 1.7 million tonnes of construction materials.
- The North West Rail Link will require 1.5 million tonnes of construction materials.

The Commonwealth Government is also planning the construction of a new Western Sydney Airport at Badgerys Creek, which is estimated to require approximately 200,000 tonnes of aggregate for the construction of the first stage, in addition to the significant infrastructure improvements that will support the new Western Sydney Airport including new motorways, regional road upgrades (e.g. The Northern Road, Bringelly Road and Elizabeth Drive), and possible rail connections.

To meet future demand for additional housing, as well for affordable public infrastructure an efficient supply of heavy construction materials, including aggregates, is necessary. Due to its convenient location, immediately adjacent to the Pacific Highway and in close proximity to the major growth areas around the Hunter Valley and the Sydney Metropolitan Region, the Eagleton Quarry would contribute to the efficient supply chain necessary to support the levels of development that is being driven by the strong economic growth in NSW.

Initially the quarry will employ up to 12 people, potentially rising to 18-20 employees as the quarry develops, as well as providing for approximately 20 - 25 additional full time equivalent jobs for haulage truck drivers.

7.12.2 Regional Economic Analysis

An Economic Assessment has been carried out by the Hunter Research Foundation Centre to estimate the flow on benefits of the Eagleton Quarry project to the regional economy. The Economic Assessment is provided at **Appendix S**.

Focusing on the initial investment into the proposed Eagleton Quarry, the Economic Assessment estimates the impacts of these expenditures in terms of the number of jobs created and the total flow-on consumption and investment expenditures through an input-output model for the Hunter Region.

The estimated construction (capital) and operating expenditure over a 24-year operating life is calculated by Eagleton Rock to be \$100.2 million. In addition to this direct investment, the Economic Assessment estimates that an additional \$74.4 million in economic activity will occur across the Hunter Region (in 2016 dollars), including:

- \$4.3 million of flow-on benefits stemming from capital expenditure; and
- \$70.1 million flow-on benefits from ongoing operating expenditure.

In terms of the employment impacts from the proposed investment, the Hunter Research Foundation Centre estimates that an average of 41 jobs per year will be generated over the 24 years of the project from the direct investment expenditures associated with Eagleton Quarry, and associated flow-on expenditures.

The proposed Eagleton Quarry will therefore support the continued growth of the Hunter Region through provision of necessary construction materials, as well as through increasing economic activity and providing jobs in the region.

7.12.3 Local Infrastructure Improvements

The existing gravel road along the right of carriageway and a section of Barleigh Ranch Way of approximately 350 meters will be upgraded to a 6m wide two coat sealed road with 1 m gravel shoulders on both sides. In addition, the intersection of the right of way with Italia Road will be formalised.

Whist Barleigh Ranch Way and the right of carriageway are essentially dead-end roads, only providing access to the Port Stephens Gardenland, paintball and motor-cross facilities, the land owners and visitors of these facilities will benefit as these roads will be safer due to a better skid resistant surface and line marking with appropriate signage.

The sealed road will also remove a source of local dust and noise created from the use of the unsealed road. Ongoing maintenance costs of the gravel road will also be substantially reduced for local land owners.

7.12.4 Impacts to Local Infrastructure and Services

The quarry is a small employer and will not generate significant demand for additional community based infrastructure and services. However, the quarry is a large generator of heavy vehicle movements which will impact on the capability and longevity of local road infrastructure.

Port Stephens has a specific clause in its Port Stephens S94 Development Contributions Plan 2007 which provides for extractive industries. Clause 4.5 of the S94 Plan sets out a rate of contribution for road haulage from industries that cause heavy vehicle movements.

The contribution rate is to be established from a Transportation and Economic Assessment Study to be prepared by the proponent. This study is to identify the impact the increased traffic generated by the development will have on the local road system, with consideration of the existing condition of the specific road(s), its classification, the cost of road repairs on the specific length and the relative increase in heavy vehicle usage of the road generated by specific development.

The S94 Plan also provides that where a developer chooses not to undertake a Transportation and Economic Assessment Study, a nominal contribution of 4 cents per tonne per kilometre of haul route will be levied.

Eagleton Rock has not prepared a Transportation and Economic Assessment Study, and proposes the following strategy for addressing impacts to local road infrastructure.

- Eagleton Rock would upgrade Barleigh Ranch Way at its own expense to ensure it meets the criteria for trafficable widths and other road safety requirements set out under the ARRB's. It will be improved to 8m width of crushed rock pavements and 0.5m shoulders bitumen sealed.
- Eagleton Rock will maintain Barleigh Ranch Way for the life of the quarry operations.
- Eagleton Rock will construct the improvements to the intersection at Italia Road and the Right of Way as a Major Access Driveway generally in accordance with Australia Standards AS28090.2.
- Eagleton Rock will pay to Council a Heavy Vehicle Haulage Levy of 4c per tonne per km for transportation of quarry products on Italia Road, between the Right of Carriageway and the intersection with the Pacific Highway (a distance of approximately 450m):
 - Based on normal annual output of 600,000t this equates to \$ 24,000pa.

- For the life of the quarry (of 30 years) this equates to \$720,000 if maximum extraction occurs every year for 30 years.

This strategy is considered reasonable and justifiable because of the following:

- Barleigh Ranch Way is a public road, however it is not accessible by the general public. It is a dead end road, with its only access point across a Right of Carriageway across private land. As such, the only users of Barleigh Ranch Way will be Gardenland landscape supplies facility and the Eagleton Quarry. It is therefore reasonable for these users to maintain the road to an acceptable agreed safety standard, rather than defer this to Council.
- It is expected that 100% of heavy vehicles will access the Pacific Highway directly rather than travelling west on Italia Road. The Pacific Highway is owned and maintained by the Roads and Maritime Service and so it is not reasonable for haulage on this road to be considered towards Council's local road network costs.
- If requested by Council, Eagleton Rock will carry out a verification monitoring program to determine whether any vehicles are heading west on Italia Road, and to conduct a Transport and Economic Assessment Study to determine whether the level of contribution remains adequate.

7.12.5 Local Amenity Impacts

Potential local amenity impacts are primarily related to noise and dust. Detailed assessment of these issues has been carried out and comprehensive mitigation and management measures committed to. Eagleton Rock understands that many of its neighbours are concerned about the proposed quarry undermining the rural amenity values of the area and is committed to working with its neighbours and local stakeholders to ensure minimal local amenity impacts occur.

7.13 Bushfire

7.13.1 Existing Environment

The site is characterised by substantial stands of vegetation, which also surrounds the site on all sides. Due to the existing vegetation there is a risk of bushfire, especially during dry summer months.

7.13.2 Potential Impacts

The site is located on land that is designated as Category 1 Vegetation on the Port Stephens Bushfire Prone Land Map. As such the relevant provisions of the NSW Rural Fire Service's *Planning for Bush Fire Protection* have been considered below.

While *Planning for Bush Fire Protection* applies to all land bush fire prone land, the guideline does not specify any specific provisions that apply to development for extractive industries. We have considered below the aims and objectives of the guideline in relation to the project:

- *Afford occupants of any building adequate protection from exposure to a bush fire.*

The location of buildings at the quarry is in the south-east part of the site.

- *Provide for a defensible space to be located around buildings.*

The sales, administration and amenities buildings are located in an area surrounded by at least 100m of processing area and internal haul roads, which will be cleared of all vegetation. This 100m represents an adequate defensible space against any bush fire.

- *Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.*

The sales, administration and amenities buildings are located in an area surrounded by at least 100m of processing area and internal haul roads, which will be cleared of all vegetation. This 100m represents an adequate distance to prevent direct flame contact on the buildings.

- *ensure that safe operational access and egress for emergency service personnel and residents is available;*

The site access roads have been designed to permit two have vehicles hauling extracted quarry products to pass in opposite directions. As such, it is expected that the access roads will be sufficient for any bush fire fighting vehicles.

- *Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).*

The site will have capacity to store up to 100,000 m³ of collected water which will be connected to sumps. This water could be diverted for fire fighting if required. There will also be a water cart on-site at all times, which could be used to support fire fighting activities if required.

Project construction and operational activities that may cause or increase the risk of bushfire include:

- Smoking or inappropriate disposal of cigarette butts.
- Grinding, mowing, slashing and using a petrol powered chainsaw.
- Hot works including any welding or soldering of plant and equipment for repair and/or maintenance.
- Using a petrol or diesel powered motor vehicles (or other plant and equipment) over land containing combustible material.

The quarry extraction, processing and sales areas will be cleared of all existing vegetation. As such, the chances of a bushfire being caused by on-site activities are minimal.

7.13.3 Proposed Management Strategies

All construction works would be carried out in accordance with standard procedures, practices and guidelines for bushfires including.

- Contractors/work staff would be trained in how to prevent, control and survive bush fires. This would include conducting fire drills.
- Work vehicles would be parked in cleared operational areas, away from grass or vegetation.
- Work vehicles would be equipped with appropriate bushfire control equipment.
- Alternate fire trail routes for ingress and egress to the site will utilise existing fire trails along the south of the property. Also, an alternative 4-wheel-drive emergency access route will be planned for the northern boundary onto Barleigh Ranch Way. Eagleton Rock will also initiate discussions with neighbouring land owners as to the creation of an alternate emergency exit route if Barleigh Ranch Way is blocked. Emergency access routes, and fire trails will be planned and designed in consultation with Rural Fires Service.

7.14 Waste

7.14.1 Policy Setting

The waste management practices associated with the project would be guided by the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The WARR Act aims to encourage efficient use of resources, reduce environmental harm and reduce waste generation in accordance with the principles of ecologically sustainable development. To meet the objectives of the Act, waste management options must be considered and selected in accordance with the following hierarchy.

- Avoidance of unnecessary resource consumption in the first instance.
- Recovery of resources and reduction of waste volumes through re-use and recycling practices.
- Disposal of wastes as a last resort.

In addition to the WARR Act, the following policies and guidelines would be relevant to the management of waste for this project:

- Waste Avoidance and Resource Recovery Strategy 2007.
- Waste Classification Guidelines (DECC, 2009).

7.14.2 Wastes Generated

Construction and operation of the quarry will require similar types of activities on site, being clearing of vegetation, haulage of rock and other ground materials and land forming. Waste streams from these activities include:

- During construction, general construction waste that may be generated includes scrap building materials, piping cut-offs, plastics, packaging and metal off-cuts. Where possible these materials will be sent for recycling, otherwise they will be removed by the relevant contractor or a licenced contractor for classification in accordance with the Waste Classification Guidelines and disposed of off-site to a suitably licenced landfill.
- Organic green materials from clearing of vegetation which will occur predominately during site establishment and early phases of quarry operations. This material will be mulched onsite and reused in the landscaping areas and as sediment controls around the dams. Overburden from extraction areas which will occur predominately during site establishment and early phases of quarry operations. Soil based material would constitute virgin excavated natural material and is intended to be re-used at the site.
- Waste from office and administration area will include small quantities of recyclables such as paper, glass bottles, aluminium cans, plastics, packaging as well as other non-recyclable waste (such as food contaminated waste) generated by staff. Recyclable material will be collected by a recycling contractor. Non-recyclable waste will be collected separately and disposed of off-site by a licenced contractor.
- Sewage waste will arise from the use of on-site amenities. A closed sewage system will be installed into amenities, and sewage water will be collected by a licenced contractor for off-site disposal.
- Workshop waste includes small quantities of greases and lubricants, which are classified as Group B liquid wastes under the Waste Classification Guidelines. These materials will be collected and stored in designated drums for off-site disposal by a suitably licenced contractor.

- Wastewater arising from storm water falling on quarry operational areas will be potentially contaminated with silt and sediments. All potentially contaminated surface waters will be collected in the quarry's water collection system, and conveyed for storage in the sediment basins located at the southern extent of quarry activities. Water collected in the sediment basins will be reused onsite for wetting down roads and operational areas. The storm water management system has been designed to prevent spilling from the sediment basins for events up to the 10 year ARI 24 hour storm event.

7.14.3 Reject Tiles

The site currently has approximately 1,000 tonnes of reject tile unused raw material fragments deposited on the cleared area that will be extended to form the processing area. The reject tiles have been sourced from a tile factory in the lower Hunter Valley. The tiles were rejected due to their being cracked or otherwise damaged and not acceptable for sale. They have not been sourced from building sites, and are not demolition waste. It is proposed to use the rejected tile fragments as aggregate base for the road construction. A photograph of the rejected tile fragments at the proposed located for the processing area is shown in **Figure 20**.

The use of the rejected tile fragments in this way is consistent with the EPA's Recovered Aggregate Exemption 2010 being a general exemption issued under Part 6, Clause 51 and 51A of the *Protection of the Environment Operations (Waste) Regulation 2005*.



Figure 20 – Reject tile fragments in processing area

In order to ensure the rejected tile fragments do not pose a risk to the environment testing of the chemical properties and level of contamination (i.e. by inclusion of metal, plastic, plaster, rubber, paper, cloth, paint, wood etc.) in accordance with clause 10 of the Recovered Aggregate Exemption will be carried out prior to use on-site. If the tiles do not comply with the required chemical characteristics, then they will be re-used subject to the provisions of the Environment Protection Licence that will apply to the site.

7.14.4 Impact Assessment

The quarry will generate only small quantities of waste. Where possible these waste materials will be recycled. Waste materials that cannot be recycled will be removed by suitably licenced contractors and disposed of at suitably licenced landfill facilities.

The project includes for the reuse of rejected tile fragments, which are currently located in the proposed area for processing, and can be readily used as base for the site roads. Chemical testing will be carried out to ensure that the reject tile fragments do not pose an on-going unacceptable risk to the environment.

7.14.5 Proposed Management Strategies

All works would be conducted in accordance with the waste management hierarchy established by the WARR Act, that is:

- Unnecessary resource consumption would be avoided to the greatest extent practicable.
- All waste or redundant materials generated by the project would be reuse or recycled where feasible and reasonable.
- All waste material requiring off-site disposal would be classified using the Waste Classification Guidelines.
- Overburden would be re-used at the site for fill or bunding, or will be stored at the site for reuse during rehabilitation.
- Any excess re-usable and recyclable materials that cannot be re-used or recycled on the project site would be transported to an appropriate, licensed recycling facility.
- Any excess materials that are not re-usable or recyclable would be disposed of at nearby licensed waste facilities.
- Any waste oils, greases and lubricants would be stored in designated drums prior to their removal for recycling or disposal.
- Any soils contaminated through fuel or chemical spills would be excavated and transported to a licensed waste facility and the resulting excavation would be filled with suitable clean soil.
- Any weed species that are cleared for the project would be disposed of at a licensed green waste disposal facility or landfill.
- General wastes would be segregated into recyclable and non-recyclable streams through the provision of appropriate disposal bins on the project construction site.
- Transport of wastes to recycling or waste disposal facilities would be undertaken by an appropriately licensed waste transporter.

7.15 Cumulative Impacts

7.15.1 Cumulative Traffic Impacts

The existing traffic from Boral Seaham Quarry and Gardenland landscape supplies facilities will have been captured in the traffic counts carried out for the project at the intersection of the Pacific Highway and Italia Road. It is highlighted that all of the surrounding facilities (except for the approved but not operational upgrade to the MG Car Club racing facility) are mature facilities that are assumed to be operating to their maximum capacity subject to market conditions. Given the age of these facilities (e.g. Boral Seaham Quarry was approved in 1984), the levels of traffic that might have been predicted as part of their respective

development applications should not be relevant to the cumulative assessment, which should be based on the actual traffic generated from these facilities. The modelled traffic impacts at this intersection are therefore considered to represent a full cumulative effect of the project with all surrounding developments, except for the motor racing facility.

The upgraded MG Car Club racing facility may further increase traffic volumes in the area. This approved facility, along with other land uses adjacent the proposed quarry, are primarily recreational in nature and generate traffic that is almost exclusively weekend based. The interaction of weekend based recreational traffic with quarry generated truck movements would be limited to Saturdays. Quarry operations are unlikely to be at full capacity on Saturdays, with deliveries to construction sites generally ceasing around midday. The departure peak from any Saturday motor racing event will be mid to late afternoon and as such any overlap of traffic is unlikely to be significant.

The development consent for the motor racing facility also allows for limited weekday use such as private practice by race cars, general use of the track by road registered vehicles, driver training, educational or promotional events and motorkhana. The numbers of vehicles accessing the track for these types of events is not known but it is expected that midweek patronage would not be large compared to weekend usage which would include many race cars and spectator vehicles. This traffic is also less likely to be generated in peak periods, with a more uniform distribution throughout the day.

As such it is proposed that the cumulative traffic impact on the existing road network is minimal.

7.15.2 Cumulative Noise Impacts

The cumulative impact of more than one development can be compared against the amenity criteria provided in the Industrial Noise Policy. The amenity criteria act like an overall cap on industrial noise levels at any receptor, but need to be adjusted to take into account existing industrial noise sources.

Existing noise levels from other existing and approved industrial facilities is unknown. For the purpose of this assessment it has been assumed that logged period L_{Aeq} have been generated by road traffic at the Italia Road location, and, existing industry at the Six Mile Road location. Based on this the standard Rural Amenity Criteria have been adjusted downwards by 2-4 dBA for Six Mile Road receptors and upwards by between 1 and 6 dBA for Italia Road receptor in accordance with the INP.

For all of the residential receptors the cumulative noise criteria is higher than the project specific noise criteria. As such, compliance with the project specific noise criteria indicates compliance also with the cumulative noise criteria. No exceedances of the cumulative noise criteria for any residential receptor are predicted, except for the Port Stephens Gardenland landscape supplies facility manager's residence.

The approved car racing facility on Lot 2 DP1158962 and Lot 1 DP245116 has potential to generate short duration, high level noise bursts during races, with periods of low noise emission between races. When averaged over the duration of the operating period (daytime only), the resulting $L_{Aeq,11hour}$ emissions are expected to be sufficiently low level as to not cause exceedance of cumulative noise criteria.

7.15.3 Dust

Cumulative impacts have also been assessed by considering emissions from existing dust sources in the area. Potential dust emissions from the existing

Gardenland composting facility, which forms part of the site, have been included in this assessment. There is also an existing quarry operation located approximate 1 km north and an off-road motor cycle track located to the north east of the site.

The cumulative assessments of PM₁₀ and PM_{2.5} concentrations at the worst impacted receptors have been plotted in **Appendix K** showing the cumulative 24-hour average concentration compared with the assumed background. Pacific Environment's analysis of these plots is that the addition of the project would be unlikely to result in any days over the impact assessment criteria level, and that the project has a very minimal impact on current PM₁₀ and PM_{2.5} concentrations

The predicted pollutant concentrations, including the emissions from Gardenland, at each of the sensitive receptors have been added to the adopted background levels. There are no privately owned receivers that are predicted to exceed the annual average assessment criteria when existing background concentrations are included.

The cumulative assessment indicates that the Project is unlikely to result in any additional exceedances of relevant impact assessment criteria at the neighbouring receivers.

7.15.4 Cumulative Water Impacts

Eagleton Quarry, if approved, will not be the only quarry operating within the Seven Mile Creek catchment. Boral Quarries already operate within the Seven Mile Creek catchment upstream of the proposed project. Boral's environmental assessment states that they do not discharge into Seven Mile Creek, but pump water to Karuah River, so there is limited potential for cumulative surface water quality impacts.

It is estimated from aerial photography that some 35 hectares of Boral Quarry at that time extended into the Seven Mile Creek catchment. The cumulative loss of yield to Seven Mile Creek is thus around 65 hectares, if no discharges from either Boral or Eagleton occur.

As the stream is intermittent and exhibits significant variation in flow volume and duration, it is considered that a reduction in flow volume of Seven Mile Creek will not significantly impact downstream ecosystems.

It is highlighted that whilst the proposed quarry has been designed to fully contain and reuse runoff from an up to 100 year ARI 24 hour storm event, the quarry could also be operated to allow controlled discharges of suitable quality water to Seven Mile Creek to assist in maintaining flow regimes in the creek system.

Groundwater modelling indicates that the cumulative impact of the proposed quarry and surrounding developments and activities will be minor due to the limited propagation of drawdown of groundwater outside of the property boundary.

As the Boral Seaham Quarry has been operational for many years, it has been assumed that it is operating at its maximum capacity that can be reasonably achieved without substantial further investment, and that it has been operating at this capacity during the groundwater investigations. As such, it is assumed that the impacts of the operation of the Boral Seaham Quarry on groundwater have been inherently included in the groundwater model through calibration of the model to recorded groundwater levels at the site and through inclusion of the current topography of the Boral quarry in the model. As such, the potential for cumulative groundwater impacts greater than has been modelled is considered to be low.

8.0 Mitigation Measures

The collective measures required to mitigate the impacts associated with the proposed works are detailed in **Table 18** below. These measures have been derived from the previous assessment in Section 7 and those detailed in appended consultants' reports.

Table 18 – Mitigation Measures

Objective	Action
Construction Environmental Management	
Minimise impact of the construction activities associated with the development of the quarry on surrounding area	A Construction Environmental Management Plan (CEMP) will be prepared and implemented for construction works associated with the quarry, including improvements to access roads. The CEMP will include: ▪ Environmental Management ▪ Traffic Management around road works ▪ Air Quality ▪ Water Quality, including Erosion and Sediment Control Plans ▪ Noise ▪ Heritage, including provision subsurface testing at the crossing of Seven Mile Creek ▪ Waste Management ▪ Emergency Response, including form bush fire hazards ▪ Community Consultation
Operational Environmental Management	
Minimise impact of the operational activities associated with the development of the quarry on surrounding area	An Operational Environmental Management Plan (OEMP) will be prepared and implemented for the quarry to guide operational activities. The OEMP will include: ▪ Environmental Management ▪ Traffic Management ▪ Air Quality ▪ Water Quality ▪ Noise & Vibration ▪ Heritage ▪ Waste Management ▪ Emergency Response, including form bush fire hazards ▪ Community Consultation
General	Hours of operation for the quarry will be as follows: ▪ Processing and extraction activities 7:00am – 6:00 pm Monday to Friday and 7:00am to 4:00pm Saturdays. ▪ Scheduled maintenance would generally be limited to processing hours. However, in the event of urgent unscheduled maintenance that cannot be completed within this period, maintenance works may need to be undertaken anytime 7 days per week. ▪ Drill and Blast will take from between 7am-6pm Monday-Friday and Saturday 7am-12pm. ▪ Standard operating hours for loading and dispatching of sales trucks will be from 5.00am-10pm Monday to Friday, and 5am-4pm Saturday. Subject to demand sales loading activities may need to take place up to 10pm Monday-Friday and up to 6pm on Saturdays.
Traffic	
Design of access routes	Access routes from Italia Road to the site will be upgraded, sealed and maintained to meet Council's requirements.

Objective	Action
Flora and Fauna	
Avoid and offset biodiversity impacts.	▪ Avoidance and retention of 58.81 ha of native vegetation within the study area. This retained vegetation is proposed to be secured under a biobanking agreement as part of the offset to provide in-perpetuity protection and management of this native vegetation and threatened species habitat. ▪ Avoidance of 2nd and 3rd order streams and the associated riparian buffers in the study area, with the exception of a small area for the proposed haul road. Haul road design and construction to ensure existing hydrological regimes for Seven Mile Creek are maintained. ▪ Retention of vegetation corridors on the southern, central and north-east parts of the study area. Connectivity through the eastern corridor would be enhanced through revegetation of grassland areas. ▪ The development site should be delineated with permanent wildlife-friendly fencing, and include signage to identify 'no-go' areas. ▪ Speed limits on traffic using access roads to 40 km / hr (in accordance with CKPoM 2002) will reduce potential for death or injury to wildlife as well as reduce noise and pollution levels.
Flora and Fauna Management Plan	The Flora and Fauna Management Plan would include the following: ▪ Weed Management Plan and Pest Management Plan; ▪ Pre-clearing fauna surveys; ▪ Clearing protocols: ▪ Hollow-bearing tree clearing protocol; ▪ Fauna translocation protocol; and ▪ Vegetation clearing protocol.
Landscape and Rehabilitation Management	▪ The Landscape and Rehabilitation Management would include the following: ▪ Weed management within the development site during operations; ▪ Management of any retained vegetation within the development footprint during operations; ▪ Measures to protect areas of native vegetation and fauna habitats occurring adjacent to the development site; ▪ Details of traffic-calming measures and signage to be installed within the site to reduce the risk of vehicle strike to Koalas and other native fauna; ▪ Details of proposed rehabilitation and revegetation (including timing, target species composition, rehabilitation methods, and ongoing monitoring); ▪ Details on appropriate soil handling processes, including topsoil management for later use in any rehabilitation areas; ▪ Details on the salvage, storage and redistribution of habitat features (e.g. hollows and logs) within the rehabilitation areas; ▪ Fire management; ▪ Vertebrate pest control within the development site; ▪ Details of maintenance, monitoring and performance criteria to assess the condition and functioning of the adjoining vegetation and fauna habitats, and to evaluate progress of rehabilitation works.
Surface Water Quality	
Prevent pollution of waters and impacts on aquatic ecology	▪ Implement Water Management Strategy ▪ Prepare and implement a Water Monitoring Plan which includes. - Surface water quality monitoring will be undertaken at upstream and downstream locations on Seven Mile Creek. - The parameters and frequency of sampling will be monthly sampling of pH, EC, TSS, Total Phosphorus and Total Nitrogen. - Monitor the performance of the water management systems and associated sediment control measures monthly and after major storm events. Flow monitoring of Seven Mile Creek will be

Objective	Action
	undertaken by visual observation during water quality sampling, the visual flow data observations will be used to inform the assessment of water quality data. - Document rainfall depths, water usages, dam volumes and discharges (during extreme events) together with other data that will facilitate updating of water balances, assessment of spill risk and associated water management requirements. - Undertake dam safety and maintenance checks biennially (every two years) on all water management dam walls to assess structural integrity and maintenance requirements, including removal of any trees and shrubs that may impact on the integrity of the walls, and ensuring adequate erosion protection is in place. - Report results of surface water monitoring activities in the Annual Environmental Review which will be distributed to the relevant government agencies and made available to the public. All monitoring data will be retained in an appropriate database. ■ Implement a Construction Erosion and Sediment Control Plan which meets the requirements of the <i>Blue Book Volumes 1 and 2</i> (Landcom, 2004 and DECC, 2008) as part of the CEMP. The performance of erosion and sediment controls at construction areas, including the creek crossing and associated water management measures will be reviewed and monitored during construction. ■ Implement erosion protection at the bridge for the crossing of Seven Mile Creek.
Groundwater	
Groundwater monitoring	■ All existing bores will continue to be monitored until they are disturbed or quarried through. A network of bores will be maintained through the life of the quarry. It is proposed to monitor groundwater levels at these bores quarterly and the following water quality parameters six monthly: - pH - Conductivity - Total Dissolved Solids - Chloride - Arsenic - Total Phosphorus - Total Nitrogen, NOx, Ammonia. ■ Groundwater level and quality results will be analysed, compared with groundwater model predictions and reported annually.
Air Quality	
Minimise impacts to local air quality	■ Best practice environmental management controls will be applied to the operation of quarry plant, equipment and vehicles, including: - Use of water carts/trucks to control emissions from haul roads. - Enforcement of speed limits onsite and on right of way. - Progressive rehabilitation of exposed areas. - Application of water at the crusher and on conveyor transfer points. - Minimising drop height of material during truck loading and unloading. - Use of water sprays when drilling. - Sheltering of stockpiles and transfer points where possible. - Proper blast design. - Management of dust generating activities during unfavourable meteorological conditions.
Minimise emissions, including of greenhouse gas emissions	■ Plant and equipment will be maintained in a good condition to ensure efficient operations. ■ Plant, equipment vehicles not in use will be switched off to minimise emissions.

Objective	Action
Noise and Vibration	
Noise barriers	■ For the initial diesel powered plant configuration, barriers would be required on the: - West side of the Jaw Crusher, minimum length 12 metres. Barrier to extent as far south as practical without impeding the excavator; - South side of the Northern Cone Crusher, minimum length 18 metres; - South-west side of the North-eastern Cone Crusher, minimum length 12 metres; and - West and south sides of the VSI Crusher (an 'L' shaped barrier), 18 x 6 metres with long leg oriented north/south. ■ For the ultimate electric powered plant configuration, barriers would be required on the: - South side of the Jaw Crusher, minimum length 12 metres; and - Western side of the Secondary and Tertiary Crushers (entire length of feed tower structures, with 5 metre extension to south).
Minimise operational noise impact on surrounding residences.	A Noise Management Plan (NMP) for operations will be prepared and implemented as part of the OEMP and would detail methods available to mitigate noise. In particular the Plan will include: ■ Maintenance of all equipment to ensure correct working order; ■ Selection of quiet equipment and plant where practicable; ■ No reversing alarms on mobile plant and equipment; ■ Appropriate training of all staff in relation to noise issues; ■ Appropriate maintenance of internal haulage roads; ■ Community consultation program, including 24 hour hotline number for complaints; ■ Procedures for responding to complaints; and ■ Nominated responsibilities for noise control during operation, and response to complaints.
Aboriginal Heritage	
Verify presence or otherwise of items in Potential Archaeological Deposit to be impacted by the project.	Prior to construction of the internal site road across Seven Mile Creek carry out subsurface investigations in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW. If items of Aboriginal heritage are discovered then their significance will be assessed in consultation with representatives of the local Aboriginal community and further approvals obtained as necessary.
Protect known Aboriginal items and areas of cultural significance	Implement as part of the Site's environmental management plans a strategy of conservation and protection of Aboriginal heritage through: ■ Ensuring that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010, under the National Parks and Wildlife Act 1974; ■ Promoting the involvement of Registered Aboriginal stakeholders in the ongoing management of the Aboriginal cultural materials within the project study area; and ■ Preparing and implementing as part of the Environmental Management Plan a cultural awareness program, developed with the registered Aboriginal stakeholders, to be included as part of the site induction program.
Waste Management	
Reduce the generation of waste	■ Unnecessary resource consumption would be avoided to the greatest extent practicable. ■ All waste or redundant materials generated by the project would be reuse or recycled where feasible and reasonable. ■ Overburden would be re-used at the site for fill or bunding, or will be stored at the site for reuse during rehabilitation.

Objective	Action
	- Any excess re-usable and recyclable materials that cannot be re-used or recycled on the project site would be transported to an appropriate, licensed recycling facility. - General wastes would be segregated into recyclable and non-recyclable streams through the provision of appropriate disposal bins on the project construction site. - Reject tile fragments currently deposited on the ground at the quarry site will be tested against the requirements of the Recovered Aggregate Exemption 2010. If they comply with these criteria, they will be re-used for road base for internal site roads and as surface treatment for the processing area.
Remove and dispose of waste appropriately	- All waste material requiring off-site disposal would be classified using the Waste Classification Guidelines. - Any excess materials that are not re-usable or recyclable would be disposed of at nearby licensed waste facilities. - Any waste oils, greases and lubricants would be stored in designated drums prior to their removal for recycling or disposal. - Any soils contaminated through fuel or chemical spills would be excavated and transported to a licensed waste facility and the resulting excavation would be filled with suitable clean soil. - Any weed species that are cleared for the project would be disposed of at a licensed green waste disposal facility or landfill. - Transport of wastes to recycling or waste disposal facilities would be undertaken by an appropriately licensed waste transporter.
Bush Fire Hazards	
Minimise the potential for site activities to cause bush fire	- Contractors/work staff would be trained in how to prevent, bush fires. - Work vehicles would be parked in cleared operational areas, away from grass or vegetation.
Ensure that staff and contractors are suitably protected from bush fires.	- Contractors/work staff would be trained in how to control and survive bush fires. This would include conducting fire drills. - Work vehicles would be equipped with appropriate bushfire control equipment. - Alternate fire trail routes for ingress and egress to the site will utilise existing fire trails along the south of the property. Also, an alternative 4-wheel-drive emergency access route will be planned for the northern boundary onto Barleigh Ranch Way. Eagleton Rock will initiate discussions with Boral as to the creation of an alternate emergency exit route if Barleigh Ranch Way is blocked. Emergency access routes and fire trails will be planned and designed in consultation with RFS.
Socio-Economic	
Contribute appropriately to the maintenance of local road infrastructure	- Upgrade, and maintain for the duration of operational activities, Barleigh Ranch Way to meet Council's requirements. - Pay to Port Stephens Council a Heavy Vehicle Haulage Levy of 4c per tonne per km for transportation of quarry products on Italia Road, between the Right of Carriageway and the intersection with the Pacific Highway (a distance of approximately 450m).
Closure and Rehabilitation	
Ensure minimal environmental impact on quarry closure	Implement the Rehabilitation and Closure Plan
Consultation	
Effective consultation with the community	- Carry out additional consultation with local community during project planning and construction. - The OEMP will outline measures for effective consultation with the local community and will include contact details for site manager or other appropriate representative and a complaints handling procedure to address and respond to issues raised by the community.

9.0 Justification of the Proposal

In general, investment in major projects can only be justified if the benefits of doing so exceed the costs. Such an assessment must consider all costs and benefits, and not simply those that can be easily quantified. As a result, the EP&A Act specifies that such a justification must be made having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development.

This means that the decision on whether a project can proceed or not needs to be made in the full knowledge of its effects, both positive and negative, whether those impacts can be quantified or not.

The proposed development involves the operation of a hard quarry for 30 years. The assessment must therefore focus on the identification and appraisal of the effects of the proposed change over the site's existing condition.

Various components of the biophysical, social and economic environments have been examined in this EIS and are summarised below.

9.1 Social and Economic

The main economic benefit of the proposed Eagleton Quarry would be the security of supply of aggregate to Newcastle and the Lower Hunter region. The Lower Hunter Regional Strategy forecasts strong growth for the Lower Hunter with 66,000 new jobs and an additional 160,000 residents and 115,000 new dwellings being planned for. In addition, the strategic location of the quarry will also make it a viable supply to the Port of Newcastle for the continued expansion of port facilities include coal loading and handling facilities.

9.2 Biophysical

The environmental impact assessment of the proposed development has demonstrated that the quarry:

- Will not have significant impacts on threatened species or their habitats.
- Suitable biodiversity offset sites are available to enable the necessary BioBanking credits to be obtained to ensure biodiversity impacts are offset in accordance with the Framework for Biodiversity Assessment.
- Local amenity impacts associated with air quality, noise and vibration can be managed so that accepted guidelines levels would not be exceeded.
- Can be operated to prevent discharges to Seven Mile Creek, and to ensure there are no water quality impacts to Seven Mile Creek and the downstream Grahamstown Dam.

9.3 Ecologically Sustainable Development

The EP&A Regulation lists 4 principles of ecologically sustainable development to be considered in assessing a project. They are:

- The precautionary principle;
- Intergenerational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation and pricing of environmental resources.

An analysis of these principles follows.

Precautionary Principle

The precautionary principle is utilised when uncertainty exists about potential environmental impacts. It provides that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. The precautionary principle requires careful evaluation of potential environmental impacts in order to avoid, wherever practicable, serious or irreversible damage to the environment.

Whilst the quarry will permanently alter the landform, this EIS has not identified any serious threat of irreversible damage to the environment and therefore the precautionary principle is not relevant to the proposal.

Intergenerational Equity

Inter-generational equity is concerned with ensuring that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The proposal has been designed to benefit both the existing and future generations by:

- maintaining heritage listed items for future generations to appreciate and enjoy;
- implementing safeguards and management measures to protect environmental values.
- facilitating job creation and the provision of housing in close proximity to public transport; and
- Improving the public domain and amenity in The Haymarket precinct.

The proposal has integrated short and long-term social, financial and environmental considerations so that any foreseeable impacts are not left to be addressed by future generations. Particularly, a Rehabilitation and Closure Plan has been prepared to ensure the quarry site is suitably rehabilitated at the completion of quarrying.

Conservation of biological diversity and ecological integrity

The principle of biological diversity upholds that the conservation of biological diversity and ecological integrity should be a fundamental consideration.

The proposal would not have any significant effect on the biological diversity and ecological integrity of the study area. A detailed biodiversity assessment has been carried out concluding that the quarry will not have significant impacts on threatened species or their habitats. Suitable biodiversity offset sites are available to enable the necessary BioBanking credits to be obtained to ensure biodiversity impacts are offset in accordance with the Framework for Biodiversity Assessment.

Improved valuation, pricing and incentive mechanisms

The principles of improved valuation and pricing of environmental resources requires consideration of all environmental resources which may be affected by a proposal, including air, water, land and living things. Mitigation measures for avoiding, reusing, recycling and managing waste during construction and operation would be implemented to ensure resources are used responsibly in the first instance. The quarry operators will contribute to the local Haulage Levy for transporting extractive materials on the local road network.

10.0 Conclusion

The Environmental Impact Statement (EIS) has been prepared to consider the environmental, social and economic impacts of the proposed Eagleton Quarry. The EIS has addressed the issues outlined in the SEARs (**Appendix A**) and accords with Schedule 2 of the EP&A Regulation.

The proposed quarry will satisfy an identified demand in the Hunter Region by the construction industry for additional materials needed to facilitate the construction of housing and infrastructure in the region to reach targets established by the NSW government.

This EIS and its supporting documents have detailed the different components of the proposal and undertaken an assessment of the potential impacts. This assessment has involved a detailed analysis of the existing environment, the potential impact of the proposed quarry and the cumulative impact of the quarry and existing uses in the area.

The environmental assessment of the potential impacts has identified that there will not be any adverse social, economic or environmental impacts which will not be able to be managed, mitigated or offset in the proposed development. A number of recommendations have been made by specialist consultants have been included as mitigation measures to ensure that adequate measures and management principles are put in place to reduce or mitigate these potential impacts.

Having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development, the carrying out of the project is justified and in the public interest to proceed.

