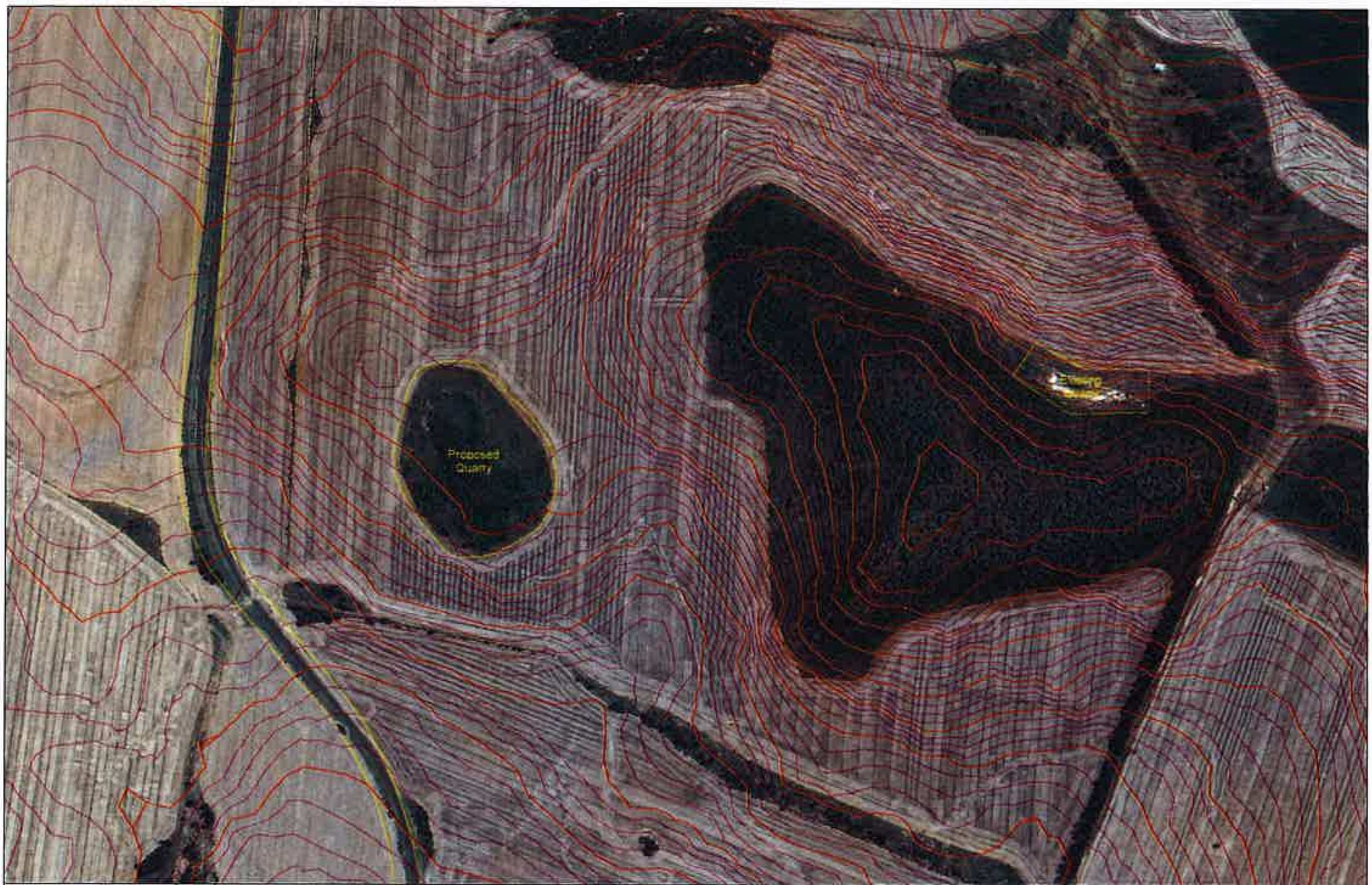
Annexure 4 – Part 1

EIS Appendix 1 - 7

Appendix 1: Site Plans

SCALES HORIZ 1 in 2500 VERT 1 in - DATUM Approximate AHD MGA ZONE 55 SURVEYED SMK CONSULTANTS DESIGNED A Swarbrick CHECKED W Taylor	A3	**SMK CONSULTANTS** surveying - irrigation - environmental PO BOX 774 MOREE 2400 PHONE (02) 67 521021	CLIENT: Alan Pearlman PROJECT: Tikilere Quarry	DESCRIPTION: Site Plan	PLAN REVISION: A FIRST ISSUE B Processing Area from NW to NE C	DATE 29-01-2018 06-02-2018	1 of 1

CONTOUR INTERVAL Major: 1.0 m Minor: 0.2 m



SCALES HORIZ 1 in 5000 VERT 1 in - DATUM Approximate AHD MGA ZONE 55	A3	**SMK CONSULTANTS** surveying - irrigation - environmental	CLIENT: Alan Pearlman	DESCRIPTION:
SURVEYED LIDAR DESIGNED A Voerhez CHECKED P Taylor	CONTOUR INTERVAL Major: 2.0 m Minor: 0.5 m	PO BOX 774 MOREE 2400 PHONE (02) 67 521021	PROJECT: Tikitere Quarry	Contour Map

PLAN REVISION:		DATE	SHEET No.
A	FIRST ISSUE	15-01-2018	1 of 1
B			
C			

Appendix 2: Secretary's Environmental Assessment Requirements

NSW GOVERNMENT | Planning & Environment

Planning Services
Resource Assessments
Contact: Anthony Barnes
Phone: 8289 6709
Email: anthony.barnes@planning.nsw.gov.au

Ms Hayley Greenham
SMK Consultants
PO Box 774
MOREE NSW 2400

Dear Ms Greenham

Secretary's Environmental Assessment Requirements
Tikitere Quarry (EAR 1171)

I refer to your request on behalf of Alan and Kerry Pearlman for the Secretary's Environmental Assessment Requirements (EARs) for the above development, which is designated local development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

I have attached a copy of the EARs for the Environmental Impact Statement (EIS) for the development. These requirements have been prepared in consultation with relevant government agencies and are based on the information your company has provided to date. I have also attached the agencies' input into the EARs, which you are also advised to consider closely when preparing the EIS. You must have regard to these comments in the preparation of the EIS. I advise that there are comments yet to be received from Local Land Services NSW and Gwydir Shire Council. Comments from these agencies will be forwarded to you once they are received.

In your request for EARs, you have also indicated that the proposal is classified as integrated development under section 91 of the EP&A Act. You are encouraged to consult with the Environment Protection Authority with respect to licence/approval requirements. If further integrated approvals are required, you must undertake your own consultation with the relevant public authorities, and address their requirements in the EIS.

When you lodge your DA with the consent authority, you must provide:
- one hard and one electronic copy of the EIS to the Department;
- one hard and one electronic copy of the EIS to any identified integrated approval authority; and
- a cheque for $320 to each identified integrated approval authority, to offset costs involved in the review of the DA and EIS. No cheque is required for the Department as it is not an approval authority.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will also require approval under the Commonwealth's *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Department of the Environment and Energy in Canberra (6274 1111 or www.environment.gov.au).

You should contact the local Mine Safety Operations Branch of the Division of Energy, Water, Regulation and Portfolio Strategy within the NSW Department of Planning & Environment in regard to this development and other matters relating to compliance with the *Work Health and Safety (Mines and Petroleum Sites) Act 2013.*

If you have any enquiries about these requirements, please contact Anthony Barnes on the details listed above.

Yours sincerely

26/09/17
Matthew Sprott
A/Director
Resource Assessments
As the Secretary's delegate

Secretary's Environmental Assessment Requirements

Section 78A(8) of the *Environmental Planning and Assessment Act 1979* and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000.*

Designated Development

EAR Number	EAR 1171
Proposal	Establishment of a hard rock quarry to extract and process a maximum of 500,000 tonnes per annum over a 3-year period.
Location	1135 Croppa Creek Road, North Star (Lot 17 DP 755984)
Applicant	Alan and Kerry Pearlman
Date of Issue	26 September 2017
Date of Expiry	26 September 2019
General Requirements	The Environmental Impact Statement (EIS) for the development must comply with the requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. In particular, the EIS must include: • an executive summary; • a comprehensive description of the development, including: - a detailed site description and history of any previous quarrying on the site, including a current survey plan; - identification of the resource, including the amount, type, composition; - the layout of the proposed works and components (including any existing infrastructure that would be used for the development); - an assessment of the potential impacts of the development, as well as any cumulative impacts, including the measures that would be used to minimise, manage or offset these impacts; - a detailed rehabilitation plan for the site; - any likely interactions between the development and any existing/approved developments and land uses in the area, paying particular attention to potential land use conflicts with nearby residential development; - a list of any other approvals that must be obtained before the development may commence; - the permissibility of the development, including identification of the land use zoning of the site; - identification of sensitive receivers likely to be affected by the development using clear maps/plans, including key landform areas, such as conservation areas and waterways; • a conclusion justifying why the development should be approved, taking into consideration: - alternatives; - the suitability of the site; - the biophysical, economic and social impacts of the project, having regard to the principles of ecologically sustainable development; and - whether the project is consistent with the objects of the Environmental Planning and Assessment Act 1979; and • a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.
Consultation	In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers and any surrounding landowners and affected communities that may be impacted by the development. The EIS must describe the consultation that was carried out, identify the issues raised during this consultation, and explain how these issues have been addressed in the EIS.
Key Issues	The EIS must assess the potential impacts of the proposal at all stages of the development, including the establishment, operation and decommissioning of the development. The EIS must address the following specific issues: • **Noise** – including a quantitative assessment of potential: - construction and operational noise and off-site transport noise impacts of the development in accordance with the Interim Construction Noise Guideline, NSW Industrial Noise Policy and NSW Road Noise Policy respectively;

- reasonable and feasible mitigation measures to minimise noise emissions; and
- monitoring and management measures;

- **Blasting & Vibration** – including;
  - proposed hours, frequency, methods and impacts; and
  - an assessment of the likely blasting and vibration impacts of the development, having regard to the relevant ANZEC guidelines and paying particular attention to impacts on people, buildings, livestock, infrastructure and significant natural features;
- **Air** – including an assessment of the likely air quality impacts of the development in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW. The assessment is to give particular attention to potential dust impacts on any nearby private receivers due to construction activities, the operation of the quarry and/or road haulage;
- **Water** – including:
  - a detailed site water balance and an assessment of any volumetric water licensing requirements, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges), water supply infrastructure and water storage structures;
  - identification of any licensing requirements or other approvals required under the Water Act 1912 and/or Water Management Act 2000;
  - demonstration that water for the construction and operation of the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP)
  - a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo;
  - an assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts;
  - an assessment of any likely flooding impacts of the development;
  - an assessment of potential impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives; and
  - a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts;
- **Biodiversity** – including:
  - accurate predictions of any vegetation clearing on site;
  - a detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems;
  - a detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant; and
  - an assessment of whether a Species Impact Statement is required;
- **Heritage** – including:
  - an assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage; and
  - identification of Historic heritage in the vicinity of the development and an assessment of the likelihood and significance of impacts on heritage items, having regard to the relevant policies and guidelines listed in Attachment 1;
- **Traffic &Transport** – including:
  - accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;
  - an assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;
  - a description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development;
  - evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and
  - a description of access roads, specifically in relation to nearby Crown roads and fire trails;
- **Land Resources** – including an assessment of:
  - potential impacts on soils and land capability (including potential erosion and land contamination) and the proposed mitigation, management and remedial measures (as appropriate);
  - potential impacts on landforms (topography), paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds etc); and

	- the compatibility of the development with other land uses in the vicinity of the development, in accordance with the requirements of Clause 12 of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007; • **Waste** – including estimates of the quantity and nature of the waste streams that would be generated or received by the development and any measures that would be implemented to minimise, manage or dispose of these waste streams; • **Hazards** – including an assessment of the likely risks to public safety, paying particular attention to the transport, storage, handling and use of any hazardous or dangerous goods; • **Visual** – including an assessment of the likely visual impacts of the development on private landowners in the vicinity of the development and key vantage points in the public domain, including with respect to any new landforms; • **Social & Economic** – an assessment of the likely social and economic impacts of the development, including consideration of both the significance of the resource and the costs and benefits of the project; and • **Rehabilitation** – including: - a detailed description of the proposed rehabilitation measures that would be undertaken throughout the development and during quarry closure; - a detailed rehabilitation strategy, including justification for the proposed final landform and consideration of the objectives of any relevant strategic land use plans or policies; and - the measures that would be undertaken to ensure sufficient financial resources are available to implement the proposed rehabilitation strategy, recognising that a rehabilitation bond will likely be required as a condition of any future development consent.
Environmental Planning Instruments	The EIS must take into account all relevant State Government environmental planning instruments, guidelines, policies, and plans. While not exhaustive, Attachment 1 contains a list of some of the environmental planning instruments, guidelines, policies and plans that may be relevant to the environmental assessment of this development. During the preparation of the EIS you must also consult the Department's EIS Guideline – Extractive Industries – Quarries. This guideline is available at http://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/extractive-industries-quarries-eis-guideline-1996-10.ashx. In addition, the EIS must assess the development against the Gwydir LEP 2013 and any relevant development control plans/strategies.

ATTACHMENT 1

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.bookshop.nsw.gov.au
http://www.publications.gov.au

Environmental Planning Instruments, Policies, Guidelines & Plans

Environmental Planning Instruments - General	
	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
	State Environmental Planning Policy (State and Regional Development) 2011
	State Environmental Planning Policy (Infrastructure) 2007
	Gwydir LEP 2013
Risk Assessment	
	AS/NZS 4360:2004 Risk Management (Standards Australia)
	HB 203: 203:2006 Environmental Risk Management – Principles & Process (Standards Australia)
Land	
	State Environmental Planning Policy No. 55 – Remediation of Land
	Agricultural Land Classification (DPI)
	Rural Land Capability Mapping (OEH)
	Soil and Landscape Issues in Environmental Impact Assessment (NOW)
	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC)
	Guidelines for Consultants Reporting on Contaminated Sites (EPA)
	Agricultural Issues for Extractive Industry Development (DPI)
Water	
Groundwater	NSW Aquifer Interference Policy 2012 (NOW)
	NSW State Groundwater Policy Framework Document (NOW)
	NSW State Groundwater Quality Protection Policy (NOW)
	NSW State Groundwater Quantity Management Policy (NOW)
	Australian Groundwater Modelling Guidelines 2012 (Commonwealth)
	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	Guidelines for the Assessment & Management of Groundwater Contamination (EPA)
Surface Water	NSW State Rivers and Estuary Policy (NOW)
	NSW Government Water Quality and River Flow Objectives (EPA)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (EPA)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)
	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA)
	Managing Urban Stormwater: Soils & Construction (Landcom) and associated Volume 2E: Mines and Quarries (DECC)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control (EPA)
	Technical Guidelines: Bunding & Spill Management (EPA)
	A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH)
	NSW Guidelines for Controlled Activities (NOW)
Flooding	Floodplain Development Manual (OEH)
	Floodplain Risk Management Guideline (OEH)
Biodiversity	
	Biodiversity Assessment Method (BAM) (OEH 2017)

	NSW Guide to Surveying Threatened Plants (OEH 2016)
	Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECC 2009)
	Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC 2004)
	Threatened Species Assessment Guideline – The Assessment of Significance (DECC 2007)
	OEH principles for the use of biodiversity offsets in NSW
	NSW State Groundwater Dependent Ecosystem Policy (NOW)
Heritage	
	The Burra Charter (The Australia ICOMOS charter for places of cultural significance)
	Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW (OEH) 2011
	Draft Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (DP&E)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH)
	Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (OEH)
	Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (OEH)
	NSW Heritage Manual (OEH)
	Statements of Heritage Impact (OEH)
Noise & Blasting	
	NSW Industrial Noise Policy (EPA)
	Interim Construction Noise Guideline (EPA)
	NSW Road Noise Policy (EPA)
	Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC)
Air	
	Protection of the Environment Operations (Clean Air) Regulation 2002
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA)
	Assessment and Management of Odour from Stationary Sources in NSW (DEC)
	National Greenhouse Accounts Factors (Commonwealth)
Transport	
	Guide to Traffic Generating Development (RTA)
	Road Design Guide (RMS) & relevant Austroads Standards
Public Safety	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Hazardous and Offensive Development Application Guidelines – Applying SEPP 33
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
Resource	
	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 (JORC)
Waste	
	Waste Classification Guidelines (DECC)
	Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes 1999 (EPA)
Rehabilitation	
	Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Strategic Framework for Mine Closure (ANZMEC-MCA)

ATTACHMENT 2

AGENCIES' CORRESPONDENCE

Resource Assessments
Dept Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Genevieve Seed

Notice Number 1556562

Dear Ms Seed,

RE: ENVIRONMENTAL ASSESSMENT REQUIREMENTS 1170 - PROPOSED TIKITERE QUARRY

I refer to your request for the Environment Protection Authority's (EPA) requirements for the environmental assessment (EA) regarding the above proposal, received by EPA on 4 September 2017.

The EPA has considered the details of the proposal provided by the Department of Planning and Environment (DPE) and has identified the information it requires to consider its general terms of approval in **Attachment A**. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. Noise - Proximity to sensitive receptors and impact of any sources associated with the project.

2. Air - Dust generated and management of potential impacts on adjacent rural residences during the construction and operational phases.

3. Water - Water management systems and the implementation of adequate erosion and sediment controls to control runoff from the quarry.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment B** and any relevant industry codes of practice and best practice management guidelines.

Based on the information provided to the EPA, if approval is granted, the applicant will require an environment protection licence (EPL) issued under the provisions of the *Protection of the Environment Operations Act* 1997 (POEO Act) for the following: *Carrying out scheduled activities – Extractive Activities – Land-based extractive activity*. The applicant will need to make a separate application to the EPA for this licence. General information on licence requirements can be obtained from Environment Line on 131555 or on the EPA website at: http://www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the EA it is requested that the EA follow the format of the Department of Planning EIS guidelines and addresses the EPA's specific EA requirements outlined in the Attachments A and B of this letter. If the necessary information is not adequately provided in the EA then delays in the development application process may occur. The applicant should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The applicant should be made aware that, consistent with provisions under Part 9.4 of the POEO Act, the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an EPL.

In addition, as a requirement of an EPL, the EPA will require the applicant to prepare, test and implement a Pollution Incident Response Management Plan and/or Plans in accordance with Section 153A of the POEO Act.

The EPA requests that the applicant provide one (1) electronic copy of the DA/EA/EIS when lodging its application with the EPA. These documents should be sent to the EPA's Armidale office by email to: armidale@epa.nsw.gov.au.

Please note that this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage.

If you have any queries regarding this matter, please contact Rebecca Scrivener on (02) 6773 7000.

Yours sincerely

.....

Robert O'Hern

Head Regional Operation Unit

North - Armidale

(by Delegation)

ATTACHMENT A: Environmental Assessment Requirements for Tikitere Quarry – North Star

1 Environmental impacts of the project

1.1. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- Air quality issues including dust generation
- Noise and vibration
- Waste including hazardous materials and radiation
  - General waste – disposal options
  - Hazardous materials and radiation
- Water and Soils
  - Sediment and Erosion controls

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment B**.

2 Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted. The EIS should address the requirements of Section 45 of the POEO Act determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate limits and conditions for the EPL.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

The EIS should include an air quality impact assessment (AQIA). The AQIA should:

3.1. Assess the risk associated with potential discharges of fugitive and point source emissions for all stages of the proposal. Assessment of risk relates to environmental harm, risk to human health and amenity.

3.2. Justify the level of assessment undertaken based on risk factors, including but not limited to:
- proposal location;
- characteristics of the receiving environment; and
- type and quantity of pollutants emitted.

3.3. Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to:
- meteorology and climate;
- topography;
- surrounding land-use;
- receptors; and
- ambient air quality.

3.4. Include a detailed description of the proposal. All processes that could result in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided.

3.5. Include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits.

3.6. Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.

3.7. Include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.8. Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2010)*.

3.9. Detail emission control techniques/practices that will be employed by the proposal.

4 Noise and Vibration

In relation to noise, the following matters should be addressed (where relevant) as part of the Environmental Assessment.

General

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009).
http://www.epa.nsw.gov.au/noise/constructnoise.htm

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). http://www.epa.nsw.gov.au/noise/vibrationguide.htm

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990). http://www.epa.nsw.gov.au/noise/blasting.htm

Industry

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Industrial Noise Policy* (EPA, 2000) and *Industrial Noise Policy Application Notes.* http://www.epa.nsw.gov.au/noise/industrial.htm

Road

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *Environmental Criteria for Road Traffic Noise* (EPA, 1999). http://www.epa.nsw.gov.au/noise/traffic.htm

5 Waste, chemicals and hazardous materials and radiation

5.1. Identify, characterise and classify all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste.
Note: All waste must be classified in accordance with the *EPA's Waste Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm

5.2. Identify, characterise and classify all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.
Note: All waste must be classified in accordance with the *EPA's Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm.

5.3. Include a commitment to retaining all sampling and classification results for the life of the project to demonstrate compliance with *EPA's Waste Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm.

5.4. Provide details of how waste will be handled and managed onsite to minimise pollution, including:

a) Stockpile location and management
- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners etc.

b) Erosion, sediment and leachate control including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during works. The EA should show the location of each measure to be implemented. The Proponent should consider measures such as:
- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate

5.5. The Proponent should also provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

5.6. Provide details of how the waste will be handled and managed during transport to a lawful facility. If the waste possesses hazardous characteristics, the Proponent must provide details of how the waste will be treated or immobilised to render it suitable for transport and disposal.

5.7. Include details of all procedures and protocols to be implemented to ensure that any waste leaving the site is transported and disposed of lawfully and does not pose a risk to human health or the environment.

5.8. Include a statement demonstrating that the applicant is aware of the EPA's requirements with respect to notification and tracking of waste.

5.9. Include a statement demonstrating that the applicant is aware of the relevant legislative requirements for disposal of the waste, including any relevant Resource Recovery Exemptions, as gazetted by the EPA from time to time.

5.10. Outline contingency plans for any event that affects operations at the site that may result in environmental harm, including: excessive stockpiling of waste, volume of leachate generated exceeds the storage capacity available on-site etc.

6 Water and soils

6.1 Soils

The EA should include:

6.1.1. An assessment of potential impacts on soil and land resources should be undertaken, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Particular attention should be given to:

a. Soil erosion and sediment transport - in accordance with *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B Waste landfills; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC 2008).

b. Mass movement (landslides) – in accordance with *Landslide risk management* guidelines presented in Australian Geomechanics Society (2007).

c. Urban and regional salinity – guidance given in the Local Government Salinity Initiative booklets which includes *Site Investigations for Urban Salinity* (DLWC, 2002).

6.1.2. A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified soil and land resource impacts associated with the project. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. Where required, add any specific assessment requirements relevant to the project.

6.2 Water

Describe Proposal

6.2.1. Describe the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

6.2.2. Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.2.3. Where relevant include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Background Conditions

6.3.1. Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resource likely to be affected by the proposal.

Proponents are generally only expected to source available data and information. However, proponents of relatively large and/or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could also include, for example:

- water chemistry
- a description of receiving water processes, circulation and mixing characteristics and hydrodynamic regimes
- lake or estuary flushing characteristics
- sensitive ecosystems or species conservation values
- specific human uses (e.g. fishing, proximity to recreation areas)
- a description of any impacts from existing industry or activities on water quality
- a description of the condition of the local catchment e.g. erosion, soils, vegetation cover, etc.
- an outline of baseline groundwater information, including, for example, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
- historic river flow data

6.3.1. State the Water Quality Objectives for the receiving waters relevant to the proposal. These refer to the community's agreed environmental values and human uses endorsed by the NSW Government as goals for ambient waters (http://www.environment.nsw.gov.au/ieo/index.htm). Where groundwater may be impacted the assessment should identify appropriate groundwater environmental values.

6.3.2. State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.3.3. State any locally specific objectives, criteria or targets which have been endorsed by the NSW Government.

Impact Assessment

No proposal should breach section 120 of the *Protection of the Environment Operations Act 1997* (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).

6.4.1. Describe the nature and degree of impact that any proposed discharges will have on the receiving environment.

Depending on the nature, scale and/or risk of the proposal, this could include specific requirements to consider impacts on, for example:

- water circulation, current patterns, water chemistry and other appropriate characteristics such as clarity, temperature, nutrient and toxicants
- changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, and groundwater)
- disturbance of acid sulphate soils and potential acid sulfate soils
- stream bank stability and impacts on macro invertebrates

Depending on the nature, scale and/or risk of the proposal, modelling, monitoring, or both, may need to be undertaken to assess the potential impact of discharges on the receiving environment. If modelling is required to assess the potential impact of any discharge(s), this could include, for example:

- a range of scenarios that encompass any variations in discharge quality and quantity as well as the relevant range of environmental conditions of the receiving waters. The scenarios could describe a set of worst-case conditions and typical conditions to ensure that both acute and chronic impacts are assessed,
- assumptions used in the modelling, including identification and discussion of the limitations and assumptions to ensure full consideration of all factors, including uncertainty in predictions.

6.4.2. Assess impacts against the relevant ambient water quality outcomes.

Demonstrate how the proposal will be designed and operated to:

- protect the Water Quality Objectives for receiving waters where they are currently being achieved; and
- contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved.

6.4.3. Where a discharge is proposed that includes a mixing zone, the proposal should demonstrate how wastewater discharged to waterways will ensure the ANZECC (2000) water quality criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge, and that any impacts in the initial mixing zone are demonstrated to be reversible.

6.4.4. Assess impacts on groundwater and groundwater dependent ecosystems.

6.4.5. Describe how stormwater will be managed both during and after construction.

6.4.6. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.4.7. Outline sediment and erosion control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.

6.4.8. Provide details of how stormwater and runoff will be managed to minimise pollution, including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. The proponent should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC2008) as well as control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

Monitoring

6.5.1. Describe how predicted impacts will be monitored and assessed over time.

For relatively large and/or high risk developments, proponents should develop a water quality and aquatic ecosystem monitoring program to monitor the responses for each component or process that affects the Water Quality Objectives that includes, for example:

- adequate data for evaluating compliance with water quality standards and/or Water Quality Objectives,
- measurement of pollutants identified or expected to be present in any discharge.

Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) (http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf).

Attachment B – Guidance Material

Title	Web Address
Contaminated Land Management Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+140+1997+cd+0+N
Environmentally Hazardous Chemicals Act 1985	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+14+1985+cd+0+N
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Licensing	
EPA Guide to Licensing	www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Approved methods for modelling and assessment of air pollutants in NSW (2005)	http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf
POEO (Clean Air) Regulation 2010	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+428+2010+cd+0+N
Noise and Vibration	
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.epa.nsw.gov.au/noise/vibrationguide.htm
Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990)	http://www.epa.nsw.gov.au/noise/blasting.htm
Industrial Noise Policy (EPA)	http://www.epa.nsw.gov.au/noise/industrial.htm
Industrial Noise Policy Application Notes	http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm
Environmental Criteria for Road Traffic Noise (EPA, 1999)	http://www.epa.nsw.gov.au/noise/traffic.htm
Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (DECC, 2007)	http://www.epa.nsw.gov.au/noise/railinfranoise.htm
Environmental assessment requirements for rail traffic-generating developments	http://www.epa.nsw.gov.au/noise/railnoise.htm
Waste, Chemicals and Hazardous Materials and Radiation	
Waste	

Environmental Guidelines: Solid Waste Landfills (EPA, 1996)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/solidlandfill.pdf
Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/industrialfill.pdf
Waste Classification Guidelines (DECC, 2008)	http://www.epa.nsw.gov.au/waste/envguidlns/index.htm
EPA Resource recovery exemption	http://www.epa.nsw.gov.au/waste/RRecoveryExemptions.htm
Chemicals subject to Chemical Control Orders	
Chemical Control Orders (regulated through the EHC Act)	http://www.epa.nsw.gov.au/pesticides/CCOs.htm
National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
Water and Soils	
Acid sulphate soils	
Coastal acid sulfate soils guidance material	http://www.environment.nsw.gov.au/acidsulfatesoil/
Acid Sulfate Soils Planning Maps	http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm
Contaminated Sites Assessment and Remediation	
Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land	http://www.planning.nsw.gov.au/assessingdev/pdf/gu_contam.pdf
Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000)	http://www.epa.nsw.gov.au/resources/clm/20110650consultantsglines.pdf
Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006)	http://www.epa.nsw.gov.au/resources/clm/auditorglines06121.pdf
Sampling Design Guidelines (EPA, 1995)	Available by request from EPA's Environment Line
National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update)	http://www.scew.gov.au/nepms/assessment-site-contamination
Soils – general	
Managing land and soil	http://www.environment.nsw.gov.au/soils/landandsoil.htm
Managing urban stormwater for the protection of soils	http://www.environment.nsw.gov.au/stormwater/publications.htm
Landslide risk management guidelines	http://www.australiangeomechanics.org/resources/downloads/

Site Investigations for Urban Salinity (DLWC, 2002)	http://www.environment.nsw.gov.au/resources/salinity/booklet3siteinvestigationsforurbansalinity.pdf
Local Government Salinity Initiative Booklets	http://www.environment.nsw.gov.au/salinity/solutions/urban.htm
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://environment.gov.au/water/policy-programs/nwqms/index.html
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	Contact the EPA on 131555
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

NSW GOVERNMENT | Department of Primary Industries

OUT17/38500

22 September 2017

Genevieve Seed
Senior Planning Officer
Resource Assessments
GPO Box 39
Sydney NSW 2001

genevieve.seed@planning.nsw.gov.au

Dear Genevieve

SEAR's Request –EAR 1171 – Tikitere Quarry Proposal

Thank you for the opportunity to provide Secretary Environmental Assessment Requirements (SEAR) for the above proposal as per your correspondence dated 4 September 2017.

The NSW Department of Primary Industries (NSW DPI) Agriculture is committed to the protection and growth of agricultural industries, and the land and resources upon which these industries depend. Important issues for extractive industries are the potential impact on limited agricultural resources and the ability to rehabilitate the land to enable continued agricultural investment.

NSW DPI Agriculture provides SEARs (Attachment 1) and a range of publications to assist consent authorities, community and proponents in addressing the recommended SEARs (Attachment 2).

Should you require clarification on any of the information contained in this response, please contact Resource management Officer Mary Kovac on (02) 68811250.

DPI Agriculture is working to ensure that the advice provided is of the highest quality. Please take some time to provide us with feedback on our work by completing a short survey.

Yours sincerely

Lilian Parker
Manager Agricultural Land Use Planning

Attachment 1: SEARs Recommendations

Issue and desired outcome	Detail / Requirement
Site Suitable for development	• Detail that the quarry is consistent with strategic plans and zone requirements • Complete a Landuse Conflict Risk Assessment (LUCRA) to identify potential landuse conflict, in particular relating to separation distances and management practices to minimise odour, dust and noise from sensitive receptors. A LUCRA is described in the DPI Land Use Conflict Risk Assessment Guide. • Include a map to scale showing the above operational and infrastructure details including separation distances from sensitive receptors.
Consideration for impacts to agricultural resources and land	• Describe the current and potential *Strategic and/or Important Agriculture Land* on the proposed development site and surrounding locality including the land capability and agricultural productivity. • Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated. • Consider possible cumulative effects to agricultural enterprises and landholders. • Detail the expected life span of the proposed development
Bushfire risk identified and managed	• Risk assessment level and mitigation plan developed to address bush fire risk.
Suitable and secure water supply	• Estimated water demand and water availability should be clearly outlined in the proposal. The source of water and any sanitisation methods to be detailed in the application. • Outline any impacts to water use from agriculture and mitigation measures if required.
Surface & Groundwater protected	• Proposed development design, operation and by-product management should be undertaken to avoid nutrient and sediment build up and minimise erosion, off site surface water movement and groundwater accession. • The proposal should detail how design and operation will be undertaken for by-product management in accordance with best practice to prevent excess build-up of nutrients and salts in the soil profile and increase the risk of leaching. A monitoring program should be developed.
Biosecurity Standards met	• Include a biosecurity (pests and weeds) risk assessment outlining the likely plant, animal and community risks. • Develop a biosecurity response plan to deal with identified risks as well as contingency plans for any failures. Including monitoring and mitigation measures in weed and pest management plans.
Suitable traffic movements	• Consideration of the route for movements needs to be taken into account so that impacts on sensitive receptors are minimised (eg noise, dust, volume of traffic). This should include consideration of Travelling Stock Reserves1 (TSR) and the movement of livestock or farm vehicles along / across the affected roads
Visual amenity achieved	• Amenity impacts are assessed and any necessary response to mitigate visual impacts is described and illustrated.

Issue and desired outcome	Detail / Requirement
Land stewardship met	• Develop Rehabilitation and Decommissioning/Closure Plans that describes the design criteria of the final landuse and landform along with the expected timeline for the rehabilitation program. • Outline monitoring and mitigation measures to be adopted for rehabilitation remedial actions.
Adequate consultation with community	• Consult with relevant agencies such as on the design, construction and operation of the proposed infrastructure. • Consult with the owners / managers of affected and adjoining neighbours and agricultural operations in a timely and appropriate manner about; the proposal, the likely impacts and suitable mitigation measures or compensation. • Establish a complaints register that includes reporting and investigating procedures and timelines, and liaison with Council in relation to complaint issues.
Contingency and Environmental Management Plan developed	• Contingency plans should be developed to enable the operation to deal with emergency situations. Commitment to the preparation of an Emergency Management plan that outlines procedures and responsibilities for responding to bushfire threats and possible mass mortality events which might result from extreme climatic conditions, routine or emergency animal disease outbreaks.

Attachment 2: Guidelines for assessment

Title	Location
Land Use Conflict Risk Assessment Guide	www.dpi.nsw.gov.au/content/agriculture/resources/lup/development-assessment/lucra
Agricultural Issues for Extractive industry Development	http://www.dpi.nsw.gov.au/content/agriculture/resources/lup/development-assessment/extractive-industries

Department of Primary Industries
Water

Contact: Jeanette Nestor
Phone: 02 6841 7447
Email : jeanette.nestor@dpi.nsw.gov.au

Our ref: V15/2812-2#3, OUT17/37760
Your Ref: EAR1171

Planning & Environment
Senior Planning Officer
Resource Assessment
GPO Box 39 SYDNEY NSW 2001

12 September 2017

Attn: Genevieve Seed

genevieve.seed@planning.nsw.gov.au

Dear Genevieve

Re: Name of project and address – Secretary Environmental Assessment Requirements ID No. EAR1171 – Tikitere Quarry - Designated Development

Thank you for your email of 4th September 2017 seeking Secretary Environmental Assessment Requirements (SEARs) for the above development. DPI Water has reviewed the supporting documentation accompanying the request for SEARs and recommends the EIS be required to include the following.

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.
- Assessment of impacts on surface and groundwater 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.
- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS in the form of a table.

- A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.
- Full technical details and data of all surface and groundwater modelling, and an independent peer review.
- Proposed management and disposal of produced or incidental water
- Details of the final landform of the site, including final void management (where relevant) and rehabilitation measures.

For further information please contact Jeanette Nestor Water Regulation Officer at DPI Water Dubbo on **t:** (02) 6841 7447; **e:** jeanette.nestor@dpi.nsw.gov.au

Yours sincerely

Jeanette Nestor
Water Regulation Officer
Water Regulatory Operations
Department of Primary Industries - Water

ATTACHMENT A

DPI Water General Assessment Requirements for Designated Development projects

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the DPI Water website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Act 1912* (WA 1912) and *Water Management Act 2000* (*WM Act*), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WM Act)
Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979 (EP&A Act)*.
- No exemptions for volumetric licensing apply as a result of the *EP&A Act*.
- Harvestable rights dams
- Aquifer interference activity approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Flood management Work approvals have now commenced
- Maximum penalties of $ 2.2 million plus $ 264,000 for each day an offence continues apply under the *WM Act*

Water Act 1912 (WA 1912)
Key points:

- Monitoring bores
- Aquifer interference activities that are not regulated as a water supply work under the *WM Act*.
- No exemptions apply to licences or permits under the *WA 1912* as a result of the *EP&A Act*.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011
Key points:

- Provides various exemptions for volumetric licensing and activity approvals
- Provides further detail on requirements for dealings and applications.

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans these are considered regulations under the *WM Act*

It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au. Multiple water sharing plans may apply and these must all be described.

The *Water Act 1912* applies to all water sources not yet covered by a commenced water sharing plan.

The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
    - Sufficient market depth to acquire the necessary entitlements for each water source.
    - Ability to carry out a "dealing" to transfer the water to relevant location under the rules of the WSP.
    - Daily and long-term access rules.
    - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)
- NSW State Rivers and Estuary Policy (1993)
- NSW Wetlands Policy (2010)
- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
- NSW Water Extraction Monitoring Policy (2007)

DPI Water policies can be accessed at the following links:
http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx
http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx

An assessment framework for the NSW Aquifer Interference Policy can be found online at: http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
- Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10% of the average annual runoff from their property if in the Eastern and Central Divisions. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit: http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff

Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety

issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
- Identification of all surface water sources as described by the relevant water sharing plan.
- Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
- Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
- Assessment of predicted impacts on the following:
    - flow of surface water, sediment movement, channel stability, and hydraulic regime,
    - water quality,
    - flood regime,
    - dependent ecosystems,
    - existing surface water users, and
    - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources.

Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.

Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal.

- The known or predicted highest groundwater table at the site.
- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.

- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.
- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
  - the effect of the proposal on the recharge to groundwater systems;
  - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
  - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
  - wetlands/swamps, watercourses and top of bank;
  - riparian corridor widths to be established along the creeks;
  - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
  - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
  - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
- A detailed description of all potential impacts on the watercourses/riparian land.
- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.

Drill Pad, Well and Access Road Construction (applies to Quarries and Non Coal Mine projects)

- Any construction activity within 40m of a watercourse, should be designed by a suitably qualified person, consistent with the NSW *Guidelines for Controlled Activities on Waterfront Land* (July 2012).
- Construction of all wells must be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia* (3rd edition 2012) by a driller holding a bore drillers' licence valid in New South Wales.
- The length of time that a core hole is maintained as an open hole should be minimised.

Applies to Coal Mines and Gas projects:

- Construction, suspension and abandonment of wells for petroleum projects should be carried out in accordance with the NSW *Code of Practice for Coal Seam Gas Well Integrity* (DTIRIS 2012).

Landform rehabilitation

Where significant modification to landform is proposed, the EIS must include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and

- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.

Additional Landform Rehabilitation Requirements for Quarries and Non Coal Mines (including final void management)

- Detailed modelling of potential groundwater volume, flow and quality impacts of the presence of an inundated final void (where relevant) on identified receptors specifically considering those environmental systems that are likely to be groundwater dependent;
- The measures that would be established for the long-term protection of local and regional aquifer systems and for the ongoing management of the site following the cessation of the project.

Consultation and general enquiries

General licensing enquiries can be made to Advisory Services: water.enquiries@dpi.nsw.gov.au, 1800 353 104.

Assessment of state significant development enquiries, or requests for review or consultation should be directed to the Water Regulation Co-ordination Unit, water.referrals@dpi.nsw.gov.au.

A consultation guideline and further information is available online at: www.water.nsw.gov.au/water-management/law-and-policy/planning-and-assessment

Planning & Environment
NSW GOVERNMENT | Resources & Geoscience

14th September 2017

Genevieve Seed
Senior Planning Officer
Department of Planning & Environment
GPO Box 39
Sydney NSW 2001

Emailed: genevieve.seed@planning.nsw.gov.au

Your Reference: SEARs 1171
Our Reference: OUT17/38285

Dear Ms Seed,

Re: Request for Secretary's Environmental Assessment Requirements for the Tikitere Quarry Proposal - SEARs 1171 - Gwyder LGA.

Thank you for the opportunity to provide advice on the subject proposal. I refer to your email of 4th September 2017. Thank you for the opportunity to provide advice on the above matter. This is a response from NSW Department of Planning & Environment – Division of Resources & Geoscience, Geological Survey of New South Wales (GSNSW).

The building and construction industries in NSW require ongoing replacement of supplies as sources are exhausted. The expansion of existing quarries, subject to environmental assessment, helps to ensure a continued supply of material for a range of building and construction uses in NSW. The resource in the subject area represents an important source construction material for the Australian Rail Track Corporation Inland Rail Project.

It is in the best interests of both the proponent and the community to fully assess the resources which are to be extracted. This means that a thorough geological assessment should be undertaken to determine the nature, quality and extent of the resource. Failure to undertake such an assessment could lead to operational problems and possibly even failure of the proposal.

Basalt and siltstone are not prescribed minerals under the *Mining Act 1992*. Therefore, the Department has no statutory role in authorising or regulating the extraction of this commodity, apart from its role under the *Work Health and Safety Act 2011* and associated regulations and the *Work Health and Safety (Mine and Petroleum Sites) Act 2013* and associated regulations, for ensuring the safe operation of mines and quarries. However, the Department is the principal government authority responsible for assessing the State's resources of construction materials and for advising State and local government on their planning and management.

All environmental reports (EIS or similar) accompanying Development Applications for extractive industry lodged under the *Environmental Planning & Assessment Act 1979* should include a resource assessment **(as detailed in Attachment A)** which:

- **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.**

The above information should be summarised in the EIS, with full documentation appended. If deemed commercial-in-confidence, the resource assessment summary included in the EIS should commit to providing DRG with full resource assessment documentation separately. Applications to modify, expand, extend or intensify an existing consent that has already been adequately reported using the above protocol in publicly available documents, may restrict detailed documentation to the additional resources to be used, if accompanied by a summary of past resource assessments and of past production.

DRG collects data on the quantity of construction materials produced annually throughout the State. Forms are sent to all operating quarries at the end of each financial year for this purpose. The statistical data collected is of great value to Government and industry in planning and resource management, particularly as a basis for analysing trends in production and for estimating future demand for particular commodities or in particular regions. Production data may be published in aggregated form, however production data for individual operations is kept strictly confidential.

In order to assist in the collection of construction material production data, the proponent should be required to provide annual production data for the subject site to the NSW Division of Resources and Geoscience as a condition of any new or amended development consent.

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the Division of Resources & Geoscience - Land Use team at landuse.minerals@industry.nsw.gov.au.

Yours sincerely

Cressida Gilmore
Manager - Land Use

Encl. Attachments "A"

NSW GOVERNMENT | Planning & Environment

ATTACHMENT A

NSW Department of Planning & Environment
RESOURCES & GEOSCIENCE DIVISION

ENVIRONMENTAL and WORK HEALTH & SAFETY ASSESSMENT REQUIREMENTS FOR CONSTRUCTION MATERIAL QUARRY PROPOSALS

It is in the best interests of both the proponent and the community to fully assess the resources which are to be extracted. This means that a thorough geological assessment should be undertaken to determine the nature, quality and extent of the resource. Failure to undertake such an assessment could lead to operational problems and possibly even failure of the proposal.

The following issues need to be addressed when preparing an environmental assessment (EA) or environmental impact statement (EIS) for a proposed construction materials (extractive materials) quarry:

Resource Assessment

1. A summary of the regional and local geology including information on the stratigraphic unit or units within which the resource is located.

2. The amount of material to be extracted and the method or methods used to determine the size of the resource (e.g. drilling, trenching, geophysical methods). Plans and cross-sections summarising this data, at a standard scale, showing location of drillholes and/or trenches, and the area proposed for extraction, should be included in the EA or EIS. Relevant supporting documentation such as drill logs should be included or appended. Major resource proposals should be subject to extensive drilling programs to identify the nature and extent of the resource.

3. Characteristics of the material or materials to be produced:
   a) For structural clay/shale extraction proposals, ceramic properties such as plasticity, drying characteristics (e.g. dry green strength, linear drying shrinkage), and firing characteristics (e.g. shrinkage, water absorption, fired colour) should be described.
   b) For sand extraction proposals, properties such as composition, grainsize, grading, clay content and contaminants should be indicated. The inclusion of indicative grading curves for all anticipated products as well as the overall deposit is recommended.
   c) For hard rock aggregate proposals, information should be provided on properties such as grainsize and mineralogy, nature and extent of weathering or alteration, and amount and type of deleterious minerals, if any.
   d) For other proposals, properties relevant to the range of intended uses for the particular material should be indicated.

Details of tests carried out to determine the characteristics of the material should be included or appended. Such tests should be undertaken by NATA registered testing laboratories.

4. An assessment of the quality of the material and its suitability for the anticipated range of applications should be given.

5. The amount of material anticipated to be produced annually should be indicated. If the proposal includes a staged extraction sequence, details of the staging sequence needs to be provided. The intended life of the operation should be indicated.

6. If the proposal is an extension to an existing operation, details of history and past production should be provided.

7. An assessment of alternative sources to the proposal and the availability of these sources. The impact of not proceeding with the proposal should be addressed.

8. Justification for the proposal in terms of the local and, if appropriate, the regional context.

9. Information on the location and size of markets to be supplied from the site.

10. Route(s) used to transport quarry products to market.

11. Disposal of waste products and the location and size of stockpiles.

12. Assessment of noise, vibration, dust and visual impacts, and proposed measures to minimise these impacts.

13. Proposed rehabilitation procedures during, and after completion of, extraction operations, and proposed final use of site.

14. Assessment of the ecological sustainability of the proposal.

Health and Safety Issues

In relation to the health and safety of mining and quarrying operations, the following must be addressed:

1. All mining operations are to comply with the following legislation:
    a. *Work Health and Safety Act 2011*
    b. *Work Health and Safety Regulation 2017*
    c. *Work Health and Safety (Mine and Petroleum Sites) Act 2013*
    d. *Work Health and Safety (Mine and Petroleum Sites) Regulation 2014*
    e. *Explosives Act 2003*
    f. *Explosives Regulation 2013.*

2. The mine holder must appoint a mine operator and notify the Department in writing as required by clause 7 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* before commencing any mining operations.

3. Other duties and notification and reporting requirements exist under the WHS laws and duty holders must ensure they understand and comply with these requirements.

Mineral Ownership

The *Mining Act 1992* applies to those commodities prescribed by the regulations of the Act (Schedule 2, *Mining Regulation 2016*). Most construction materials are not prescribed minerals under the *Mining Act 1992*. In general terms, this means these materials are owned by the Crown where they occur on Crown land and by the landowner in the case of freehold land. A Mining Title is not required for their extraction although a Crown Lands licence is required where they occur on Crown land.

Construction materials such as s*and (other than marine aggregate), loam, river gravel, and coarse aggregate materials such as basalt, sandstone, and granite* are not prescribed minerals under the *Mining Act 1992*. Therefore, NSW Department of Planning & Environment has no statutory responsibility for authorising or regulating the extraction of these commodities, apart from its role under the WHS laws with respect to the safe operation of mines and quarries. However, the Department is the principal government authority responsible for assessing the State's resources of construction materials and for advising State and local government on their planning and management.

Some commodities, notably *structural clay (ie clay for brick, tile and pipe manufacture), dimension stone (except for sandstone), quartzite, kaolin, limestone and marine aggregate* are prescribed minerals under the *Mining Act 1992*. Minerals which are prescribed as minerals under the terms of the Mining Act may, in some cases belong either to the Crown or to an individual, depending on a number of factors including the date on which the mineral was proclaimed and the date of alienation of the land.

The proponent needs to determine whether the material is privately owned or Crown mineral (publicly owned). If it is privately owned, then either a mining lease or mining (mineral owner) lease would be required. If it is a Crown mineral, an application for a mining lease will have to be lodged.

If you are unsure whether a mining title is required for your proposal you should contact NSW Department of Planning & Environment, Resources & Geoscience Division.

Resource Assessments
Dept Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Genevieve Seed

Notice Number 1556562

Dear Ms Seed,

RE: ENVIRONMENTAL ASSESSMENT REQUIREMENTS 1170 - PROPOSED TIKITERE QUARRY

I refer to your request for the Environment Protection Authority's (EPA) requirements for the environmental assessment (EA) regarding the above proposal, received by EPA on 4 September 2017.

The EPA has considered the details of the proposal provided by the Department of Planning and Environment (DPE) and has identified the information it requires to consider its general terms of approval in **Attachment A**. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. Noise - Proximity to sensitive receptors and impact of any sources associated with the project.

2. Air - Dust generated and management of potential impacts on adjacent rural residences during the construction and operational phases.

3. Water - Water management systems and the implementation of adequate erosion and sediment controls to control runoff from the quarry.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment B** and any relevant industry codes of practice and best practice management guidelines.

Based on the information provided to the EPA, if approval is granted, the applicant will require an environment protection licence (EPL) issued under the provisions of the *Protection of the Environment Operations Act* 1997 (POEO Act) for the following: *Carrying out scheduled activities – Extractive Activities – Land-based extractive activity.* The applicant will need to make a separate application to the EPA for this licence. General information on licence requirements can be obtained from Environment Line on 131555 or on the EPA website at: http://www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the EA it is requested that the EA follow the format of the Department of Planning EIS guidelines and addresses the EPA's specific EA requirements outlined in the Attachments A and B of this letter. If the necessary information is not adequately provided in the EA then delays in the development application process may occur. The applicant should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The applicant should be made aware that, consistent with provisions under Part 9.4 of the POEO Act, the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an EPL.

In addition, as a requirement of an EPL, the EPA will require the applicant to prepare, test and implement a Pollution Incident Response Management Plan and/or Plans in accordance with Section 153A of the POEO Act.

The EPA requests that the applicant provide one (1) electronic copy of the DA/EA/EIS when lodging its application with the EPA. These documents should be sent to the EPA's Armidale office by email to: armidale@epa.nsw.gov.au.

Please note that this response does not cover biodiversity or Aboriginal cultural heritage issues, which are the responsibility of the Office of Environment and Heritage.

If you have any queries regarding this matter, please contact Rebecca Scrivener on (02) 6773 7000.

Yours sincerely

.....

Robert O'Hern

Head Regional Operation Unit

North - Armidale

(by Delegation)

ATTACHMENT A: Environmental Assessment Requirements for Tikitere Quarry – North Star

1 Environmental impacts of the project

1.1. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- Air quality issues including dust generation
- Noise and vibration
- Waste including hazardous materials and radiation
  - General waste – disposal options
  - Hazardous materials and radiation
- Water and Soils
  - Sediment and Erosion controls

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment B**.

2 Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted. The EIS should address the requirements of Section 45 of the POEO Act determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate limits and conditions for the EPL.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

The EIS should include an air quality impact assessment (AQIA). The AQIA should:

3.1. Assess the risk associated with potential discharges of fugitive and point source emissions for all stages of the proposal. Assessment of risk relates to environmental harm, risk to human health and amenity.

3.2. Justify the level of assessment undertaken based on risk factors, including but not limited to:
- proposal location;
- characteristics of the receiving environment; and
- type and quantity of pollutants emitted.

3.3. Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to:
- meteorology and climate;
- topography;
- surrounding land-use;
- receptors; and
- ambient air quality.

3.4. Include a detailed description of the proposal. All processes that could result in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided.

3.5. Include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits.

3.6. Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.

3.7. Include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.8. Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2010)*.

3.9. Detail emission control techniques/practices that will be employed by the proposal.

4 Noise and Vibration

In relation to noise, the following matters should be addressed (where relevant) as part of the Environmental Assessment.

General

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009). http://www.epa.nsw.gov.au/noise/constructnoise.htm

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). http://www.epa.nsw.gov.au/noise/vibrationguide.htm

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990). http://www.epa.nsw.gov.au/noise/blasting.htm

Industry

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Industrial Noise Policy* (EPA, 2000) and *Industrial Noise Policy Application Notes.* http://www.epa.nsw.gov.au/noise/industrial.htm

Road

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *Environmental Criteria for Road Traffic Noise* (EPA, 1999). http://www.epa.nsw.gov.au/noise/traffic.htm

5 Waste, chemicals and hazardous materials and radiation

5.1. Identify, characterise and classify all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste.
Note: All waste must be classified in accordance with the *EPA's Waste Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm

5.2. Identify, characterise and classify all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.
Note: All waste must be classified in accordance with the *EPA's Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm.

5.3. Include a commitment to retaining all sampling and classification results for the life of the project to demonstrate compliance with *EPA's Waste Classification Guidelines* available at: http://www.epa.nsw.gov.au/wasteregulation/classify-waste.htm.

5.4. Provide details of how waste will be handled and managed onsite to minimise pollution, including:

a) Stockpile location and management
- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners etc.

b) Erosion, sediment and leachate control including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during works. The EA should show the location of each measure to be implemented. The Proponent should consider measures such as:
- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate

5.5. The Proponent should also provide details of:
- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

5.6. Provide details of how the waste will be handled and managed during transport to a lawful facility. If the waste possesses hazardous characteristics, the Proponent must provide details of how the waste will be treated or immobilised to render it suitable for transport and disposal.

5.7. Include details of all procedures and protocols to be implemented to ensure that any waste leaving the site is transported and disposed of lawfully and does not pose a risk to human health or the environment.

5.8. Include a statement demonstrating that the applicant is aware of the EPA's requirements with respect to notification and tracking of waste.

5.9. Include a statement demonstrating that the applicant is aware of the relevant legislative requirements for disposal of the waste, including any relevant Resource Recovery Exemptions, as gazetted by the EPA from time to time.

5.10. Outline contingency plans for any event that affects operations at the site that may result in environmental harm, including: excessive stockpiling of waste, volume of leachate generated exceeds the storage capacity available on-site etc.

6 Water and soils

6.1 Soils

The EA should include:

6.1.1. An assessment of potential impacts on soil and land resources should be undertaken, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Particular attention should be given to:

a. Soil erosion and sediment transport - in accordance with *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B Waste landfills; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC 2008).

b. Mass movement (landslides) – in accordance with *Landslide risk management* guidelines presented in Australian Geomechanics Society (2007).

c. Urban and regional salinity – guidance given in the Local Government Salinity Initiative booklets which includes *Site Investigations for Urban Salinity* (DLWC, 2002).

6.1.2. A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified soil and land resource impacts associated with the project. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. Where required, add any specific assessment requirements relevant to the project.

6.2 Water

Describe Proposal

6.2.1. Describe the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

6.2.2. Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.2.3. Where relevant include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

Background Conditions

6.3.1. Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resource likely to be affected by the proposal.

Proponents are generally only expected to source available data and information. However, proponents of relatively large and/or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could also include, for example:

- water chemistry
- a description of receiving water processes, circulation and mixing characteristics and hydrodynamic regimes
- lake or estuary flushing characteristics
- sensitive ecosystems or species conservation values
- specific human uses (e.g. fishing, proximity to recreation areas)
- a description of any impacts from existing industry or activities on water quality
- a description of the condition of the local catchment e.g. erosion, soils, vegetation cover, etc.
- an outline of baseline groundwater information, including, for example, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
- historic river flow data

6.3.1. State the Water Quality Objectives for the receiving waters relevant to the proposal. These refer to the community's agreed environmental values and human uses endorsed by the NSW Government as goals for ambient waters (http://www.environment.nsw.gov.au/ieo/index.htm). Where groundwater may be impacted the assessment should identify appropriate groundwater environmental values.

6.3.2. State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.3.3. State any locally specific objectives, criteria or targets which have been endorsed by the NSW Government.

Impact Assessment

No proposal should breach section 120 of the *Protection of the Environment Operations Act 1997* (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).

6.4.1. Describe the nature and degree of impact that any proposed discharges will have on the receiving environment.

Depending on the nature, scale and/or risk of the proposal, this could include specific requirements to consider impacts on, for example:

- water circulation, current patterns, water chemistry and other appropriate characteristics such as clarity, temperature, nutrient and toxicants
- changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, and groundwater)
- disturbance of acid sulphate soils and potential acid sulfate soils
- stream bank stability and impacts on macro invertebrates

Depending on the nature, scale and/or risk of the proposal, modelling, monitoring, or both, may need to be undertaken to assess the potential impact of discharges on the receiving environment. If modelling is required to assess the potential impact of any discharge(s), this could include, for example:

- a range of scenarios that encompass any variations in discharge quality and quantity as well as the relevant range of environmental conditions of the receiving waters. The scenarios could describe a set of worst-case conditions and typical conditions to ensure that both acute and chronic impacts are assessed,
- assumptions used in the modelling, including identification and discussion of the limitations and assumptions to ensure full consideration of all factors, including uncertainty in predictions.

6.4.2. Assess impacts against the relevant ambient water quality outcomes.

Demonstrate how the proposal will be designed and operated to:

- protect the Water Quality Objectives for receiving waters where they are currently being achieved; and
- contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved.

6.4.3. Where a discharge is proposed that includes a mixing zone, the proposal should demonstrate how wastewater discharged to waterways will ensure the ANZECC (2000) water quality criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge, and that any impacts in the initial mixing zone are demonstrated to be reversible.

6.4.4. Assess impacts on groundwater and groundwater dependent ecosystems.

6.4.5. Describe how stormwater will be managed both during and after construction.

6.4.6. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.4.7. Outline sediment and erosion control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.

6.4.8. Provide details of how stormwater and runoff will be managed to minimise pollution, including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. The proponent should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC2008) as well as control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

Monitoring

6.5.1. Describe how predicted impacts will be monitored and assessed over time.

For relatively large and/or high risk developments, proponents should develop a water quality and aquatic ecosystem monitoring program to monitor the responses for each component or process that affects the Water Quality Objectives that includes, for example:

- adequate data for evaluating compliance with water quality standards and/or Water Quality Objectives,
- measurement of pollutants identified or expected to be present in any discharge.

Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) (http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf).

Attachment B – Guidance Material

Title	Web Address
Contaminated Land Management Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+140+1997+cd+0+N
Environmentally Hazardous Chemicals Act 1985	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+14+1985+cd+0+N
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Licensing	
EPA Guide to Licensing	www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Approved methods for modelling and assessment of air pollutants in NSW (2005)	http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf
POEO (Clean Air) Regulation 2010	http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+428+2010+cd+0+N
Noise and Vibration	
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.epa.nsw.gov.au/noise/vibrationguide.htm
Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990)	http://www.epa.nsw.gov.au/noise/blasting.htm
Industrial Noise Policy (EPA)	http://www.epa.nsw.gov.au/noise/industrial.htm
Industrial Noise Policy Application Notes	http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm
Environmental Criteria for Road Traffic Noise (EPA, 1999)	http://www.epa.nsw.gov.au/noise/traffic.htm
Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (DECC, 2007)	http://www.epa.nsw.gov.au/noise/railinfranoise.htm
Environmental assessment requirements for rail traffic-generating developments	http://www.epa.nsw.gov.au/noise/railnoise.htm
Waste, Chemicals and Hazardous Materials and Radiation	
Waste	

Environmental Guidelines: Solid Waste Landfills (EPA, 1996)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/solidlandfill.pdf
Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998)	http://www.epa.nsw.gov.au/resources/waste/envguidlns/industrialfill.pdf
Waste Classification Guidelines (DECC, 2008)	http://www.epa.nsw.gov.au/waste/envguidlns/index.htm
EPA Resource recovery exemption	http://www.epa.nsw.gov.au/waste/RRecoveryExemptions.htm
Chemicals subject to Chemical Control Orders	
Chemical Control Orders (regulated through the EHC Act)	http://www.epa.nsw.gov.au/pesticides/CCOs.htm
National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
Water and Soils	
Acid sulphate soils	
Coastal acid sulfate soils guidance material	http://www.environment.nsw.gov.au/acidsulfatesoil/
Acid Sulfate Soils Planning Maps	http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm
Contaminated Sites Assessment and Remediation	
Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land	http://www.planning.nsw.gov.au/assessingdev/pdf/gu_contam.pdf
Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000)	http://www.epa.nsw.gov.au/resources/clm/20110650consultantsglines.pdf
Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006)	http://www.epa.nsw.gov.au/resources/clm/auditorglines06121.pdf
Sampling Design Guidelines (EPA, 1995)	Available by request from EPA's Environment Line
National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update)	http://www.scew.gov.au/nepms/assessment-site-contamination
Soils – general	
Managing land and soil	http://www.environment.nsw.gov.au/soils/landandsoil.htm
Managing urban stormwater for the protection of soils	http://www.environment.nsw.gov.au/stormwater/publications.htm
Landslide risk management guidelines	http://www.australiangeomechanics.org/resources/downloads/

Site Investigations for Urban Salinity (DLWC, 2002)	http://www.environment.nsw.gov.au/resources/salinity/booklet3siteinvestigationsforurbansalinity.pdf
Local Government Salinity Initiative Booklets	http://www.environment.nsw.gov.au/salinity/solutions/urban.htm
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	http://environment.gov.au/water/policy-programs/nwqms/index.html
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	Contact the EPA on 131555
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

NSW GOVERNMENT | Office of Environment & Heritage

DOC17/471941
EAR 1171

Ms Genevieve Seed
Senior Planning Officer
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms Seed

Tikitere Quarry (EAR 1171) - Request for Environmental Assessment Requirements

Thank you for your email dated 4 September 2017 seeking the requirements of the Office of Environment and Heritage (OEH) for the preparation of an Environmental Impact Statement (EIS) for the above proposal.

Please note for any application (accompanied by an EIS) that is submitted by 25 November 2017, assessment of impacts on biodiversity using the Biodiversity Assessment Methodology (BAM) is optional. Any application received after 25 November 2017 **must** use the BAM to assess impacts to biodiversity in accordance with the *Biodiversity Conservation Act 2016* (BC Act). The requirements below are in accordance with the BC Act.

The background information provided indicates that the proposal will include the construction of a new gravel quarry with an extraction rate of up to 500,000 tonnes per annum. The material extracted is proposed to be used by ARTC for their proposed rail upgrade project.

OEH has responsibilities under the:

- *National Parks and Wildlife Act 1974* (NP&W Act) - namely the protection and care of Aboriginal objects and places, the protection and care of native flora and fauna and the protection and management of reserves; and the
- *Biodiversity Conservation Act 2016.*

OEH understands from the correspondence that the proposed activity is a Part 4 application pursuant to the *Environmental Planning and Assessment Act 1979* (EP&A Act), and has not been classified as State Significant Development.

The EP&A Act and *Environmental Planning and Assessment Regulation 2000* require that the EIS should fully describe the proposal, the existing environment and impacts of the proposal. It is the responsibility of the proponent and consent authority to adequately consider the requirements under the EP&A Act and Regulation.

OEH can provide advice on the EIS where the EIS deals with impacts to biodiversity and Aboriginal cultural heritage. OEH may also comment on the legitimacy of the conclusions reached regarding the significance of impacts by the proposed development to these components of the environment.

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Tel: (02) 6883 5330 Fax: (02) 6884 8675
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OEH Requirements

In summary, the OEH's key information requirements for the proposal include an adequate assessment of:

1. **Impacts on flora, fauna, threatened species, populations, communities and their habitats;**
2. **Impacts to Aboriginal cultural heritage objects.**

This assessment should include consideration of direct and indirect impacts as a result of both construction and operation of the project. Assessment of any cumulative impacts of this and other developments in the area will be essential.

Flora, Fauna and Threatened Species

A copy of our Environmental Assessment Guidelines are included in **Attachments A and B**. These guidelines address requirements under the EP&A Act and the BC Act.

OEH is committed to the protection, appropriate management, and where necessary, rehabilitation of native vegetation. For these reasons, OEH considers that careful planning should precede any development that involves further vegetation clearance or other significant impact within areas of remnant vegetation.

OEH note that there is biodiversity values present within the proposed impact area. The proposed area of impact is in remnant vegetation within a highly-cleared landscape, negative impacts to biodiversity should be avoided where possible.

Cultural Heritage

The importance of protecting Aboriginal Cultural Heritage is reflected in the provisions under Part 6 of the NP&W Act, as amended. That Act clearly establishes that Aboriginal objects and places are protected and may not be harmed, disturbed or desecrated without appropriate authorisation. Importantly, approvals under Parts 4 and 5 of the EP&A Act do not absolve the proponent of their obligations under the NP&W Act.

Under the NP&W Act, it is the responsibility of each individual proposing to conduct ground disturbance works to ensure that they have conducted a due diligence assessment to avoid harming Aboriginal objects by the proposed activity. OEH has produced a generic due diligence process, which is not mandatory to follow, however any alternative process followed must be able to demonstrate their process was reasonable and practicable in attempts to avoid harm to Aboriginal objects.

Consultation must also be in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) as set by OEH if impact to cultural heritage is unavoidable.

Further advice regarding Aboriginal cultural heritage can be found on the OEH web-site at: http://www.environment.nsw.gov.au/licences/achregulation.htm. and within guidance documents listed in Attachment B.

Should you require further information please contact Michelle Howarth, Conservation Planning Officer on (02) 6883 5339.

Yours sincerely

DAVID GEERING
A/Senior Team Leader Planning North West
Regional Operations Division

15 September 2017

Contact officer: MICHELLE HOWARTH
02 6883 5339

ATTACHMENT A

EIS Requirements for the proposed Tikitere Quarry

1. Environmental impacts of the project

Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- Cumulative impact
- Aboriginal cultural heritage
- Biodiversity
- OEH Estate - Land reserved or acquired under the NPW Act

The Environmental Impact Statement (EIS) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment B**.

2. Cumulative Impact

The cumulative impacts from all clearing activities and operations, associated edge effects and other indirect impacts on cultural heritage, biodiversity and OEH Estate need to be comprehensively assessed in accordance with the EP&A Act.

This should include the cumulative impact of the proponent's existing and proposed development and associated infrastructure (such as access tracks etc.) as well as the cumulative impact of other developments located in the vicinity. This assessment should include consideration of both construction and operational impacts.

3. Aboriginal cultural heritage

The EIS report should contain:

a. A description of the Aboriginal objects and declared Aboriginal places located within the area of the proposed development.
b. A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposed development, and the significance of these values for the Aboriginal people who have a cultural association with the land.
c. A description of how the requirements for consultation with Aboriginal people as specified in clause 80C of the *National Parks and Wildlife Regulation 2009* have been met.
d. The views of those Aboriginal people regarding the likely impact of the proposed development on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
e. A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified, and the need apply for an Aboriginal Heritage Impact Permit (AHIP).
f. A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
g. A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.
h. A specific Statement of Commitment that the proponent will complete an Aboriginal Site Impact Recording Form and submit it to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through the proposed development.

In addressing these requirements, the proponent must refer to the following documents:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010) - http://www.environment.nsw.gov.au/licences/consultation.htm. This document further explains the consultation requirements that are set out in clause 80C of the National Parks and Wildlife Regulation 2009. The process set out in this document must be followed and documented in the Environmental Assessment Report.
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010) http://www.environment.nsw.gov.au/licences/archinvestigations.htm. The process described in this Code should be followed and documented where the assessment of Aboriginal cultural heritage requires an archaeological investigation to be undertaken.

Notes:

i. An *Aboriginal Site Impact Recording Form* (http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.

ii. Under section 89A of the NP&W Act, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar (http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm), for each Aboriginal site found during investigations.

4. Biodiversity

Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the BC Act (s 6.12), *Biodiversity Conservation Regulation 2017* (s 6.8) and Biodiversity Assessment Method including details of the measures proposed to address the offset obligation as follows;

- The total number and classes of biodiversity credits required to be retired for the development/project;
- The number and classes of like-for-like biodiversity credits proposed to be retired;
- The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;
- Any proposal to fund a biodiversity conservation action;
- Any proposal to conduct ecological rehabilitation (if a mining project);
- Any proposal to make a payment to the Biodiversity Conservation Fund (Fund).

If requesting the application of the variation rules, the BDAR must contain details of what reasonable steps have been taken to attempt to obtain the required like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under S6.10 of the BC Act.

ATTACHMENT B

Guidance Material

Title	Web Address
Commonwealth Environment Protection & Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Biodiversity Conservation Act 2016	https://www.legislation.nsw.gov.au/~/view/act/2016/63
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N

Aboriginal Cultural Heritage

Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Due Diligence Code for the Protection of Aboriginal Objects in NSW (DECCW 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm

Biodiversity

Biodiversity Assessment Method (BAM)	http://www.environment.nsw.gov.au/biodiversity/assessmentmethod.htm
Biodiversity Offset Scheme (BOS)	http://www.environment.nsw.gov.au/biodiversity/entryrequirements.htm
BioBanking Assessment Methodology (OEH, 2014)[1]	http://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)[2]	http://www.environment.nsw.gov.au/biobanking/calculator.htm
Threatened Species Survey and Assessment Guidelines: Field Survey	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf

[1] This can only be applied to applications (accompanied by an EIS) that are submitted prior to 25 November 2017.

[2] This can only be applied to applications (accompanied by an EIS) that are submitted prior to 25 November 2017.

Methods for Fauna –Amphibians (DECCW, 2009)	
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Survey requirements (birds, bats, reptiles, frogs, fish and mammals) for species listed under the EPBC Act	http://www.environment.gov.au/topics/environment-protection/environment-assessments.
OEH Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/
Atlas of NSW Wildlife	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org.au/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm

NSW RURAL FIRE SERVICE

The Secretary
Department of Planning & Environment
PO Box 39
SYDNEY NSW 2001

Your reference: SEAR 1170
Our reference: D17/3054
DA17090809163 AB

Attention: Genevieve Seed

20 September 2017

Dear Ms Seed

Request for Secretary's Environmental Assessment Requirements (SEARs 1170): 5//755984 - 1135 Croppa Creek Road North Star

I refer to NSW Planning and Environment correspondence dated 4 September 2017 seeking comment from the NSW Rural Fire Service on matters to be included in the Secretary's Environmental Assessment Requirements for the above proposal.

The subject land is not mapped bush fire prone land by Gwydir Shire Council however it contains a significant woodland vegetation community. The NSW Rural Fire Service considers that the environmental assessment for the development of a 'hard rock quarry' should address the following bush fire criteria:

- *the aim and objectives of 'Planning for Bush Fire Protection 2006';*
- *identification of potential ignition sources during construction and operation of the development;*
- *storage of fuels and other hazardous materials (e.g., explosives for blasting);*
- *proposed bush fire protection measures for the development, including vegetation management and fire suppression capabilities;*
- *operational access for fire fighting appliances to the site; and*
- *emergency and evacuation planning.*

For any enquiries regarding this correspondence, please contact Alan Bawden on 6691 0400.

Yours sincerely

Ian Cook
Acting Manager – Planning and Environment Services North

The RFS has made getting information easier. For general information on 'Planning for Bush Fire Protection, 2006', visit the RFS web page at www.rfs.nsw.gov.au and search under 'Planning for Bush Fire Protection, 2006'.

Postal address
NSW Rural Fire Service
Records Management
Locked Bag 17
GRANVILLE NSW 2142

Street address
NSW Rural Fire Service
Coffs Harbour Customer Service Centre
Suite 1, 129 West High Street
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www.rfs.nsw.gov.au
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Transport
Roads & Maritime
Services

File No: NTH17/00128
Your Ref: EAR 1171

The Manager
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Anthony Barnes

Dear Sir / Madam,

Secretary's Environmental Assessment Requirements for EAR 1171 – Tikitere Quarry. Croppa Creek Road North Star.

I refer to your email of 4 September 2017 requesting input to the Secretary's Environmental Assessment Requirements (EARs) for the abovementioned state significant development.

Roles and Responsibilities

The key interests for Roads and Maritime Services are the safety and efficiency of the road network, traffic management, the integrity of infrastructure assets and the integration of land use and transport.

Roads and Maritime is given the opportunity to review and provide comment on the subject development under Clause 16 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

Roads and Maritime Response

Roads and Maritime requests that the Environmental Assessment be supported by a Traffic Impact Assessment (TIA) prepared by a suitably qualified person in accordance with the Austroads Guide to Traffic Management Part 12, the complementary Roads and Maritime Supplement and RTA Guide to Traffic Generating Developments. The TIA is to address the following;

- The total impact of existing and proposed development on the road network with consideration for a 10 year horizon.
- The volume and distribution of traffic generated by the proposed development.
- Intersection sight distances at key intersections along the primary haul route.
- Existing and proposed site access standards.
- Details of proposed improvements to affected intersections.

- Impact of rail corridors on the road network and details of proposed interface treatments.
- Details of servicing and parking arrangements.
- Impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling.
- Impacts of road traffic noise and dust generated along the primary haul route/s.
- Consideration for Clause 16(1) of the Mining SEPP regarding;

    - Impact on school zones and residential areas.
    - Code of Conduct for haulage operators
    - Road safety assessment of key haulage route/s

Should the consent authority wish to condition the preparation of a Code of Conduct for haulage operators, this could include, but not be limited to;

a. A map of the primary haulage routes highlighting critical locations.
b. Safety initiatives for haulage through residential areas and/or school zones.
c. An induction process for vehicle operators & regular toolbox meetings.
d. A complaint resolution and disciplinary procedure.
e. Any community consultation measures for peak haulage periods.

Due to the remoteness of the site and that most haulage will occur on private property it would be appreciated if photographs of the site, relevant accesses, road junctions and sight lines could be included to assist in the final assessment.

Where road safety concerns are identified at a specific location along the identified haulage route/s, Roads and Maritime suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons.

The current Austroads Guidelines, Australian Standards and Roads and Maritime Supplements are to be adopted for any proposed works on the classified road network.

The Developer would be required to enter into a 'Works Authorisation Deed' (WAD) with Roads and Maritime for any works deemed necessary on the classified road network. The developer would be responsible for all costs associated with the works and administration for the WAD

Further information on undertaking private developments adjacent to classified roads can be accessed at:

http://www.rms.nsw.gov.au/projects/planning-principles/index.html

Advice to the Consent Authority

Roads and Maritime highlights the Consent Authority is responsible for considering the environmental impacts of any road works which are ancillary to the development. This includes any works which form part of the proposal and/or any works deemed necessary to include as requirements in the conditions of development consent.

If you have any further enquiries regarding the above comments please contact Bill Butler, A/Manager Land Use Assessment on (02) 6640 1362 or via email at: development.northern@rms.nsw.gov.au

Yours faithfully

W.R Butler

19 September 2017
for Liz Smith
A/Network & Safety Manager, Northern Region

Appendix 3: Resource Assessment

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

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Tikitere Quarry

RESOURCE ASSESSMENT

Lot 5 in Deposited Plan 755984

1135 Croppa Creek Road, North Star NSW 2408

December 2017

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

ABN 63 061 919 003

DOCUMENT CONTROL

Project Name	**Tikitere Quarry**
Proponent	Alan and Kerry Pearlman
Project Reference	17/146
Report Number	17/146 – Resource Assessment
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Company	SMK Consultants

Revision History			
Version Number	**Date**	**Authority**	**Details**
0	December 2017	Hayley Greenham (SMK Consultants)	Initial Issue

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1 Introduction

SMK Consultants have been engaged by Alan and Kerry Pearlman to prepare a Resource Assessment. This report will accompany an Environmental Impact Statement in support of a development application for a 500,000 tonne hard-rock quarry to be located on their property, "Tikitere" in north-west NSW. The Resource Assessment has been based on geotechnical information and associated laboratory testing undertaken by Chadwick Geotechnics Pty Ltd.

2 Site Location and Description

The proposed development site is encompassed within the property of "Tikitere" 1135 Croppa Creek Road, North Star. The property is located approximately 10 kilometres south-west of North Star and 12 kilometres north of Croppa Creek, in north-west New South Wales. The site is accessed off Croppa Creek Road via the farm access driveway and then through open cotton field paddocks. The site will be completely contained within Lot 5 in Deposited Plan 755984. An aerial image of the property boundary and proposed quarry locations is included as Figure 1.

Figure 1: Locality Plan

2.1 Geological Characteristics

The geology of the area is split between the plains to west and the slopes to the east of the site. Geological mapping of the region surrounding the subject site has been accessed using the NSW Department of Planning and Environment (Resources and Geoscience)'s online mapping tool. The online mapping tool presents a 1:1,500,000 scale geological map that has been compiled from numerous geological maps and regional geological synthesis datasets from the Geological Survey of NSW and Geoscience Australia. The map represents a simplified, generalised description of geological characteristics of New South Wales. From this, the geology of the region surrounding the proposed development site is outlined in Figure 2. Table 1 provides a description of the geological formations present within the area.

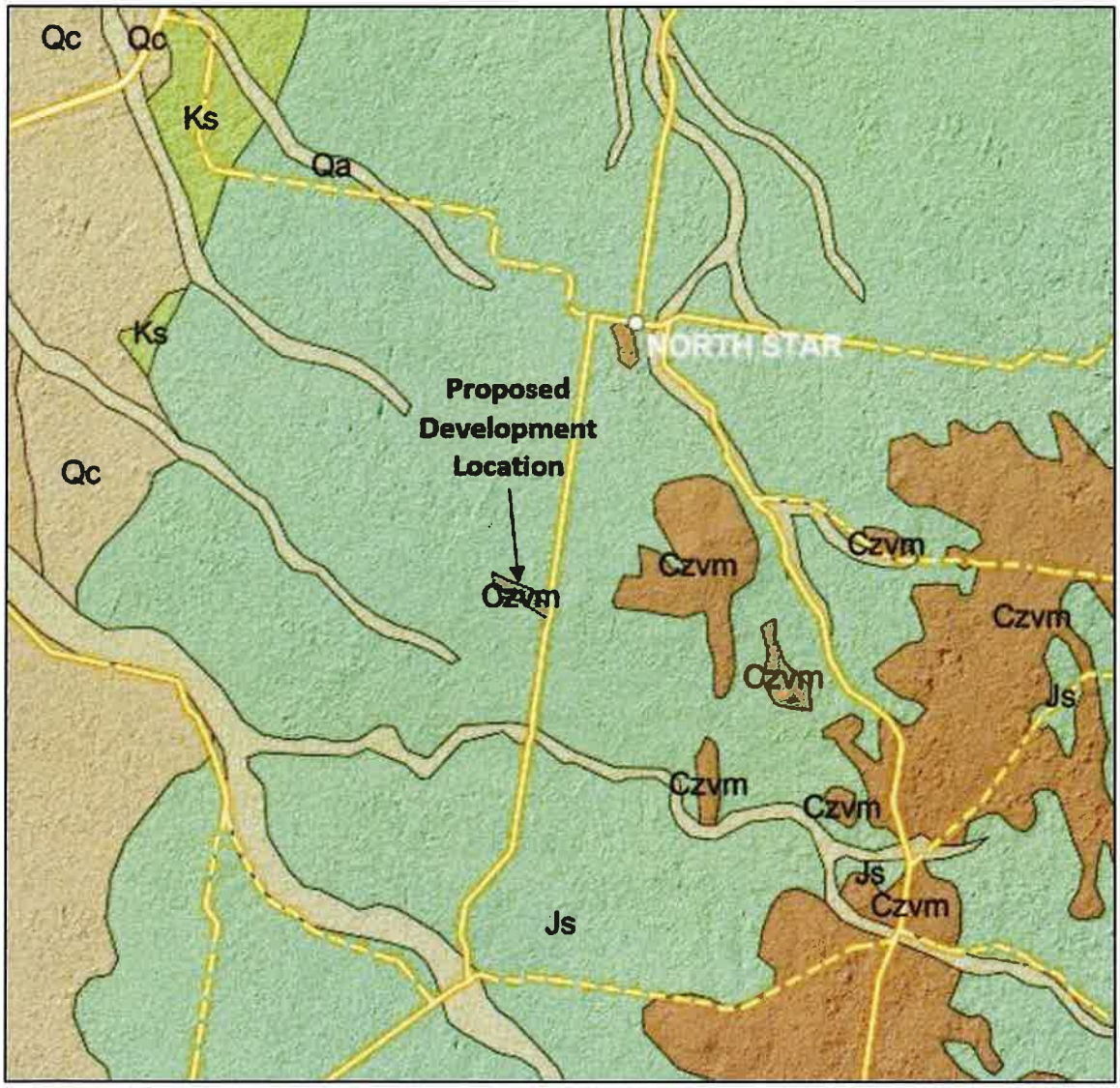

Figure 2: Site Geology

(Source: Geoscience NSW Maps.com)

Table 1: Site Geology Legend

Abbreviation	Name	Age	Description
Czvm	Cainozoic Mafic Volcanics	0 to 66 MYO	Mafic volcanic rocks are those that were erupted from widespread volcanic activity throughout the eastern part of the state over the last 65 million years. Basalt lava flows are typical examples.
Js	Jurassic Sedimentary Rocks	145 to 201 MYO	Sedimentary sequences dominated by sandstone with minor conglomerate units and claystone.
Ks	Cretaceous Sedimentary Rocks	66 to 145 MYO	Sandstone, calcareous sandstone, siltstone and shale. The depositional environment for these rocks was typically shallow marine.
Qa	Quaternary Alluvia Deposits	0 to 2.5 MYO	Current and recent mud, silt, sand and gravel deposited by river (alluvial) systems.
Qc	Quaternary Colluvial Deposits	0 to 2.5 MYO	Colluvial deposits are unconsolidated sediments that are found downslope from hills. They form by erosion of hills and by creep or sheetwash.

Published information[1] indicates the site to be directly underlain by Cainozoic Mafic Volcanics surrounded by Jurassic Sedimentary Rocks. Mafic volcanic rocks are those that were erupted from widespread volcanic activity throughout the eastern part of the state over the last 65 million years. Basalt lava flows are typical examples. Whilst sedimentary sequences are typically dominated by sandstone with minor conglomerate units and claystone. Field investigations confirmed the geology of the area to be consistent with the desktop findings.

The primary quarry is a volcanic plug located within 300m of the existing Camurra-Boggabilla Railway, which is consistent with the proposed alignment of the Inland Railway. There is a gradual rise on the open paddock leading up to a significant Basalt intrusion which is oval in shape and rises 20 metres above the surrounding landscape.

3 Site Investigation

3.1 Field Assessment

Chadwick Geotechnics carried out field work in March and April, 2017. This involved the following:

- Three (3) cored boreholes to depths ranging from 20.2m to 30.5m below ground level drilled by a Hydrapower drilling rig owned and operated by Rockwell Drilling.

[1] Geological Map Series 1:250,000 geological map. Geological Survey of New South Wales.

- Twelve (12) percussion boreholes drilled to termination depths ranging from 5.2 to 30.0m below ground level drilled by Chadwick Geotechnics using a Commachio drilling rig.

Figure 3 includes the approximate locations of the field tests. The locations were not formally surveyed, and accuracy is considered to be within 5m. The recovered core and percussion chip cuttings were logged by geotechnical engineers and the engineering field logs are presented in Table 2.

Laboratory Testing

As a result of the field investigation, boreholes TC01, TC02 and TC03 were selected to test the recovered cores for secondary mineral content and petrographics. Point load testing was conducted onsite and Secondary Mineral Content testing was outsourced to Geochempt Services Brisbane. The field results and laboratory analysis have been summarised in Table 2.

Table 2

As a result of the field investigation, boreholes TC01, TC02 and TC03 were selected to test the recovered cores for secondary mineral content and petrographics. Point load testing was conducted onsite and Secondary Mineral Content testing was outsourced to Geochempt Services Brisbane. The field results and laboratory analysis have been summarised in Table 2.

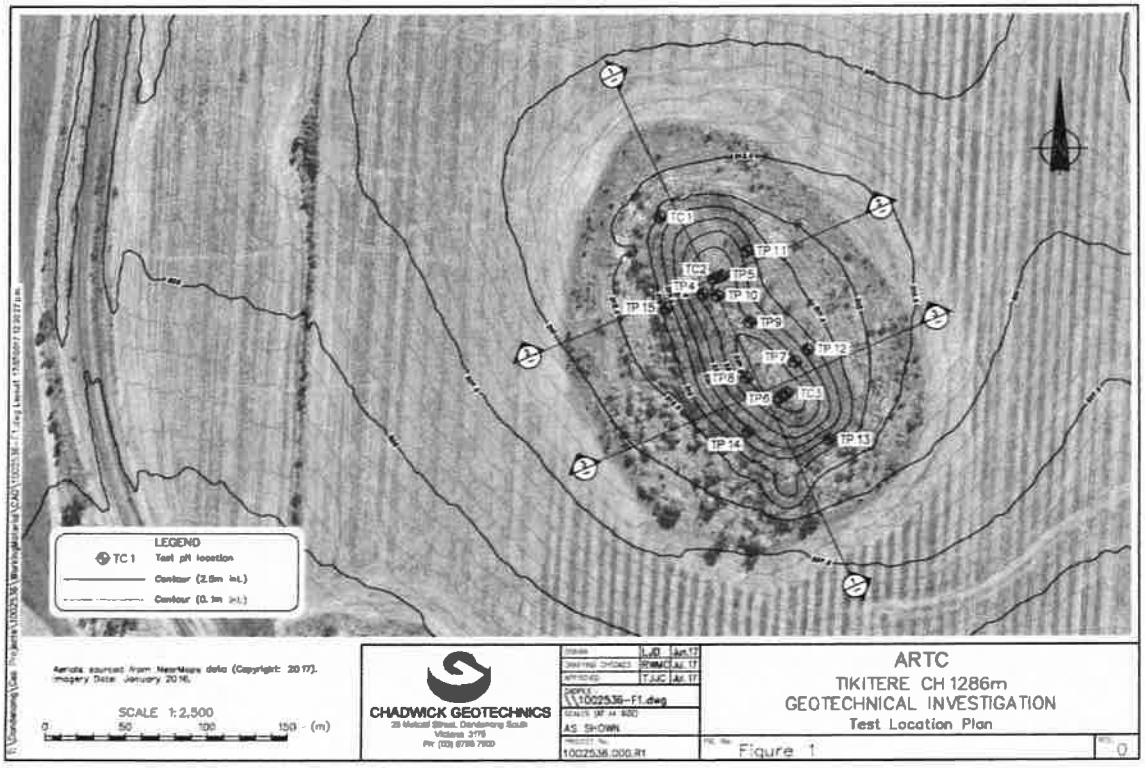

Figure 3: Field Test Locations

(Source Chadwick Geotechnics Pty Ltd "Geotechnical Investigation" June, 2017)

3.2 Laboratory Testing

As a result of the field investigation, boreholes TC01, TC02 and TC03 were selected to test the recovered cores for secondary mineral content and petrographics. Point load testing was conducted onsite and Secondary Mineral Content testing was outsourced to Geochempt Services Brisbane. The field results and laboratory analysis have been summarised in Table 2.

Table 2: Field and Laboratory Results

Location	Layer Depth (m)	Material	Point Load Index (MPa)	Secondary Mineral Content (%)
TC01	1.00-1.10	Basalt	9.2	-
TC01	3.64-3.79	Basalt	10.4	-
TC01	4.60-4.80	Basalt	11.3	-
TC01	7.33-7.48	Basalt	12.3	-
TC01	8.52-8.63	Basalt	13.9	-
TC01	10.08-10.18	Basalt	12.9	-
TC01	13.08-13.23	Basalt	13.4	-
TC01	15.61-15.75	Basalt	9.1	-
TC01	16.62-16.77	Basalt	10.4	-
TC01	17.80-18.00	Basalt	-	7.1
TC01	19.25-19.41	Basalt	8.2	-
TC02	4.23-4.43	Basalt	11.2	-
TC02	5.75-5.93	Basalt	13.6	-
TC02	9.47-9.60	Basalt	11.1	-
TC02	11.45-11.59	Basalt	12.9	-
TC02	13.16-13.36	Basalt	9.8	-
TC02	15.03-15.20	Basalt	12.0	-
TC02	17.30-17.46	Basalt	13.4	-
TC02	19.80-20.00	Basalt	# Unable to Fracture	-
TC02	24.60-24.70	EW Basalt	0.3	-
TC03	4.10-4.30	Basalt	11.2	-
TC03	6.19-6.36	Basalt	12.3	-
TC03	7.60-7.70	Basalt	12.4	-
TC03	9.10-9.23	Basalt	11.4	-
TC03	12.68-12.83	Basalt	5.3 Failed on Joint	-
TC03	14.86-14.96	Basalt	11.1	
TC03	15.00-15.30	Basalt	-	4.5
TC03	16.48-16.58	Basalt	# Unable to Fracture	-
TC03	17.89-18.07	Basalt	8.8	-
TC03	20.96-21.10	Basalt	14.9	-
TC03	25.50-25.65	Basalt	* Unable to test due to flat batteries	-

The secondary mineral contents were favourable, and a representative sample of the core was crushed to be analysed for a suite of laboratory tests. To achieve enough sample for the

laboratory testing all three (3) cored boreholes TC01, TC02 and TC03 were combined and crushed to produce the one (1) sample. The following additional tests were performed:

- Los Angeles Abrasion Test
- Mill Abrasion
- Particle Density Testing
- Wet & Dry Strength Testing
- Wet Attrition Value Testing
- Aggregate Crushing Value (ACV) Testing
- Weak Particle Testing
- Degradation Factor
- Uniaxial Compressive Strength (UCS) Testing

The tests were outsourced to various testing facilities across Queensland. The results of the testing and testing companies are summarised in Table 3.

Table 3: Laboratory Test Results

Test	Company	Sample 1	Sample 2	Sample 3
Los Angeles Abrasion	Coffey Services Australia Pty Ltd	12%	11%	13%
Mill Abrasion	Department of Transport & Main Roads	4.8	4.0	Not tested
Particle Density	Coffey Services Australia Pty Ltd	2.83t/m^3	2.83t/m^3	2.84t/m^3
Wet & Dry Strength	Coffey Services Australia Pty Ltd	221kN-246kN Variation (13.2-9.5mm) 10	239kN-265kN Variation (13.2-9.5mm) 10	357kN-372kN Variation (13.2-9.5mm) 10
Wet Attrition Value	Soil Engineering Services	2.7	2.5	3.3
ACV	Coffey Services Australia Pty Ltd	16.7%	8.2%	8.6%
Weak Particle	Coffey Services Australia Pty Ltd	0.1%	0.1%	0.2%
Aggregate Soundness	Coffey Services Australia Pty Ltd	0.6%	0.5%	0.6%
Degradation Factor	Coffey Services Australia Pty Ltd	84	84	Not tested
UCS	TriLab	230MPa	337MPa	268MPa

4 Summary of Results

4.1 Resource Extent

The subsurface stratigraphy is predicted based on the available site investigation data and as such only represents the site conditions at the locations of the field testing. It is possible that conditions at locations between the field test may be quite variable.

The subsurface materials encountered in the boreholes at the site could be summarised as follows:

- The surface unit predominantly comprised of Clay with Basalt cobbles extending to depth ranging from 0.4 – 1.5 metres below ground level. The clay was of high plasticity and brown in colour, and at the time of investigation was dry. The material extended to depth ranging from 0.3 to 1.5 metres below the natural surface.
- The clays were directly underlain by distinctly to slightly weathered Basalt which extended to depths ranging from 3.2 to 30.59 metres below ground level.
- HQ3 coring commenced at depths ranging from 0.3 to 2.2 metres below ground level and was drilled to termination depths ranging from 20.2 to 30.59 metres the recovered core was described as distinctly to slightly weathered basalt blue/grey, non-vesicular with orange/brown staining on the joints.

The basalt was penetrated at TP5 TP11, TP12 and TP15 at depths ranging from 5.2 to 2.3 metres below ground level, the recovered materials underlying the basalt included a sandy clay, sand and sandstone.

Table 4: Summary of Sub-layers

Geological Unit	Description	Depth to Top of Unit	Approx. Thickness
Topsoil/Colluvium	Brown/grey clay with slightly weathered basalt cobbles	0	1.5m
Basalt	Blue/grey, non-vesicular with orange/brown staining on the joints	0.3 to 2.2 m	10m to 25m
Sandstone	Extremely weathered sandy clay, sand	5.2 to 27.3 m	-

Figure 4 includes a cross section of the primary quarry site that indicates the likely extent of the basalt resource. The geological cross section indicates an area of approximately 16,000 m^2, with a depth of approximately 25 metres, giving a potential resource volume of 400,000 m^3. The conversion to tonnes is based on a basalt density of 3.01g/cm^3 which provides for a potential resource value of 1,204,000 tonnes.

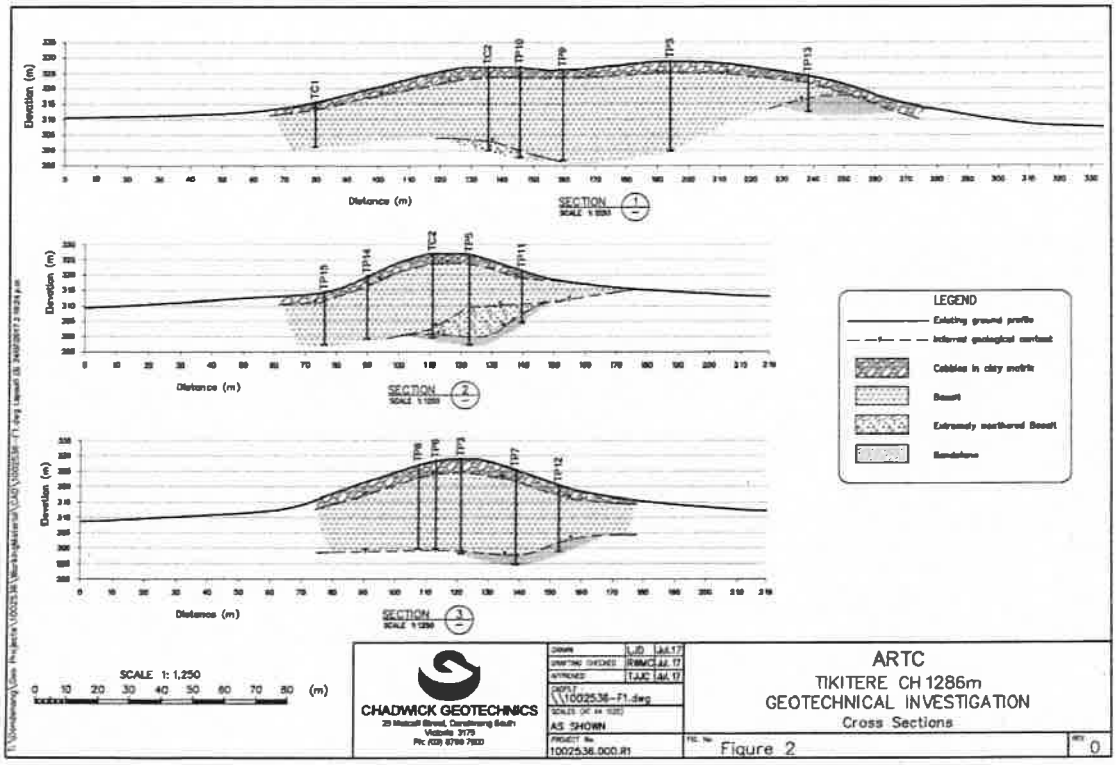

Figure 4: Geological Cross Section of the Primary Quarry Site
(Source Chadwick Geotechnics Pty Ltd "Geotechnical Investigation" June, 2017)

4.2 Resource Quality

Table 5 provides a comparison between the Australian Rail Track Corporation (ARTC) Ballast Specification and the results of the material tested onsite.

Table 5: Comparison of Resource Quality with ARTC Ballast Specifications

Laboratory Test	ARTC – ETA – 04-01 Ballast Specification	Sample 1	Sample 2	Sample 3
Bulk Density (kg/m^3)	min 1200	2800	2880	2900
Particle Density (kg/m^3)	min 2500	2800	2830	2840
Flakiness Index	max 30%			
Crushed Particles of Coarse Aggregate	max 5%			
Aggregate Crushing Value	max 25%	16.7	8.2	8.6
Wet Attrition Value	max 6%	2.7	2.5	3.3
LA Values	max 25%	12	11	13
Weak Particles	max 5%	0.1	0.1	0.2
Particle Density (SSD) (t/m^3)	>1.2 t/m^3	2.83	2.83	2.84
Water Absorption (%)		0.7	0.7	0.7
Wet Strength (13.2 -9.5mm) (kN)	>175 kN	221	239	357
Dry Strength (13.2-9.5mm) (kN)		246	265	372
Wet/Dry Strength Variation (13.2-9.5mm) (%)	<25%	10	10	4
Degradation Factor		84	84	
UCS kPa		230	337	268
Mill Abrasion Value		4.8	4	
Mill Abrasion Number		36	31	

As shown in Table 5 the quality of the material available onsite, as determined by field and laboratory tests, meets the required ARTC specifications for Ballast material. Based on the geological report from Chadwick Geotechnics the resource is considered suitable for use as rail ballast.

4.3 Overburden and Topsoil

The basalt intrusion is covered with medium trees and shrubs. The hill is covered with a 0.5m to 1.5m thick surficial veneer of colluvium comprising predominantly clay soils with Basalt cobbles (Figure 5). The location of these zones are limited to the areas around the base of the hill.

Talus slope comprising Basalt cobbles and boulders are present to the steeper sections of the hill and have very limited or no vegetation (Figure 6). These are limited to the steeper sections of the hill and have very limited or no vegetation.

Figure 5: Colluvium – Predominantly Soils with Basalt Cobbles

Figure 6: Talus Slope – Basalt Cobbles and Boulders

Basalt rock outcrops of columnar Basalt are located at the top of the hill (Figure 7). Weathered sandstone was encountered at depth below the basalt.

Figure 7: Rock outcrop – Columnar Basalt

5 Conclusion

The materials identified at the proposed Quarry site are considered suitable for use as rail ballast, in accordance with ARTC specifications. Further, the resource extent is considered to provide for up to 1,204,000 tonnes of material. This would reflect a quarry lifespan of up to three (3) years at a maximum extraction of 500,000 tonne per annum.

Appendix 4: Noise Impact Assessment

advitech

Report

Noise Impact Assessment

Tikitere Quarry

SMK Consultants

13 February, 2018
Rev 0 (Final)

Report Details

Noise Impact Assessment - Tikitere Quarry

Job #: J0170298-00, Folder #: F15296, Revision: 0 (Final), Date: 13 February, 2018

Filename: 15296 Tikitere Quarry NIA Rev0.docx

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History

Date	Revision	Comments
2/2/2018	B	Draft Issue for Review
13/2/2018	0	Final Issue

Endorsements

Function	Signature	Name and Title	Date
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APPENDIX I

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1. INTRODUCTION

Advitech Pty Limited (trading as Advitech Environmental) was engaged by SMK Consultants to undertake an assessment of potential noise impacts associated with the operation of a proposed quarry at Croppa Creek, NSW. The proposed quarry operation is located on the Tikitere Homestead property at 1135 Croppa Creek Road, NSW. The proposed operation is referred to as the Tikitere Quarry herein.

It should be noted that this report was prepared by Advitech Pty Limited for SMK Consultants ("the customer") in accordance with the scope of work and specific requirements agreed between Advitech and the customer. This report was prepared with background information, terms of reference and assumptions agreed with the customer. The report is not intended for use by any other individual or organisation and as such, Advitech will not accept liability for use of the information contained in this report, other than that which was intended at the time of writing.

2. BACKGROUND AND OBJECTIVES

Two sites have been identified for extraction of quarry materials, including a hard rock quarry and white rock/gravel quarry. The hard rock quarry consists of a previously unworked volcanic plug, while the gravel pit has been previously worked. The sites to be quarried are approximately 1000m apart, and are located towards the centre of the property. The general arrangement of the project is provided in **Figure 1**.

Approval is sought for operation of both the hard rock quarry and the white rock gravel pit. The quarries would service construction of the Inland Rail project, currently under design and assessment by the Australian Rail and Track Corporation (ARTC). Aspects of the Noise Impact Assessment for that project (ARTC NIA) are referenced as part of this assessment.

The quarries will have a proposed yield of 500ktpa. The proposed operating hours are 6:00am to 18:00pm, Monday to Saturday. This assumes 10 hours of quarrying per day, with an allowance of 2 hours for maintenance activities. Potential requirements may exist for extended work hours to service short term increases in demand from the Inland Rail construction activity. This may involve 24-hour operations during some stages of the development.

While detailed plans are not yet available, the proposed operations will include excavation and processing of material, haulage to a rail loading point, and subsequent loading onto trains. A description of the plant proposed as part of the quarry operations is provided in **Section 2.1**. Preliminary assessment of the resource indicates that blasting will not form part of the project requirements. Impacts associated with the rail based transport of material from the site to the works areas on the Inland Rail project is also beyond the scope of this assessment.

2.1 Description of the Proposed Operations

A review of proposed site activities was undertaken in order to establish an inventory of significant noise generating plant and processes. These include:

- excavation of material and transport (within the quarries) to a crushing plant;
- operation of a crushing plant to size and screen the material;
- reclaim of stockpiled material for loading into trucks;
- transport of finished material within the proponent's site to rail stockpile area;
- train loading operations.

Advitech Environmental understands that the following mobile plant will be used within the operation:

- mobile crushing plant;
- rear dump truck(s);
- Front End Loader(s) (FEL);
- excavator(s);
- light service vehicles.

The mobile plant will be utilised for excavation of material from the quarries, management of the crushing plant, loading of heavy vehicles, and clearance of vegetation (ahead of the quarry shell, as required). While production is likely to be variable, allowance has been made for 12 heavy vehicle movements between the quarries and rail loading site (per hour) at peak production.

3. METHODOLOGY

In November, 2017, the New South Wales (NSW) *Industrial Noise Policy* (INP, 2000) was replaced by the Noise Policy for Industry (NPfI, 2017). The NSW Environment Protection Authority (EPA) has established transitional arrangements to allow industry and regulators to shift to the new assessment framework, but advocate that new developments should follow guidance established in the NPfI. The outline methodological approach for the assessment includes:

- an assessment of the existing environment, including:
  - identification of potentially sensitive receivers adjacent to the operation;
  - efforts to characterise the existing noise environment, identify relevant receiver types and establish Project Noise Trigger Levels (PNTL) for the assessment of potential impacts;
  - analysis of prevailing meteorology: to identify significant meteorological conditions that may influence the way that impacts associated with the development may manifest;
- calculation of noise levels that may be generated by the development, including:
  - identification of significant operational and meteorological scenarios: that may have potential to generate different levels of noise;
  - development of a noise model: (ISO9613 calculation methodology) to derive predicted noise levels associated with the development at adjacent sensitive receivers;
  - determination of premises based contributions from the development, using descriptors established by the relevant guidelines;
- assessment of results, including:
  - recommendations for noise criteria that may be written into a development consent;
  - comparison of noise predictions against these criteria, and evaluation of potential impacts; and
  - recommendations for management of potentially adverse or residual impacts.

4. THE EXISTING ENVIRONMENT

4.1 Sensitive Receiving Noise Environments

Figure 1 identifies noise sensitive receptors adjacent to the proposed development site. The nearest residence that is not associated with the proposed development (Receptor 1) is located approximately 1800m west southwest of the proposed hard rock quarry location. The next closest receiver group (receivers 2 to 6) are located further to the west and south of the proposed operations.

Figure 1: Sensitive Noise Receivers

4.2 Existing Noise Levels

During site inspection on 21 November, 2017, site based environmental noise monitoring was undertaken at two locations to evaluate noise levels and predominant sources in receiving environments adjacent to the development site. The identified monitoring locations were considered representative of typical receiver locations in the local environment.

Additional review of third party monitoring results presented in the ARTC NIA was also undertaken. Two monitoring locations (L02NNS and L03NNS) in close proximity to the Tikitere property were identified, including:

- L02NNS is located at chainage 749km, adjacent to the locality of North-star, approximately 10kms North of the site; and
- L03NNS is located at chainage 734km, adjacent to the locality of Croppa Creek, approximately 15kms South of the site.

A summary of results from both site based (Advitech Environmental) and regional (ARTC NIA) noise monitoring are presented in **Table 1.**

Table 1: Details of background monitoring

Source	Location	Date	Measured noise level dB(A) L_{90}	L_{10}	L_{Aeq}	Observations and instantaneous noise sources
Advitech Environmental	Tikitere Homestead	21/11/2017 10:16	38	49	45	Birds, Wind gusts, Farm activities, Shed maintenance (hammering) Distant road traffic
	Tikitere Rail Crossing	21/11/2017 10:44	35	49	45	Wind gusts Birds, Windblown vegetation
ARTC NIA	LO3NNS	1/3/2016 13:14	31	44	43	Birds, 30-60 Wind noise, 30-45 Road noise, 33-39
	LO3NNS	1/3/2016 13:31	33	48	46	Birds, 30-60 Wind noise, 30-40 Road noise, 40-57
	LO2NNS	1/3/2016 11:21	27	47	43	Road noise, 30-35 Birds, 28-30 Wind noise, 35-57 Insects, 30-35
	LO2NNS	1/3/2016 11:38	25	43	40	Road noise, 25-30 Wind noise, 35-57 Insects, 30-35

The ARTC NIA also contained assessment of longer term monitoring results at the two locations adjacent to the proposed development site. These results are reproduced in **Table 2.**

Table 2: ARTC Unattended Monitoring (Extract Table 2.3)

Location	L_{A90} RBL noise levels			L_{Aeq} ambient noise levels		
	Day	Evening	Night	Day	Evening	Night
LO2NNS	19	23	32	46	43	41
LO3NNS	27	30	35	45	47	45

The operator attended and unattended monitoring results indicate that receiving environmental adjacent to the proposed development site may be considered representative of the Rural receiver type identified by the NGfI.

4.3 Assessment of PTNL

The NSW Noise Policy for Industry (NPfI) presents a methodology for determining Project Noise Trigger Levels (PNTL) for industrial development. Ambient and background noise measurements are used to determine PNTL relevant to the proposed development. Assessment in **Table 3** establishes the RBL for the project based on the pool of RBLs available.

Table 3: Assessment of RBLs relevant to the assessment

RBL Dataset	Day	Evening	Night
Assessed RBL L02NNS	19	23	32
Assessed RBL L03NNS	27	30	35
Minimum RBL NGfI	35	30	30
Adopted RBL	35	30	30

The NGfI minimum RBL were adopted for the day, evening and night periods. While marginally higher RBLs were reported in the ARTC NIA for the night period, the minimum level was conservatively adopted so as to avoid having a less stringent limit at night that during the evening period. **Table 4** provides an analysis of both the Intrusiveness and Amenity noise levels for the purposes of establishing a PNTL for the proposed development. Section 2 of the NGfI establishes that the lower of the Amenity and Intrusiveness noise levels should be adopted as the PNTL for the development.

Table 4: Assessment of PNTL in adjacent receiving environment

Metric	Day	Evening	Night
Rating Background Level	35	30	30
Project Intrusiveness Criteria	40	35	35
Recommended Amenity Level	50	45	40
Project Amenity Criteria	45	40	35
Project Trigger Noise Level	40	35	35

The Project Intrusiveness Criterion is the more stringent of the two criteria, and is thus adopted as the PTNL for the development.

4.4 Maximum Noise Level Triggers

The NGfI provides updated guidance relating to the assessment of maximum noise level events that carry potential to cause sleep disturbance. In this context, potential for sleep disturbance is considered in terms of events that may induce awakenings or cause disturbance to sleep stages. The guide establishes the following requirements:

Where the subject development night-time noise levels at a residential location exceed:

- *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

... a detailed maximum noise level event assessment should be undertaken.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

4.5 Assessment of Prevailing Meteorology

The NGfl identifies that meteorological conditions may enhance noise propagation from industrial sites to distant sensitive receivers. The guide provides two options for the assessment of these impacts:

- a simple method, which adopts worst case noise enhancing conditions;
- a more detailed analysis of prevailing meteorology, to identify whether enhancing conditions occur with sufficient frequency to be considered a feature of the local environment:
  - where enhancing conditions occur with sufficient frequency, noise enhancing meteorological parameters should be adopted by the noise modelling;
  - where enhancing conditions are not a feature of the environment, modelling should adopt the standard meteorological parameters.

Definitions of the standard and enhancing conditions established by the NGfl are reproduced in **Table 5**. The NPfl indicates that where a wind or stability condition may occur for more than 30% of the time during any assessment period (day, evening or night) of any season, then the parameters for noise enhancing conditions should be adopted as part of the assessment.

Table 5: Standard and noise-enhancing meteorological conditions

Meteorological Condition	Meteorological Parameters
Standard conditions	Day/evening/night: stability categories A-D with wind speed up to 0.5 m/s at 10 m AGL.
Noise-enhancing conditions	Daytime/evening: stability categories A-D with light winds (up to 3 m/s at 10 m AGL) Night-time: stability categories A-D with light winds (up to 3 m/s at 10 m AGL) and/or stability category F with winds up to 2 m/s at 10 m AGL.

The nearest Bureau of Meteorology (BoM) Automatic Weather Station (AWS) is located at Moree Airport, approximately 65km south west of the proposed development site. Monitoring records from Spring 2016 through to Winter 2017 were analysed to identify whether any prevailing wind patterns may be considered a feature of this environment.

The results presented in **Table 6** indicate that none of the prevailing winds are observed for more than 30% of the time during any season. Prevailing winds are therefore not considered significant feature of this environment, and standard meteorological conditions were adopted for the assessment of potential gradient wind impacts. Seasonal wind-roses are provided in **Appendix I**.

Table 6: Frequency of most dominant prevailing winds (+/-22.5deg, <3m/s)

Season	Day	Evening	Night
Spring	SE (7%), E, S, SW (6%)	NE (3%), E, SE, S (2%)	NE (3%), E, SE (2%)
Summer	SE (5%), E, SE (4%)	E, SE, S (1%)	E, SE, S (1%)
Autumn	S, SW (10%), SE (9%)	NE, E (3%), N, SE, S (2%)	NE (3%), E, SE (2%)
Winter	E (10%), NE, (9%), SE (8%)	NE, E, SE (5%)	NE, E (3%), N, SE (2%)

The AWS at Moree Airport does return observations that would enable assessment of atmospheric stability and temperature inversion frequency; however, previous experience suggests that these phenomena have potential to be a feature in rural environments. On this basis, the parameters for noise enhancing conditions are conservatively adopted in noise modelling.

5. ASSESSMENT OF OPERATIONAL NOISE LEVELS

5.1 Operating Scenarios

A model of operational noise impacts was constructed using the ISO9613 calculation method within the Predictor-Lima software packaged. The proposed operation is comprised of a number of noise generating activities, including:

- operation of the quarry, crushing plant, stockpiling and reclaim at quarry areas;
- haulage of material in heavy vehicles from the quarry areas to the rail loading point (wholly contained within the boundary of the site); and
- loading of product onto waiting trains.

A summary of Sound Power Level (SWL) for plant utilised during these operational phase activities are shown in **Table 7.** Given that the configuration of the quarrying plant will not be determined until the approval is in place, assumptions relating to equipment and power levels were determined on the basis of the production rates that are sought. Sound Power Level data were then sourced from a library of representative plant, and cross referenced against existing assessment of similarly sized quarrying operations (Gunlake Quarries, 2016).

Table 7: Operational stage noise sources

Plant Description	Description of Utilisation	SWL, dB(A)
Hard Rock Quarry	Including extraction and crushing, sizing and stockpiling operations	123
Gravel Pit Quarry	Including excavations, and screening / sizing plant (without crushing)	110
Product Haulage	Caterpillar 773 (or similar) Rear Dump Truck(s) between quarry areas and rail loading point	112
Train Loading	Front end loader for train loading/material stockpile	108 (124 L_{AMax})

Preliminary modelling indicated that establishment of the crushing and sizing plant to the west of the proposed hardrock quarry may result in marginal exceedences (1 to 2dB) of the PTNL during the evening and night at the nearest sensitive receiver. This may be ameliorated by establishing the processing plant on the north eastern aspect of the hard rock quarry area. Noise predictions presented in **Table 8** are determined on this basis. The proposed locations of noise generating activities are shown in **Appendix II.**

5.2 Meteorological Scenarios

This operational configuration was modelled using enhancing meteorological parameters, following analysis of prevailing meteorology presented in **Section 4.5.** This includes:

- assessment under daytime (standard) conditions:
  - stability category D with 0.5m/s winds from the NE, E, S and NW: to evaluate propagation towards the various receiver locations;
- assessment under (enhancing) conditions which may occur during the evening and night:
  - light drainage winds (2m/s) that may be observed under stable atmospheric conditions (Pasquil Gifford Stability Class F). Drainage winds were assumed to occur in a NE to SW direction.

5.3 Noise Level Predictions

A summary of predicted $L_{Aeq,15minute}$ noise levels at the nearest sensitive receivers associated with each of the operational scenarios are provided in **Table 8**. Noise level contours for each of the operational stage scenarios are provided in **Appendix II.**

Table 8: Worst case noise impact predictions ($L_{Aeq,15minute}$ dB(A))

	Predicted $L_{Aeq,15minute}$					
	Day		Night		PNTL (Day/Evening/Night)	Above
Receiver	Calm	Enhancing	Calm	Enhancing	$L_{Aeq,15minute}$	PNTL?
1	32	32	35	35	40 / 35 / 35	No
2	<25	<25	<25	<25	40 / 35 / 35	No
3	28	28	30	28	40 / 35 / 35	No
4	<25	<25	<25	<25	40 / 35 / 35	No
5	<25	<25	<25	<25	40 / 35 / 35	No
6	<25	<25	<25	<25	40 / 35 / 35	No
7	<25	<25	<25	<25	40 / 35 / 35	No
8	<25	<25	<25	<25	40 / 35 / 35	No
9	<25	<25	<25	<25	40 / 35 / 35	No

The results of modelling indicate that predicted operational noise levels will be below the PTNL during all periods (day, evening and night), under both calm and enhancing meteorological conditions. Results indicate that noise contributions may approach the PTNL during the evening and night period at R1.

In all instances, operation of the crushing plant and hard rock quarrying activities is the dominant contributor. It is worth noting that the assessment assumes a source configuration that would be most representative of the commencement of the project (sources are located at the natural surface level). Noise levels may be reduced as the project progresses, as quarry noise sources are progressively located deeper in-pit and stockpiles are used to provide localised shielding.

Emissions from activities are not expected to exceed the PTNL under worst case operational (at natural level) and meteorological (enhancing) conditions, during any assessment period. On this basis, adverse impacts are not expected.

5.4 Maximum Noise Level Predictions

Assessment of predicted noise levels associated with short term high level events (L_{AMax}) with potential to cause sleep disturbance at adjacent sensitive receivers are provided in **Table 9**. Train loading was identified as the activity most likely to generate peak noise events.

Table 9: Maximum noise level predictions, activities outside daytime hours (L_{AMax} dB(A))

Receiver	Prediction L_{AMAX}		Criteria (Night) L_{Amax}	Above MNLT?
	Calm	Enhancing		
1	40	40	52	No
2	26	26	52	No
3	29	26	52	No
4	<25	<25	52	No
5	28	28	52	No
6	<25	<25	52	No
7	26	26	52	No
8	27	27	52	No
9	25	25	52	No

Train loading represents the activity closest to the property boundary (and immediately adjacent to the closest sensitive receiver). As activities are likely to comply with L_{AMax} trigger noise level at this location, more distant activities (closer to the centre of the property and further from receivers) are also expected to comply. Given these results are below the Maximum Noise Level Trigger, further assessment of impacts is not undertaken.

6. DISCUSSION AND RECOMMENDATIONS

6.1 Assessment Conditions and Criteria

Analysis of background noise monitoring indicates that the receiving environmental adjacent to the proposed development site is rural in nature, influenced predominantly by environmental and distant transportation sources. In all cases, the PTNL were established in terms of the Intrusiveness Criteria. For the purposes of evaluating potential impacts, it is recommended at that the PTNL be adopted as the assessment criteria for the development.

Review of prevailing meteorology indicates that there are no wind conditions observed more than 30% of the time during any season. Data was not available to evaluate the potential significance of temperature inversions at this location, so conservative assumptions were adopted and enhancing meteorological parameters were applied to the assessment.

6.2 Assessment of Impacts and Recommendations for Management

6.2.1 Operational Noise

Review of noise modelling indicates that the proposed operations will generate offsite noise levels below the PTNL at all receivers, during all assessment periods. Contributions at the nearest receiver (R1) may approach the evening and night period PTNL, but are expected to be well below the day period criteria level. In all cases the primary contribution to offsite noise levels is associated with operation of crushing plant at the proposed hard rock quarry. It is recommended that this plant is established at the north eastern aspect of the hard rock quarry area.

6.2.2 Maximum Noise Levels

The loading of quarried material onto trains was identified as the activity with greatest potential to generate maximum noise level impacts. It is important to note that these impacts may only manifest where loading operations are required to take place during the night period. Notwithstanding, review of modelling results indicates that L_{AMax} noise levels at adjacent sensitive receivers will be less than the Maximum Noise Trigger Level. Adverse impacts are not expected, and detailed assessment of potential impact was not undertaken.

6.2.3 Summary of Recommendations

Assessment indicates that the proposed quarry operations will comply with the established PTNL. It is likely that the development will be audible at some receivers, and it is recommended that measures be put in place to monitor and respond to potential concerns from adjacent sensitive receivers.

7. CONCLUSION

Advitech Environmental was engaged to prepare an assessment of potential noise impacts associated with the development of the proposed Tikitere Quarry, at 1135 Croppa Creek Road, NSW. The development is proposed to service bulk construction material requirements of the proposed Narrabri to North Star section of the Inland Rail project. The operation may produce up to 500ktpa of quarried material per annum.

Project Tigger Noise Levels for adjacent receiving environments were reviewed, and the assessment conservatively adopted the most stringent criteria for the project area. Modelling indicates that noise levels associated with the project are expected to meet these criteria under enhancing meteorological conditions. On this basis, the PTNL may be adopted as assessment criteria for the development.

While adverse impacts are not expected, this activity may be audible at some locations given the characteristics of the receiving environment. It is thus recommended that measures be put in place to ensure the timely and effective response to any concerns raised by adjacent receivers.

8. REFERENCES

The following information was used in the preparation of this report:

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2. AS 1055.1-1997: Acoustics - *Description and measurement of environmental noise General procedures.*
3. Bies, DA & Hansen, CH (2009). Engineering Noise Control: Theory and Practice (4th Edition), Spon Press;
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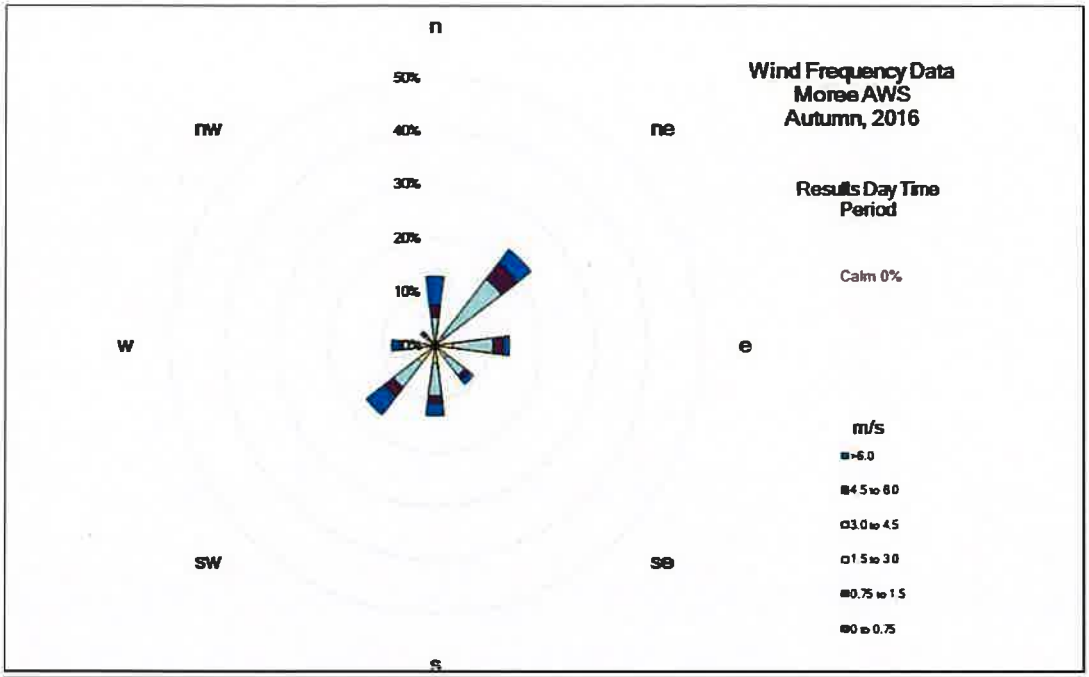
5. NSW Environment Protection Authority (2000). *NSW Industrial Noise Policy*, NSW Environment Protection Authority, Sydney;
6. NSW Environment Protection Authority (2017). *NSW Noise Guide for Industry*, NSW Environment Protection Authority, Sydney;
7. UK Department of Environment, Food and Rural Affairs (2005), *Update of noise database for prediction of noise on construction and open sites,* UK Department of Environment, Food and Rural Affairs, Norwich.

Appendix I

Seasonal Wind Roses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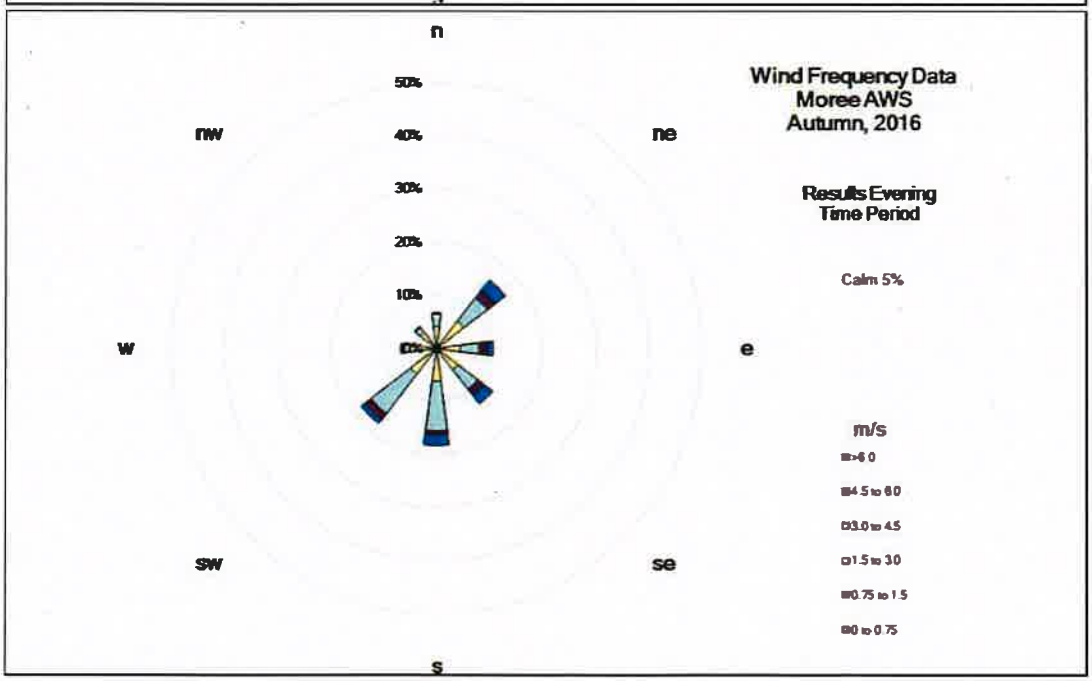
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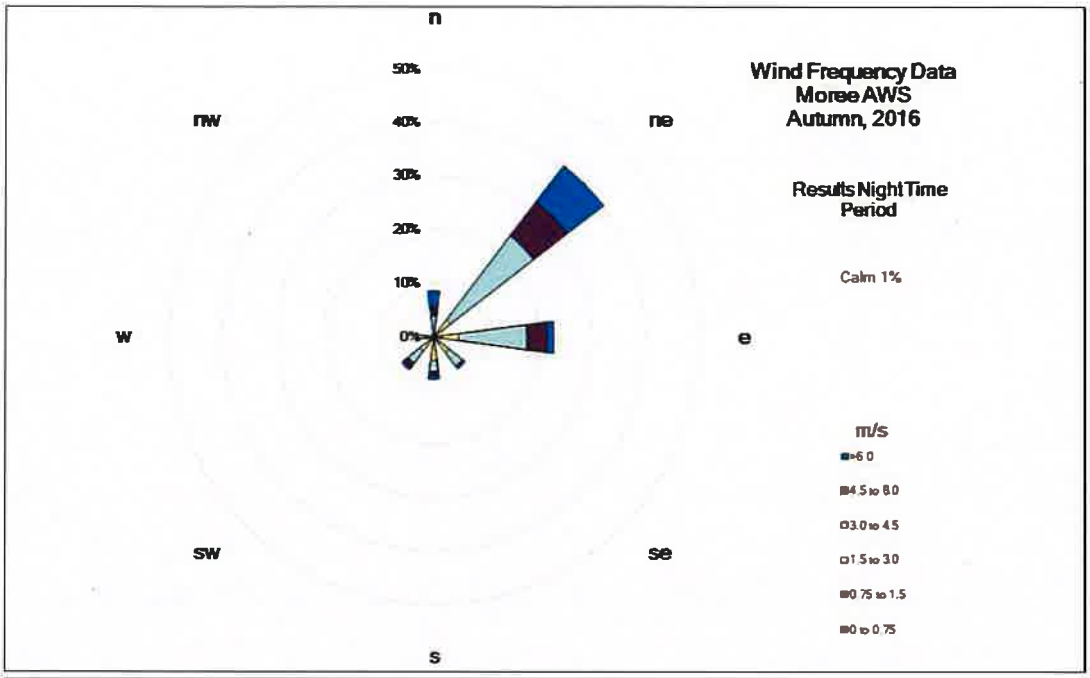
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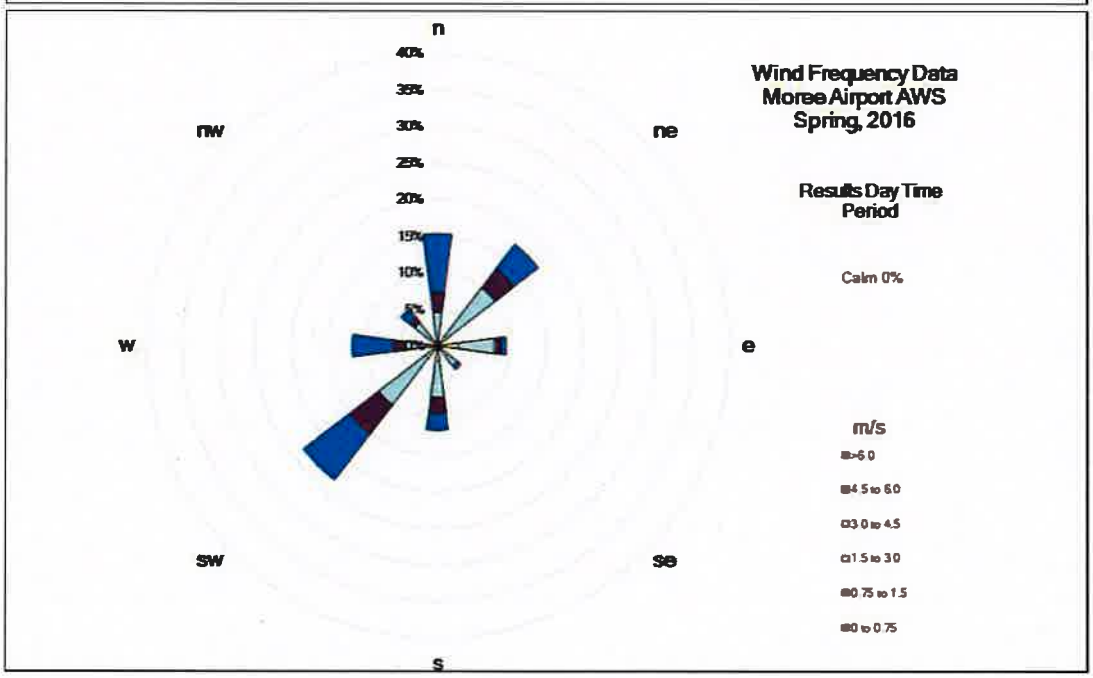
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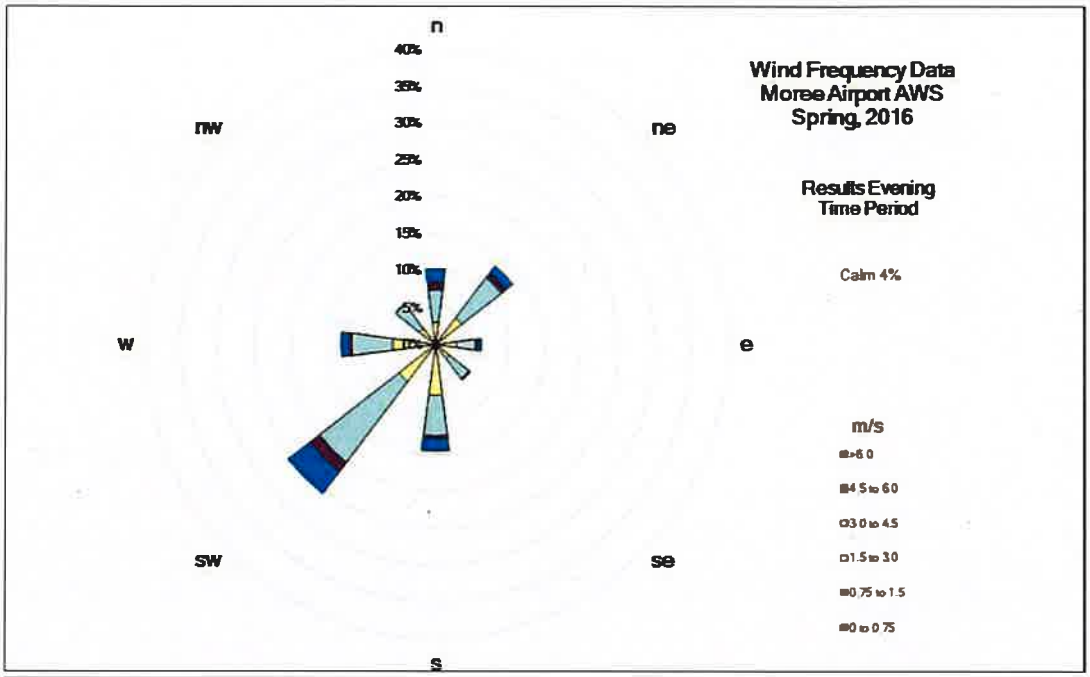
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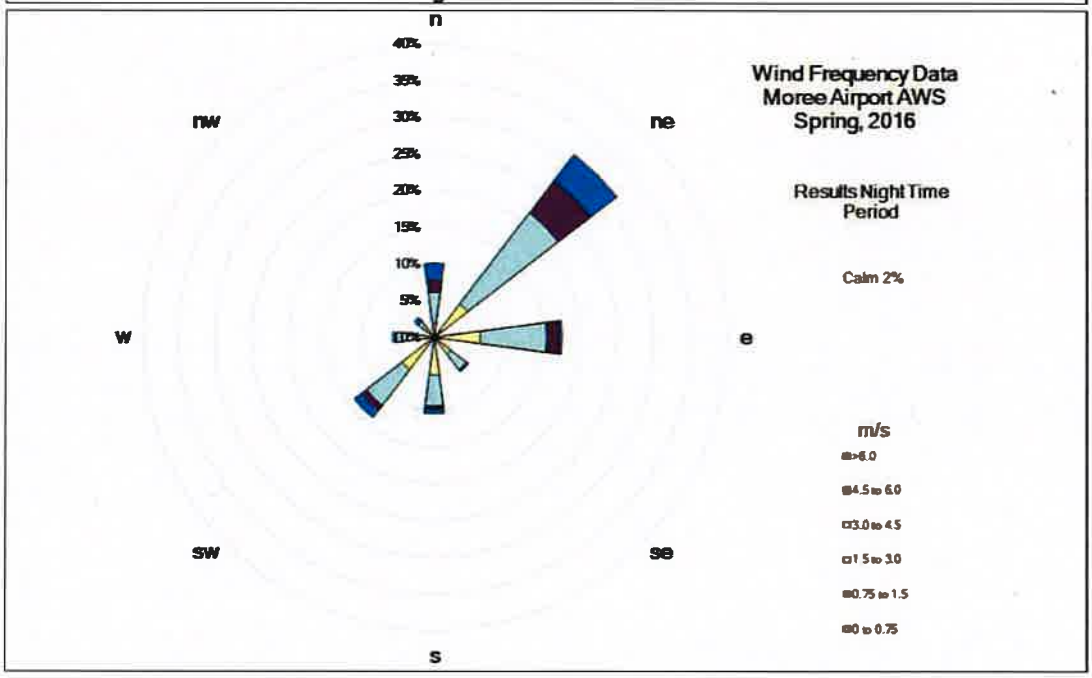
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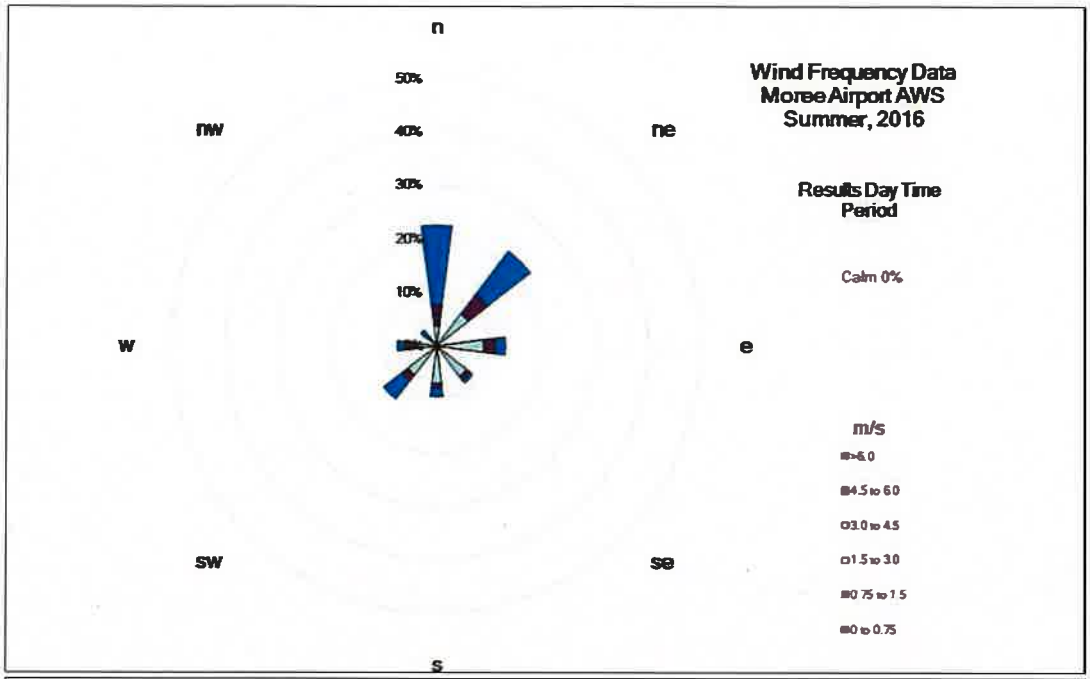
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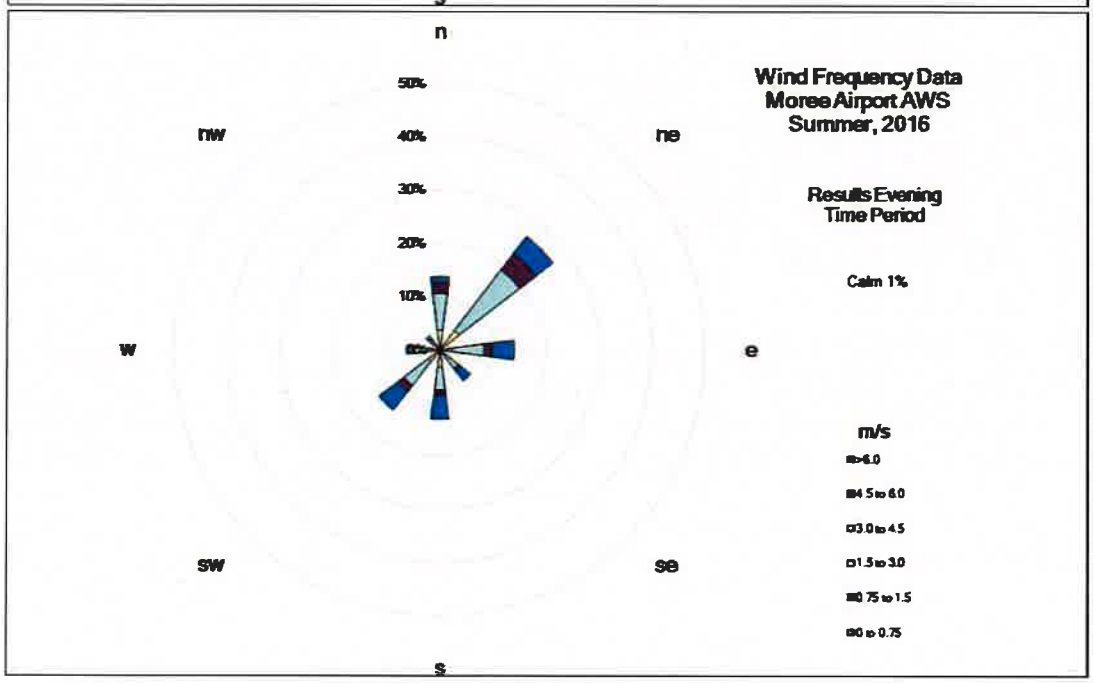
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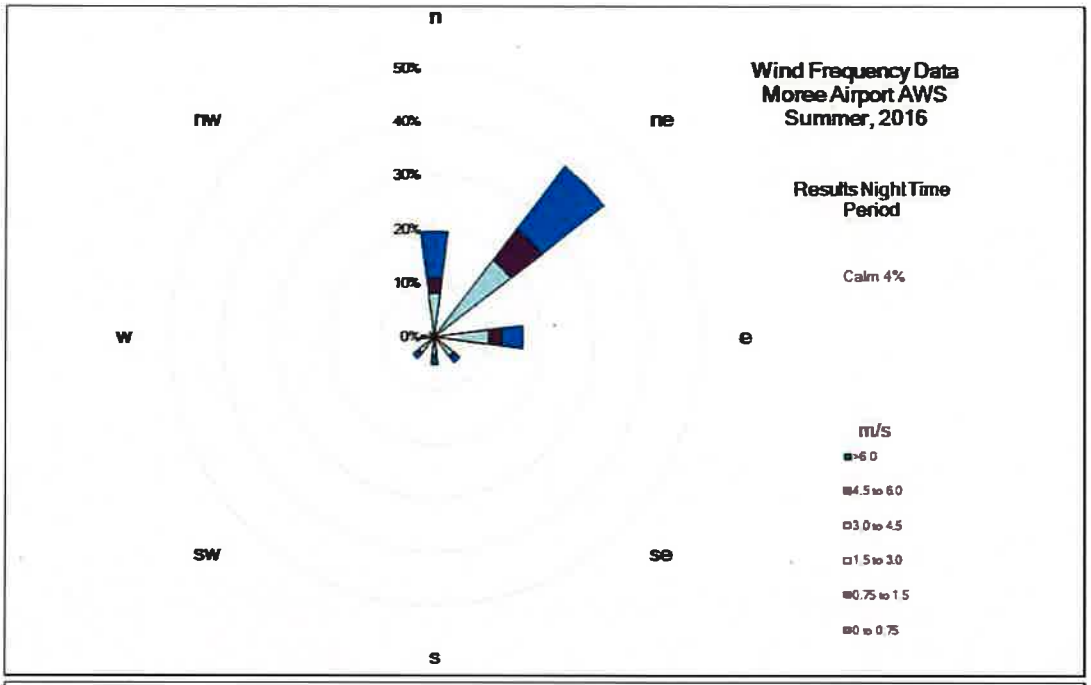
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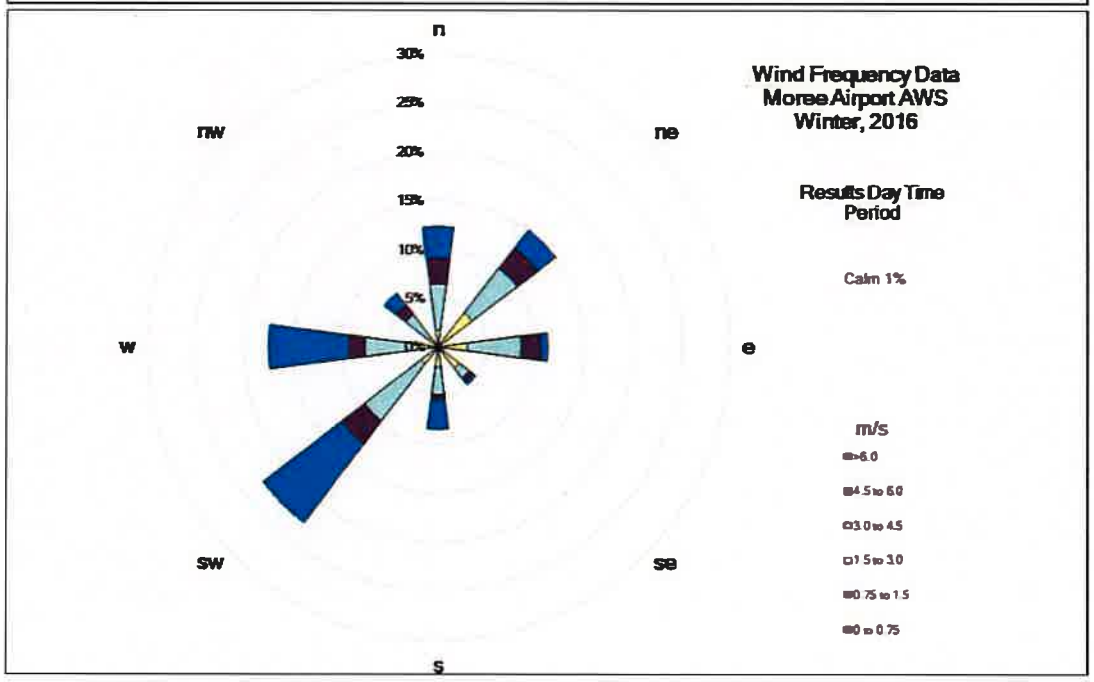
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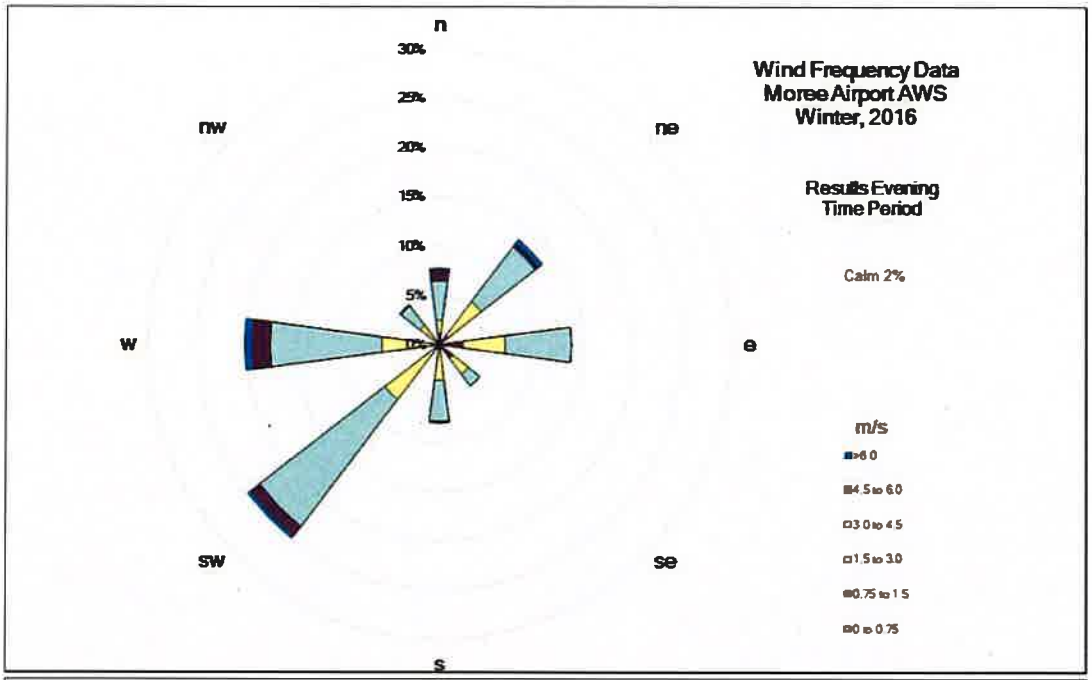
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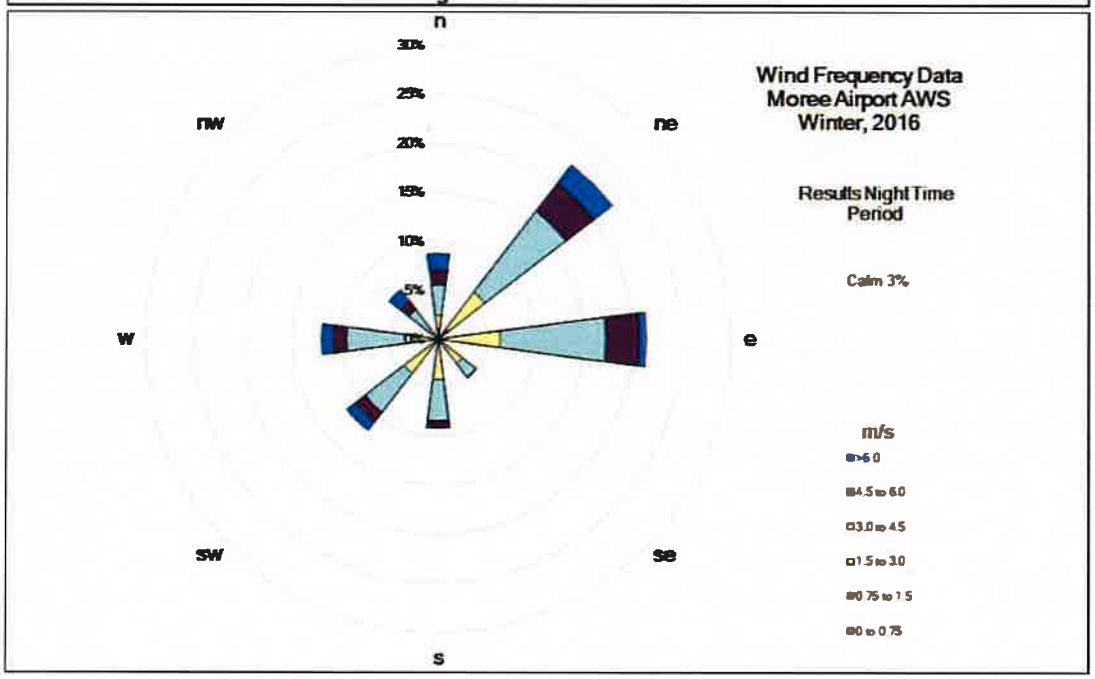
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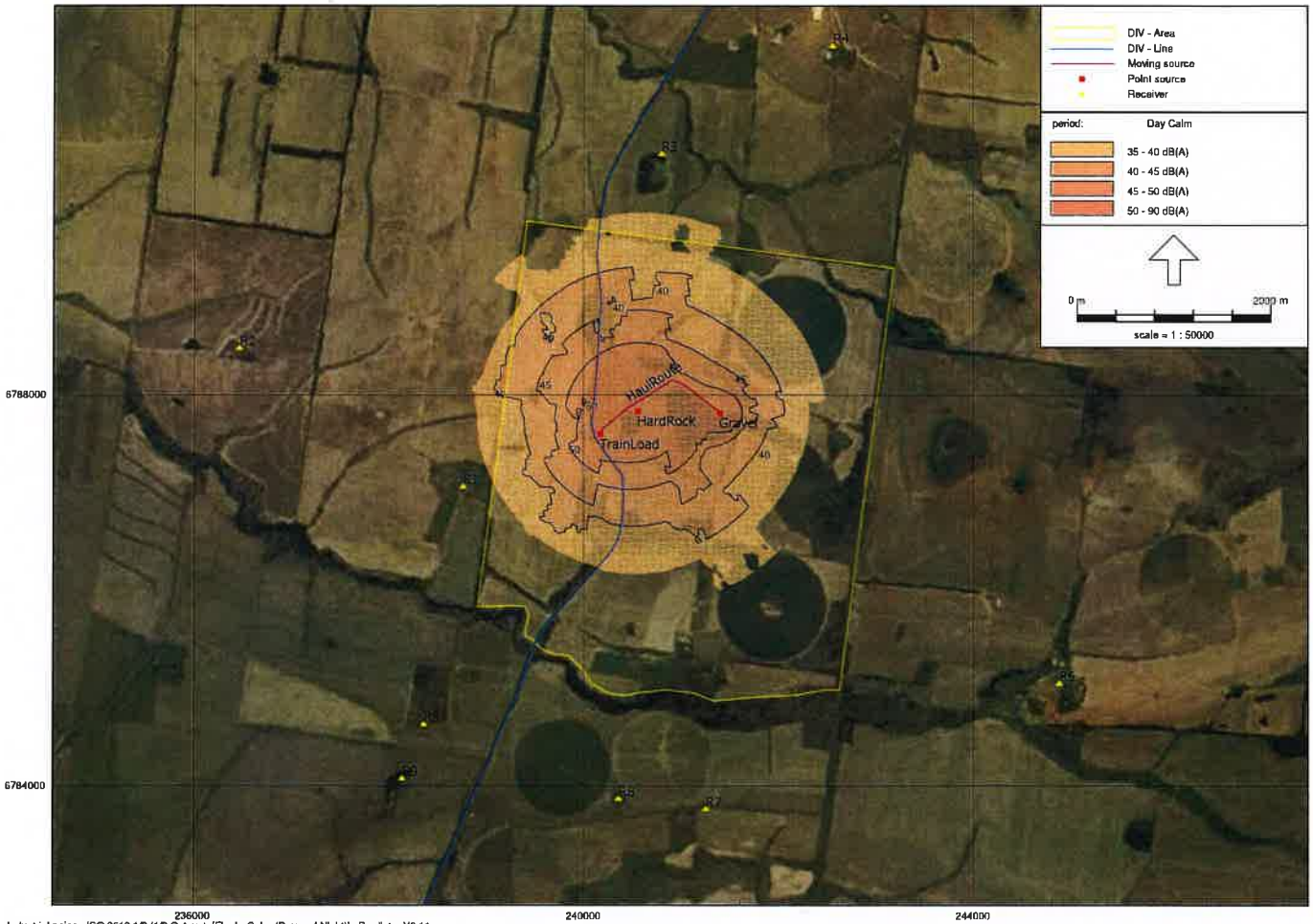
advitech
environmental

Appendix II

Noise Level Contours



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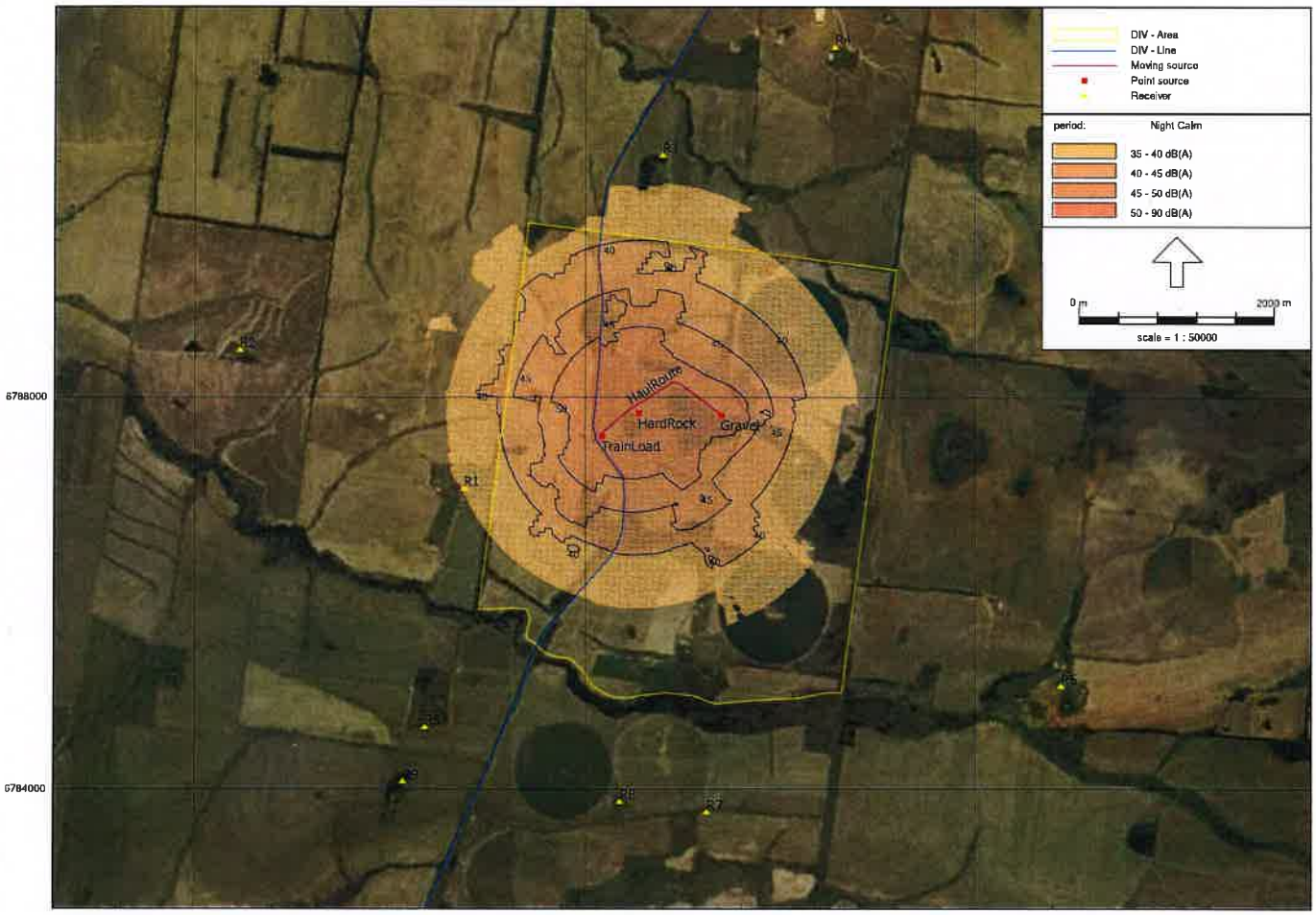
Calm Conditions (Day)

Advitech Environmental Pty Ltd



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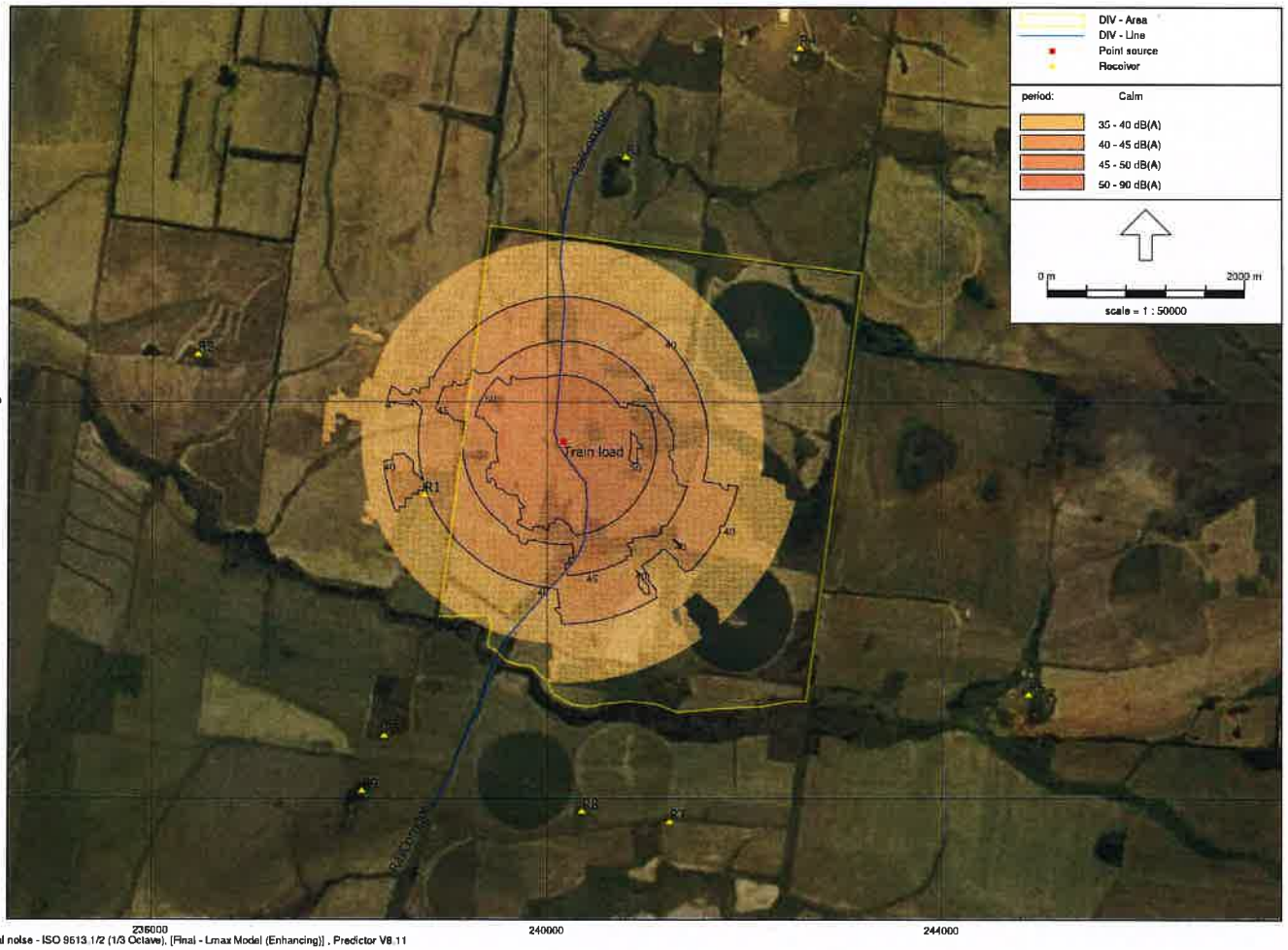

Industrial noise - ISO 9613.1/2 (1/3 Octave), [Final - Lmax Model (Enhancing)] , Predictor V8.11

Appendix 5: Air Quality Impact Assessment

SMK

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Tikitere Quarry

AIR QUALITY IMPACT ASSESSMENT

Lot 5 in Deposited Plan 755984

1135 Croppa Creek Road, North Star NSW 2408

February 2018

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

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DOCUMENT CONTROL

Project Name	**Tikitere Quarry**
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Project Reference	17/146
Report Number	17/146 - AQIA
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Revision History			
Version Number	**Date**	**Authority**	**Details**
0	February 2018	Peter Taylor (SMK Consultants)	Initial Issue

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1 Background

The proposed development involves development and operation of Quarries on the property of "Tikitere", located approximately 10 kilometres south-west of North Star and 12 kilometres north of Croppa Creek, in north-west New South Wales. The Quarries would have an annual limit of 500,000 tonne.

The primary objective of the proposed Quarry is to secure a supply of quality ballast material and other quarry products to the Inland Railway Project. The section to be targeted from this site, involves the section of line between mainly Croppa Creek to the south and the Qld Border to the north. Other quarry will be utilised for gravel products further to the south of Croppa Creek.

The project involves two separate quarry sites. Site 1 involves a hard rock quarry located in the northwest sector of Tikitere. The proposal involves quarrying of a rock knob, crushing the hard rock and using this for road base and ballast material. Site 2 involves extending an existing farm quarry of white claystone material as a filler material for the rail base materials. This white claystone would be excavated and hauled directly to the rail line.

2 Operations Proposal

The quarry work will involve several operations that have the potential to generate dust, mainly:

- Road dust generated by traffic to and from the quarry site through the access road from the North Star-Croppa Creek road
- Dust generated from crushing operations
- Dust generated within the crushing area during movement of crushed materials into stockpiles and during loading
- Road dust generated from the short-haul between the quarry and the railway corridor

Daily traffic to and from the facility would include light vehicles for site workers and occasional heavy vehicles for delivery of fuel once the quarry plant is established. The access road will consist of a gravel road connection to the North Star-Croppa Creek road. This road would be used by farm traffic in addition to vehicles associated with the quarry operation. Options have been discussed that would involve the use of a planned access road within the rail corridor. Use of the rail corridor access road would therefore avoid generation of dust on internal roads within "Tikitere".

Crushing will consist of a dry operation that involves primary crushing of the rock material from the quarry facilities and then secondary crushing and screening to obtain the required size of rock for the railway line. Several sizes of rock will be required and therefore the extent of crushing will vary throughout the operation. Finer rock (5 – 20mm) will be required for roads and the rail base at the start of the project and the courser crushing (20 – 40mm) will be required for ballast material for the rail line. Some potential exists to enclose sections of the crushers and conveyor system to reduce the release of dust during processing. The option of wet crushing is limited due to the requirement to supply the crushed material with a low moisture content. Potential is available to utilise misting systems to reduce dust on conveyors and transfer points between machinery.

Movement of machinery (front end loaders) will generate some fine dust on the site. This dust will be a by-product of the crushing process as well dust generated from daily movement of machinery on a gravel base. This dust is to be managed by initially maintaining a clean hard, working surface for machinery as well as removal of any fine dust from beneath the crushing equipment. Additional dust control measures would be adopted by utilising water trucks or sprinklers on the site on an as required basis. A water truck would be available and therefore the regular use of this truck would potentially control the surface dust issue.

Gravel produced at the quarry site would be hauled a short distance to the rail corridor for loading onto trains or hauled directly to construction areas. A formal gravel road using layers of course rock would be established. The source of road dust would include gravel fines and soil/dirt. The course rock would absorb some gravel fines and dirt. Once the course rock

becomes blocked with fines, the potential is available to apply an additional layer of course rock. Alternatively, this haul road could be watered using a water truck to restrict dust emissions.

Water would be available from either the sediment control dam to be installed or artesian water available on-farm.

The following provides an aerial image showing the quarry locations on "Tikitere". The quarries are located within an extensive and open area used for dryland cultivation of both winter and summer crops.

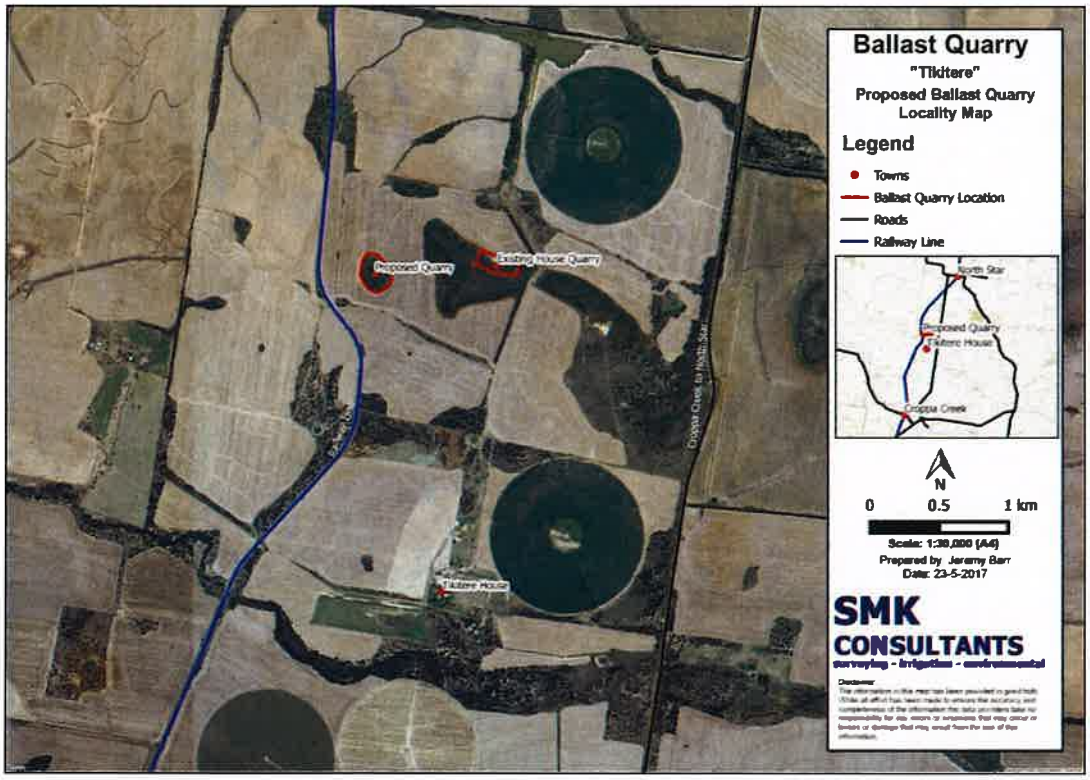

Figure 1: Locality Plan of Quarry Sites

3 Methodology

The methodology adopted for this assessment is based on several parameters.

Firstly, dust data and analysis for similar activities on sites located in the local area were used to determine the potential extent of dust emissions impacts from the proposed activity. A similar quarry operation is located approximately 30 km southeast of this site. Meteorological conditions are considered similar. The similar quarry was subjected to a Level 1 AQIA in accordance with NSW EPA guidelines. The previous assessment and results of deposited dust monitoring can therefore provide background data for the extent of dust travel from the proposed operations at Tikitere.

Methodology to be adopted in this assessment involves assessing the potential emission levels and assessing the travel distance of dust impacts under normal and worst-case conditions.

3.1 Emission Criteria

Protection of the Environment Operations (Clean Air) Regulation 2010

This Regulation:

- Provides for the certification of domestic solid fuel heaters;
- Controls burning generally by imposing an obligation to prevent or minimise emissions, by prohibiting the burning of certain articles and requiring approval for certain fires/incinerators;
- Requires the fitting of anti-pollution devices to certain motor vehicles and prescribes an offence of emitting excessive air impurities;
- Imposes certain requirements and standards on the supply of petrol;
- Prescribes standards for certain groups of plant and premises to regulate industry's air impurity emissions; and
- Imposes requirements on the control, storage and transport of volatile organic liquids.

Dust emission criteria for NSW are presented in the following table.

Table 1: NSW Dust emission criteria

Pollutant	Averaging period	Maximum concentration	Criteria Source
Particles as PM10	1 day	50 µg/m^3	NEPM
Particles as PM2.5	1 day	25 µg/m^3	NEPM
Particles as PM2.5	1 year	8 µg/m^3	NEPM
Deposited dust	Annual	Max 4 g/m^2 Insoluble dust	NSW DECCW
Deposited dust	Annual	Max increase of 2 g/m^2 Insoluble dust	NSW DECCW

4 Meteorological Data

Relevant weather data for this site assessment involves wind direction. Rainfall is highly variable, but minimal dust would be generated if the quarry operates in wet conditions. The worst-case conditions would therefore involve a dry surface.

Temperature is a parameter to be considered, however, dusty condition would prevail during all seasons. Distance of travel could potentially be influence by an inversion layer, however during an inversion layer, wind conditions are generally still and therefore the travel of dust would be minimal. Temperature is therefore excluded from a worst-case condition.

The average wind speed and direction for the area varies according to the season and time of day. The wind roses depicting the average wind speed and direction for each month at 9am and 3pm were procured from the Bureau of Meteorology. The Moree based wind roses are presented in Figure 2.

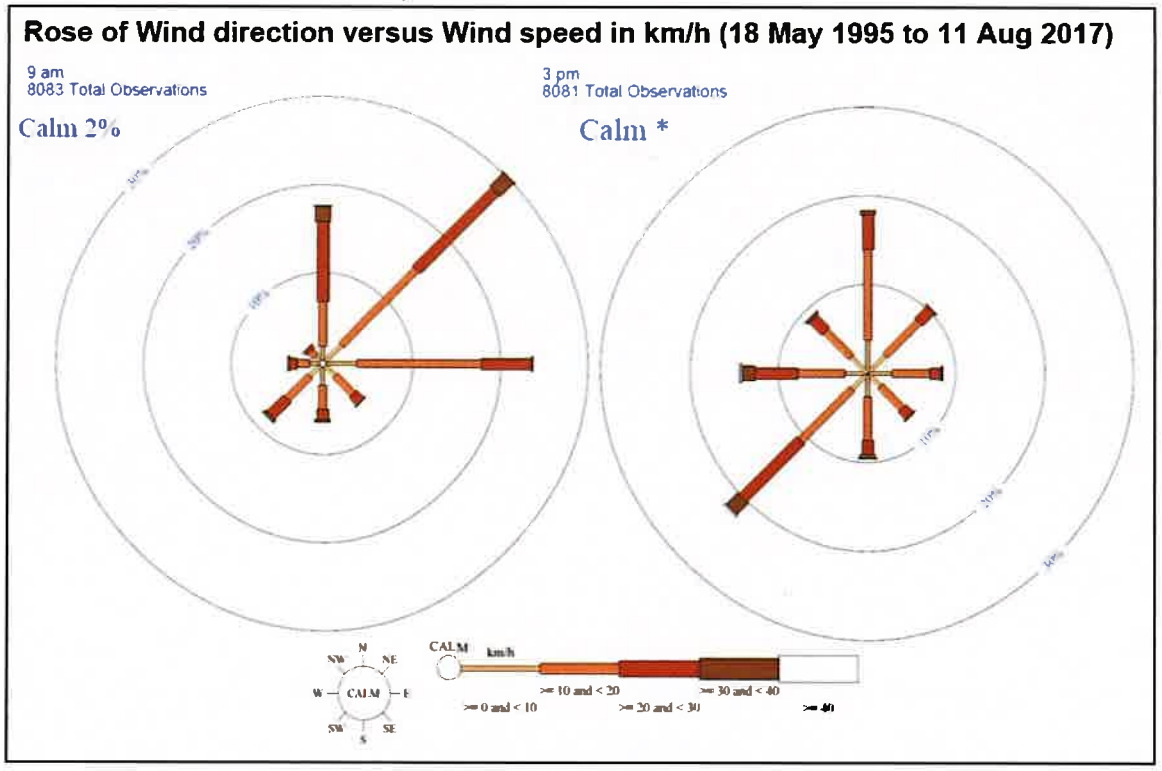

Figure 2: BOM Regional Annual Wind Roses

The Moree data is influenced by an open plain type landscape with no hills or significant undulations within a 20 km radius. The wind direction is not highly influence by katabatic winds generated from ranges to the east.

The Moree landscape is dominated by north-easterly winds in the morning and south-westerly winds in the afternoon. The north-easterly winds provide more humid air than the south-westerly winds.

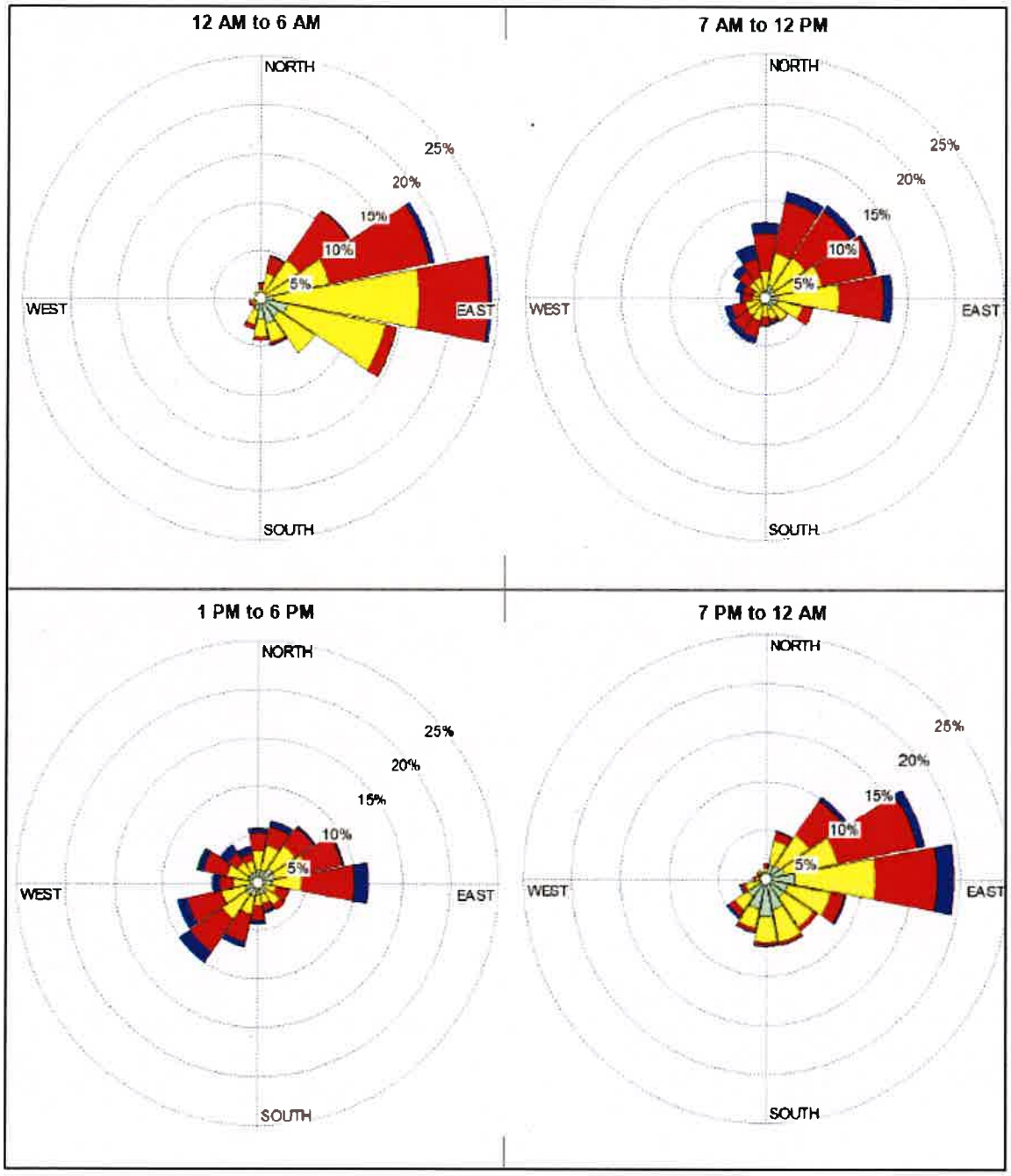

Figure 3: Detailed Wind Direction-Time of the day assessment using local (uncalibrated data*). Source. Pacific Environment Wind Data Analysis

Local data identifies a strong east-northeast wind between mid-night and 6 am. This would relate to katabatic wind forces which ease in strength through the morning period from 7 am

until noon. The data shows that wind direction becomes equally dominated by south-westerly winds in the afternoon and as the temperature reduces at night, the katabatic wind effects emerge again. The local wind in the North Star region results in an average temperature reduction of up to 5 degrees during the night when compared to Moree data.

The BOM data which is calibrated and obtained from Moree, shows similar morning data but a variation in afternoon wind direction. The North Star data shows a general dominance of easterly and north-easterly wind directions across a large part of the daytime other than afternoon periods which include south-westerly winds.

5 Local Receptor Locations

The closest homestead area to the quarry operation is located approximately 1770m west-southwest of the main hard rock quarry. The remaining homesteads and villages are located more than 2 km from the quarry operations.

Table 2: Separation Distances from Sensitive Receptors

Receptor	Receptor Type	Direction from Proposed Quarry	Distance (m)
1	Rural Dwelling	West South-west	1,770
2	Rural Dwelling	West South-west	1,851
3	Rural Dwelling	North	2,783
4	Rural Dwelling	South South-west	3,537
5	Rural Dwelling	South	3,763
6	Rural Dwelling	South	3,907
7	Rural Dwelling	West North-west	4,019
8	Rural Dwelling	South South-west	4,225
9	Rural Dwelling	South South-west	4,430
10	Rural Dwelling	North North-east	4,673
11	Rural Dwelling	South-east	5,225
North Star	Small Rural Town	North-east	10,448
Croppa Creek	Small Rural Town	South South-west	12,578

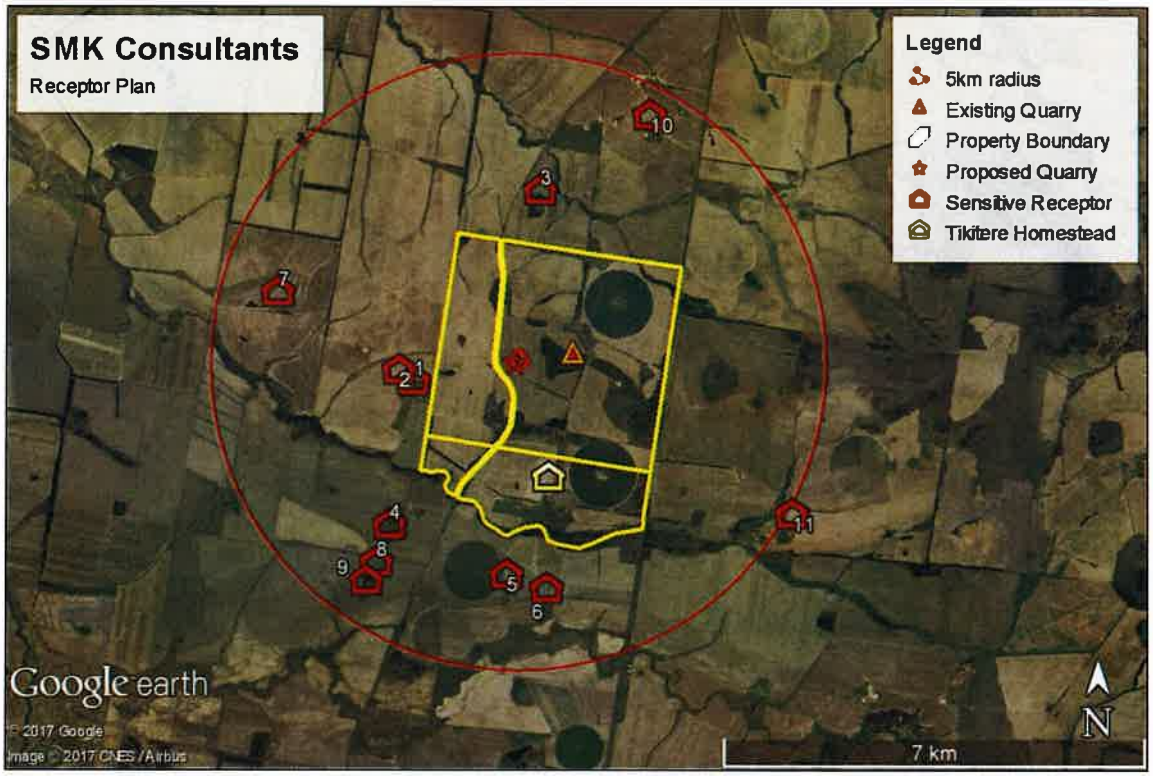

Figure 4: Locations of Nearest Sensitive Receptors to Proposed Quarry Site

6 Air Quality Risk Impact Assessment

6.1 Risk of environmental harm, risk to human health and amenity

6.1.1 Level of assessment

The level of assessment used is based on actual recorded data in preference to model data. As identified in the assessment of weather conditions, prevailing wind in the quarry area varies from publicly available data. The publicly available data would be used for modelling and therefore some issues may occur which would place some risk on the results.

risk factors, including but not limited to:

- proposal location;
- characteristics of the receiving environment; and
- type and quantity of pollutants emitted.

6.1.2 Receiving environment

The environment around the quarry sites is dominated by open slopes supporting dryland and some irrigated agriculture. There a six (6) homestead areas within 3 km of the quarry sites. These homestead areas are associated with broadacre dryland farming operations and therefore exposed to open dry paddocks during extended fallow periods and harvest operations which have been identified as to create worst case dust conditions.

The two local villages, being North Star and Croppa Creek are located more than 10 km from the quarry site and therefore considered outside of the potential impact zone of dust emissions from this site.

The properties include various remnant woodlands and woodland corridors along watercourse lines. These natural areas are currently prone to dust emissions from routine agricultural activity such as cultivation, harvest and truck traffic through fields.

The topography consists of rolling low hills. The region is located on the eastern edge of the open plain country associated with tributaries of the Macintyre and Gwydir Rivers. The hills and knobs generally consist of rocky outcrops supporting a range of woodland dominated by Iron bark eucalypts.

Ambient air quality in relation to dust, is influenced at present by soil moisture levels in open cultivation fields. Dust levels increase as conditions become dry and fields are exposed to dry westerly winds. Background PM10 levels are predicted to be in the order of 16 to 20 $\mu g/m^3$. Dust deposition data recorded by SMK Consultants for the region are in the order of 1.2 g/m^2/month which is slightly lower than background levels recorded in the Moree region of around 1.6 to 2.5 g/m^2/month. The variation is possibly due to the flatter terrain than therefore more extensive exposure of open dry cultivation fields in the Moree region when compared to the more undulating landscape in the North Star area.

6.1.3 'Worst case' emission scenarios

The worst-case scenario for the proposed Tikitere quarry operations would involve crushing and associated operations occurring in an extended dry period. The extended dry period would result in an increase in local ambient dust levels from cultivation paddocks and therefore any minor contribution of dust from the quarry would exacerbate the local conditions.

It is noted that the quarry has access to water for dust suppression purposes under worst case conditions where the proposed sediment pond may be dry. This alternative water source is from groundwater which has a 100% reliability. The use of this water for dust suppression around the quarry operation, including haul roads would be essential to avoid unacceptable dust emissions off the property.

6.1.4 Dust Emission Assessment

A quarry site located approximately 40 km south of Tikitere was monitored with dust deposition gauges over a period of more than 12-months to quantify dust impacts. The quarry operation involves hard rock materials and a significant haulage operation along local gravel roads. The quarry is located in a similar landscape to the Tikitere site and therefore the dust emission data and results of dust assessment are considered relevant to Tikitere's proposal.

The assessment involved selective placement of dust deposition gauges over an extended period in addition to development of a Level 1 Dust emission model to quantify PM10 dust impacts.

Two dust deposition gauges were utilised. Sample site 1 was located approximately 660m in a southwest direction from the secondary crusher at the quarry site. The location of the monitoring point was selected on the basis of prevailing wind directions, noting that the more common prevailing wind was in a northeast sector and therefore the dust gauge was located down wind of the operations. The selected site receives some visible dust from the quarrying operation including the crusher, road dust and general quarry dust.

Dust monitoring using the deposition gauges was undertaken monthly in accordance with the method set out in AS/NZ 3580. Monitoring was undertaken between 2009 and extended into 2010 and analysis of the dust gauges was undertaken by NATA registered laboratories. The results of monitoring are presented in the following tables.

Table 3: Dust Deposition Monitoring Site 1 results for a nearby Quarry in g/m²/month

Month	Total solids	Insoluble solids	Soluble solids	Combustible matter	Ash	Mineral dust
November		2.7				
December		3.3				

Month	Total solids	Insoluble solids	Soluble solids	Combustible matter	Ash	Mineral dust
January	6.3	**1.3**	5.0	0.13	1.2	0.1
February	7.0	**1.3**	5.7	0.10	1.2	0.1
March	4.7	**1.6**	3.1	0.39	1.2	0.4
April	0.97	**0.8**	0.16	0.76	0.05	0.3
May	4.0	**2.2**	1.8	0.92	1.3	0.9
June	4.0	**0.75**	3.2	0.32	0.44	0.31
July	4.6	**1.1**	3.5	0.23	0.88	0.22
August	4.7	**0.88**	3.8	0.29	0.6	0.28
Average		**1.59**			0.86	0.33

The average insoluble dust level of 1.59 g/m^2/month is well below the maximum of 4 g/m^2/month and the below the optimum of 2 g/m^2/month. Dust levels ranged from a low of 0.8 to a high of 3.3. Quarry activity was relatively constant throughout this period of monitoring.

The results indicate that ash forms the majority of the insoluble solids. This ash is combustible material and not mineral or soil material from the quarry. The mineral dust, being the soil and rock dust generated during the quarry operations formed a relatively small amount of the total insoluble dust level. There are no spikes or peaks to indicate intense periods of emissions or periods where quarry management failed to manage dust emissions adequately. Weather conditions during this period of assessment included wet and extended dry periods.

The above results can be compared to the 2nd dust deposition gauge placed at a control site located approximately 6.5 km from the quarry operations, on a grazing and cultivation farm. The dust gauge was located at a homestead which was approximately 440m upslope from a local gravel road used by gravel trucks and other farmers.

Table 4: Dust Deposition Monitoring results at Homestead in g/m^2/month

Month	Total solids	Insoluble solids	Soluble solids	Combustible matter	Ash	Mineral dust
November		**13.2**				
December		**1.8**				
January	5.0	**1.3**	3.7	0.18	1.1	0.2
February	4.4	**1.6**	2.8	0.110	1.5	0.1
March	4.2	**0.97**	3.2	0.24	0.72	0.25
April	2.9	**0.82**	2.1	0.58	0.24	0.58
May	4.7	**2.3**	2.4	1.4	0.87	1.43
June	3.7	**0.62**	3.0	0.33	0.29	0.33
July	2.5	**0.56**	2.0	0.26	0.30	0.26

Month	Total solids	Insoluble solids	Soluble solids	Combustible matter	Ash	Mineral dust
August	4.5	**0.67**	3.8	0.15	0.52	0.15
Average		**2.38**			0.69	0.41

This control site aimed to assess background levels of dust deposition that would be deemed typical at a rural residence as a result of cultivation operations and local road traffic on a gravel road. The control site was south of the gravel road and therefore similar prevailing winds would occur when compared to the monitoring site adjacent to the quarry.

The insoluble dust deposition rate at the homestead was slightly higher than the quarry site. This may have been due to an extreme reading of 13 g/m^2/month during the first month. If this figure is removed, the average over the remaining months in 1.18 g/m^2/month. This is slightly lower than the deposition rates from the quarry monitoring point.

This data allows typical dust deposition rates to be compared from an active quarry site and a rural residence site. The data shows that the running average dust deposition rate is lower than the recommended 4 g/m^2/month maximum and lower than the preferred long-term average of 2 g/m^2/month.

In relation to PM10 dust emission assessment of the existing quarry assessed in the above discussion, modelling, using an existing background PM10 value of 16 µg/m^3, identified that during a potential worst-case condition of wind, a PM10 increase over the distance available between the proposed Tikitere quarry and the closest residence by approximately 9.5 µg/m^3 on an annual basis may occur. The accumulative effect of existing background dust levels and the modelled increase would therefore be in the order of 25.5 µg/m^3. This modelling involved use of Ausplume Version 6 using worst case wind scenarios. The annual limit criteria for PM10 dust levels is 50 µg/m^3 and therefore the potential for exceedances from the proposed quarry operation for PM10, are considered minimal. The background levels of PM10 throughout the year would vary significantly.

Worst-case conditions for background dust levels would occur during planting and harvest periods when extensive dust is raised during these operations. The harvest can only occur in dry conditions and therefore these dry conditions coupled with an increase in use of local bare soil and gravel roads, would provide a worst-case condition.

6.1.5 Cumulative Impacts

There are no other large-scale quarry sites in the local area. Some small quarries are operated on most of the surrounding farms for on-farm purposes. These quarry operations generally involve winning and preparing of gravel and then placement of gravel over internal farm roads. The volumes of gravel and therefore the periods of operation are relatively minor. No

other industrial facilities are present in the local region that could be considered to have dust potential. The operation of the Tikitere quarry is therefore an isolated emission point.

In consideration of other activity in the area that will occur when the Tikitere quarry is operating, the Tikitere quarry's primary purpose is to supply aggregate materials for construction of the Inland Rail. This project will involve extensive earthworks and therefore construction works. The haulage of gravel along the rail corridor and placement of gravel on the structure will result in some dust emissions. The intent of the Inland Rail Authority is to minimise dust emissions where possible.

Other dust sources identified in the region include dust generated from routine farm activities and use of local black soil or gravel roads during intensive grain harvest periods. The largest grain harvest normally occurs between November and December for the harvest of winter cereal crops. The dust during a dry harvest is visible and therefore has the potential to create some short-term exceedances in both deposited dust rates and PM10 dust levels. This is a common problem across the grain belt throughout NSW and is clearly identified through the operation of the very few dust monitoring stations in western NSW. The closest is located in Tamworth.

The above calculations based on available dust emission data recorded by SMK Consultants in the local area, identify that dust emission levels from a quarry operation are similar to ambient dust emission levels within a rural area. The potential impact on neighbouring residents is considered to be of low risk under worst case conditions. The assessment is based on an assumption that appropriate dust mitigation measures would be adopted on the site. These are outlined in the following section.

7 Mitigation Measures

The following presents a summary of basic mitigation measures to limit the emission of dust during site operations. It is recommended that these measures form part of the Operational Environmental Management Plan once the site is established and quarry work commences.

Table 5: Recommended Mitigation Measures

Air Quality/ Dust Impacts	• Air quality measures / management to be considered as part of the EMP. • Employ water sprays and tankers, especially during hot, dry, windy days, to stabilise (unsealed) roads, stockpiles and other open areas including internal haul roads and access roads where traffic consists of more than 2-trucks per hour. • Include enclosed sections on crushers where extensive fines are generated • Cover loads where required under transportation for longer hauls of aggregate from the site, including hauling of white rock from pit area to rail siding stockpiles • Cover or dampen all stockpiled materials to ensure proper stabilisation. • Clean up fines from around crusher operations to avoid disturbance from either loader operations or wind-blown dust • Vehicle speed restrictions within the subject site will be imposed. • Regularly inspect and maintain all construction equipment to reduce potential for excessive emissions. • Cease operations activities if extreme wind conditions prevail. • Exposed areas of earth to be progressively revegetated and/or mulched as soon as possible to provide soil stabilisation.

Appendix 6: Land Use Conflict Risk Assessment

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Tikitere Quarry

LAND USE CONFLICT RISK ASSESSMENT

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DOCUMENT CONTROL

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Report Number	17/146 - LUCRA
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Revision History			
Version Number	**Date**	**Authority**	**Details**
0	December 2017	Hayley Greenham (SMK Consultants)	Initial Issue

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1 Introduction

SMK Consultants have been engaged by Alan and Kerry Pearlman to prepare a Land Use Conflict Risk Assessment (LUCRA). This assessment is to accompany an Environmental Impact Statement (EIS) in support of a development application for a proposed quarry to be located on "Tikitere".

A LUCRA is a system to identify and assess the possibility for and potential level of future land use conflict to occur between neighbouring land uses. It enables a systematic, consistent and site-specific conflict assessment approach to land use planning and development assessment. The LUCRA aims to:

- accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises;
- objectively assess the effect of a proposed land use on neighbouring land uses;
- increase the understanding of potential land use conflict to inform and complement development control and buffer requirements; and
- highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

In particular, this assessment will identity potential land use conflict relating to separation distances and management practices to minimise noise and dust from sensitive receptors.

1.1 Guidelines

This LUCRA is predominantly based on the "Living and Working in Rural Areas" handbook (Learmonth et al. 2007). Consideration has also been given to the "Land Use Conflict Risk Assessment Guide" (NSW DPI, 2011) and "Agriculture Issues for Extractive Industry Development" (NSW DPI, 2012).

2 Method

In general terms the purpose of the LUCRA is to identify landuse compatibility and potential conflict between neighbouring landuses, and the identification of conflict avoidance or mitigation measures.

In order to achieve those aims, a four-step assessment process is undertaken:

1. Information Gathering – The site's geophysical characteristics, the nature of the development proposed and the surrounding landuses are described.

2. Risk Level Evaluation – Each proposed activity is recorded and potential landuse conflict level is assessed. The higher the risk level, the more mitigation it will require.

3. Identification of Risk Mitigation Strategies – Management strategies are identified which can assist in lowering the risk of potential conflict.

4. Record Results – Key Issues, risk level and recommended management strategies are recorded and summarised.

3 Site Analysis

3.1 Location, Area and Zoning

The proposed hard rock quarry is to be located on the property of "Tikitere" 1135 Croppa Creek Road, North Star in north-west New South Wales. A locality and property plan has been included as Figures 1 and 2, respectively. The property comprises an area of 1,700 hectares and is zoned as RU1 – Rural Production under the *Gwydir Local Environmental Plan 2013*. A copy of the relevant land zoning map has been included as Figure 3. The proposed quarry site is located on a volcanic plug that rises to a height of 15m above the surrounding agricultural land and covers an area of approximately 5.2 hectares.

3.2 Site History and Surrounding Land Use

The site is contained within a single land holding, which has been historically utilised for grazing, cultivation and associated agricultural activities. The adjoining properties are all similarly zoned and have historically been utilised for dryland farming. Today, the main economic activity is mixed farming, with crops produced including wheat, barley, sorghum and cotton. Cattle grazing is also common in the area, with a significant proportion of the properties retaining areas of native pasture within cropping and on stubble during fallow paddocks. The area is known as the 'Golden Triangle' and produces some of the country's highest crop yields.

A small number of quarries currently exist within the wider region. The closest of these is Runnymede Quarry, which is located on Gil Gil Creek Road approximately 30km south west of the proposed development. Feedlot enterprises are also scattered throughout the region. The Myola Feedlot has a maximum capacity of 20,000 head of cattle and is located approximately 7km south of the proposed development site.

3.3 Topography, Climate and Natural Features

Tikitere is located in the north-west slopes and plains in an area described as the northern basalts characterised by undulating hills traversed by numerous ephemeral streams. Slopes generally range between 1-6%. Tackinbri Creek traverses the southern edge of the property. The proposed quarry site is located at approximately 310m AHD. Tikitere's climate is best described as warm temperate. Rainfall is variable, with an annual average of 644.8mm and potential evaporation of 2,000mmm annually. The site experiences normal wind conditions in terms of direction and frequency.

3.4 Nearest Sensitive Receptors

The nearest sensitive receptors within a 5km radius of the proposed development were identified. All sensitive receptors within this radius are rural residences. The locations of the sensitive receptors are indicated in Figure 4. The separation distances of the nearest sensitive receptors from the proposed development are outlined in Table 1.

Figure 1: Tikitere Locality Plan

Figure 2: Property Plan

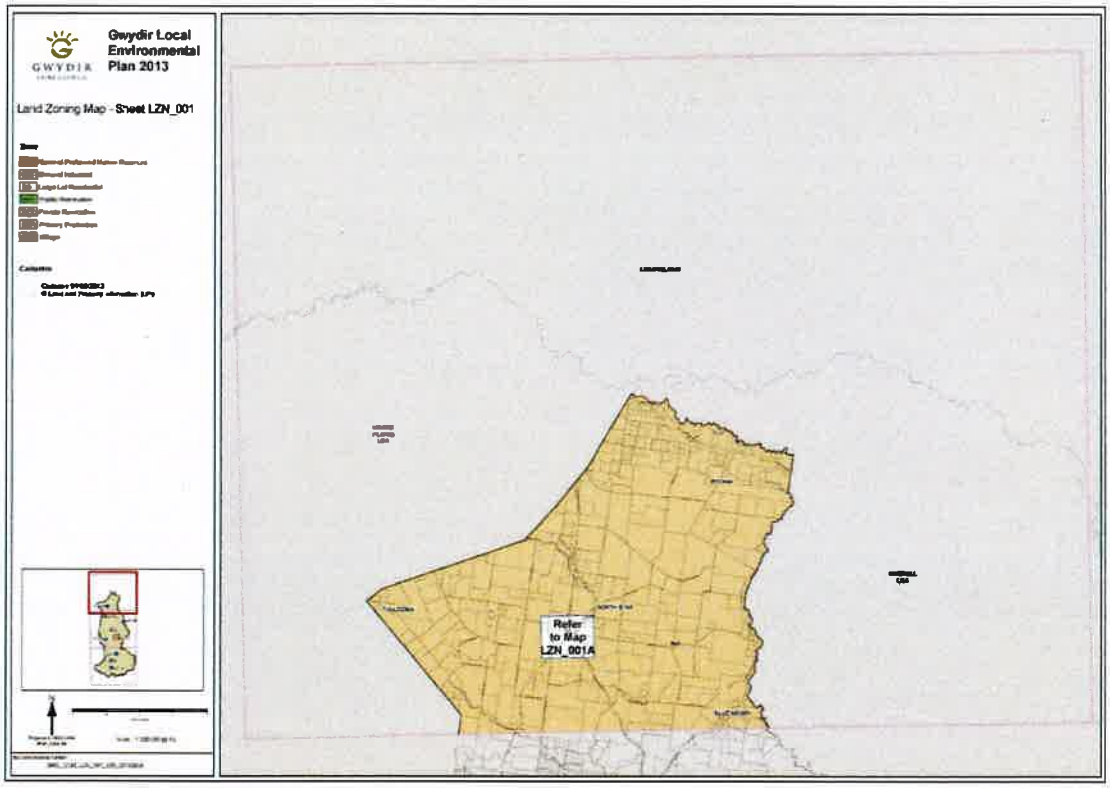


Figure 3: Land Zoning Map – Gwydir Shire Council LEP 2013

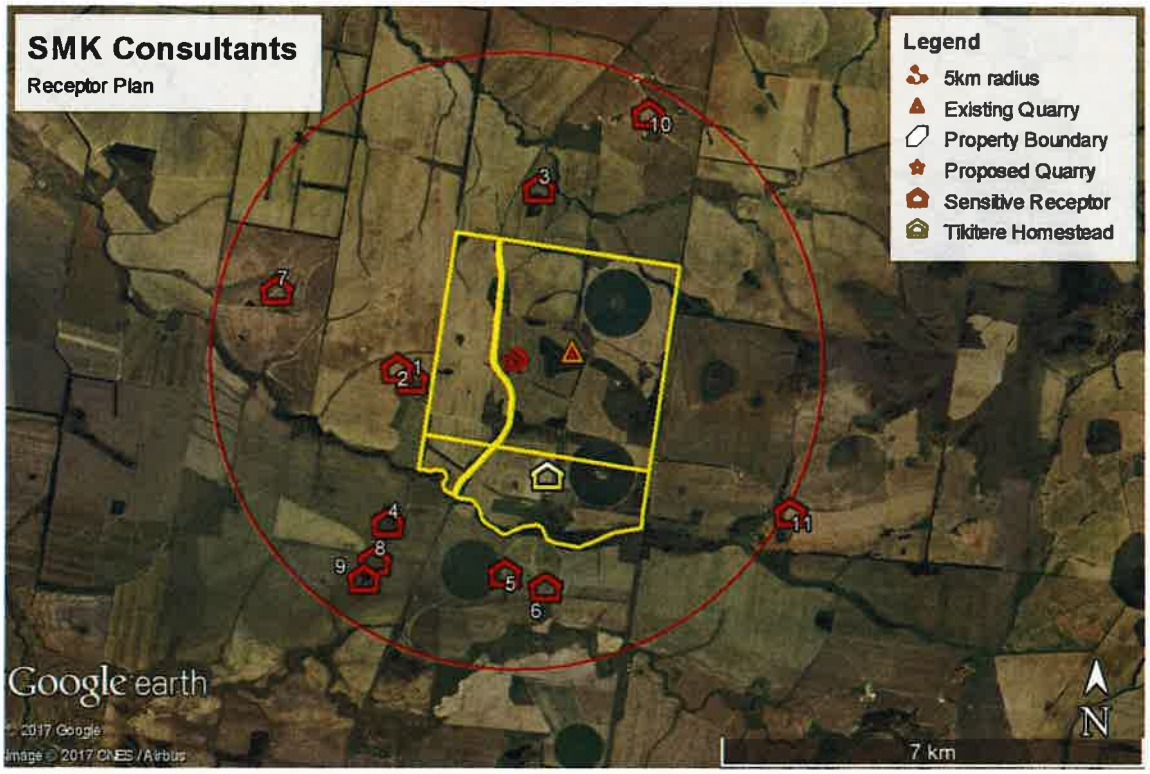


Figure 4: Locations of Nearest Sensitive Receptors to Proposed Quarry Site

Table 1: Separation Distances from Sensitive Receptors

Receptor	Receptor Type	Direction from Proposed Quarry	Distance (m)
1	Rural Dwelling	West South-west	1,770
2	Rural Dwelling	West South-west	1,851
3	Rural Dwelling	North	2,783
4	Rural Dwelling	South South-west	3,537
5	Rural Dwelling	South	3,763
6	Rural Dwelling	South	3,907
7	Rural Dwelling	West North-west	4,019
8	Rural Dwelling	South South-west	4,225
9	Rural Dwelling	South South-west	4,430
10	Rural Dwelling	North North-east	4,673
11	Rural Dwelling	South-east	5,225
North Star	Small Rural Town	North-east	10,448
Croppa Creek	Small Rural Town	South South-west	12,578

3.5 Nature of the Land Use Change and Development Proposed

Tikitere Quarry will be utilised to supply raw materials to the ARTC, to support construction of the Inland Railway Project. Initial quantities determined by the ARTC suggest a requirement for a minimum of 1,000,000 cubic metres of rail ballast material and potentially up to 500,000 tonnes of a manufactured dense graded basecourse (DGB) gravel for the reconstruction of the rail base beneath the ballast.

The proposed development involves the establishment of quarrying activities on site, including extraction of quarry materials from up to two sites on the property, in addition to the establishment of a mobile crushing plant on the western side of the quarry.

Preliminary estimates indicate that quarrying activities are intended to commence in April 2018. The ARTC further estimates that construction of the railway infrastructure to be supported by Tikitere Quarry will occur over a period of 12-24 months; it is therefore anticipated that quarrying activities on site will not exceed 24 months in duration. Following the completion of the railway construction, the site will be rehabilitated in accordance with best management rehabilitation practices.

3.5.1 The Main Activities of the Proposed Development

Extraction activities from the proposed quarry have the potential to include:

- Removal of overburden (stripping involving bulldozers, scrapers or excavators) and storage of overburden and topsoil for rehabilitation;
- Extraction of material (via methods such as drilling or mechanical methods such as hammers, rippers, bulldozers, excavators, front end loaders or hydraulic methods). Material may be temporarily stockpiled at the quarry;

- Processing on-site via portable equipment (which may involve: screening and washing for the removal of unwanted material, crushing to reduce particle size, screening/sieving to separate materials into size fractions, blending of materials with other extractive materials to achieve required characteristics); and
- Loading and transport (involving front end loaders, excavators and trucks).

Tikitere Quarry is located directly adjacent to the existing rail corridor. Therefore, transport of materials from the quarry site to the construction site will occur directly, utilising internal property roads. The potential impact of the proposed development upon the public road network is therefore primarily confined to the transport of equipment on-site at the commencement of the development, and transport off-site following the closure and rehabilitation of the quarry.

3.6 Scope of Potential Social Impacts

Identification of the scope of the potential social impact of the proposed development has been undertaken with regards to scoping methodology outlined in the Social Impact Assessment Guideline (2017) (SIA Guideline), published by the Department of Planning and Environment.

The social impact scoping assessment is presented in the associated Environmental Impact Statement. The results of the assessment indicate that the following matters are likely to experience negative social impacts in as a result of the proposed development in the absence of mitigation measures:

- Acoustic
- Aboriginal cultural
- Health
- Safety
- Air
- Biodiversity, Land, Water

These matters have each been assessed below with regards to their potential social impact, and management practices which will be implemented on site to control this impact. Overall, it is considered that each risk may be appropriately managed on site to reduce the social impact of the proposed development to an acceptable threshold.

5 Land Use Conflict Risk Assessment

5.1 LUCRA Matrix

Land Use Conflict Risk Assessment (LUCRA) is an appraisal system developed to identify the compatibility of land uses and assess the potential for land use conflict to occur between adjoining land uses.

The LUCRA process uses a "probability and consequence" risk ranking matrix to estimate the potential for land use conflict. This is the LUCRA table in its raw form:

Likely consequence from a dispute or conflict arising over the land use or activity	Likelihood of a dispute or conflict arising over the land use or activity.		
	Very likely	Likely	Unlikely
Major consequences & impacts likely	HIGH	HIGH	MEDIUM
Modest or periodic consequences & impacts likely	HIGH	MEDIUM	LOW
Minimal consequences & impacts likely	MEDIUM	LOW	LOW

Figure 5: Table 10 'Land Use Conflict Risk Assessment' in the Living and Working Rural Areas Handbook

5.1.1 Risk Ranking

The consequences of a development on the environment, public health and amenity are assessed according to this table:

Table 2: Measure of Consequence

Level	Descriptor	Description
1	Severe	• Severe and/or permanent damage to the environment/ public health and/ or amenity • Irreversible • Neighbours are in prolonged dispute and legal action involved
2	Major	• Serious and/or long-term impact to the environment/public health and/or amenity • Long-term management implications • Neighbours are in serious dispute
3	Moderate	• Moderate and/or medium term impact to the environment/ public health and/ or amenity • Some ongoing management disputes • Neighbours disputes occur

Level	Descriptor	Description
4	Minor	• Minor and/or short-term impact to the environment and/ or community • Can be effectively managed as a part of normal operations • Infrequent disputes between neighbours
5	Negligible	• Very minor impact to the environment and/ or community • Can be effectively managed as a part of normal operations • Neighbours disputes unlikely

The following table is used to score the likelihood of the consequence occurring:

Table 3: Probability Table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or 'it has happened'
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

The result is a risk rating matrix:

Table 4: Risk Ranking Matrix

PROBABILITY	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

Ranking is given before and after ameliorating measures are applied to mitigate the given activity impacts.

5.2 Risk Evaluation

This section is arranged as a schedule addressing a potential land use conflict in terms of:

- **Source of Potential Land Use Conflict –** identified in Table 4
- **Existing Risk –** what potential risks exist, without any mitigating measures at all; identified in Table 4
- **Risk Rating –** what is the risk level, as per the land use conflict risk assessment matrix; identified in Table 4
- **Mitigation Measures –** what can be done to reduce risks of land use conflict; identified in Section 4.3
- **Controlled Rating –** what is the risk level likely to be with mitigation measures in place; identified in Section 4.4

Table 5: Initial Risk Evaluation

Source	Identified Potential Conflict	Risk Ranking*
Dust from extraction and processing facilities	Dust generated by machinery, heavy vehicle movements or quarry activities may impact on neighbouring properties, particularly rural residences.	21
Noise from extraction and processing activities	Noise generated by machinery, heavy vehicle movements or quarry activities may impact on neighbouring properties, particularly rural residences.	13
Aboriginal cultural heritage impacts as a result of quarry activities	Accidental harm to Aboriginal cultural heritage items on site has the potential to impact upon local indigenous populations and result in disputes.	13
Health and safety impacts as a result of workplace hazards on site	Injury of workers on site may undermine the Quarry's 'social licence' to operate within the region and result in disputes.	22
Environmental degradation as a result of quarry activities	Environmental harm as a result of the proposed development (such as through vegetation clearing, erosion from the site and sedimentation of waterways) may result in dispute between neighbours.	13

*Risk ranking as calculated prior to any mediation or management of risk.

5.3 Risk Reduction Controls

Potential conflicts have been initially managed through the siting of the quarry and good management. The following management strategies and controls will be implemented to reduce the risk of identified sources causing conflict.

5.3.1 Dust Controls

A comprehensive suite of dust management controls will be implemented on site to limit dust generation from the quarry. These management practices are outlined in Table 6.

Table 6: Dust Mitigation Methods to be Adopted at Tikitere Quarry

Potential Impact Site	Methods to Control Air Pollution
Roads	• Dust suppression by watering. • Covered loads when transporting and watering of haul roads. • Grading of roads. • Well-defined haul routes to minimise area of disturbance. • Speed limits (recommended 40km/h).
Wind Erosion of Exposed Materials and Stockpiles	• Dust suppression by watering. • Minimising areas of disturbance. • Progressive rehabilitation.
Crushing, Screening and Handling	• Ensure dust covers in place. • Ensure water sprays are activated for dust management.

Potential Impact Site	Methods to Control Air Pollution
Loading and Handling Materials	• Keep front-end loader bucket low when handling and transporting materials.
Trucks	• Dust suppression by watering. • Covered loads when transporting and watering of haul roads.
Monitoring and Proactive Management	• Monitor meteorological conditions. • Cease activity on dry windy days. • In the event of increased dust production, increased dust suppression management measures, including by increasing watering rates, decreasing processing rates, slowing truck speeds and ensuring that dust housing protections remain in place. • Initiate Shut down procedures during periods of excessive dust generation or upon receipt of complaint and investigate and initiate additional controls.

The dust management practices outlined in Table 6 are consistent with best management practices for the prevention and/or minimisation of particulate matter from mining sites (as described in Donnelly *et al* 2011). It is considered that this suite of management methods will be sufficient to control excessive dust emissions from the quarry site.

5.3.2 Noise Controls

Noise impacts may occur in association with the construction and establishment phase of the quarry, and ongoing quarry operations.

The primary noise disturbance associated with the construction and establishment phase of the quarry relates to traffic noise, as equipment is transported onto the quarry site. Traffic noise will be controlled by the following measures:

- Limiting construction hours to between 6am and 6pm, Monday to Saturday; and
- Requesting truck drivers not to use engine brakes whilst entering/exiting the property.

Noise management practices will be implemented on site during standard quarry operating conditions to minimise the impact of the quarry upon the amenity of the surrounding regions. Management practices include:

- Implementing standard quarry operating hours of 6.00am to 6.00pm Monday to Saturday, with no work on Sundays or public holidays; and
- Fitting machinery with compliant mufflers, to minimise machinery noise as far as practicable.
- Ensuring that equipment and the plant are operated in a quiet and efficient manner.
- Scheduling high noise generating activities for less sensitive times of the day (for example: scheduling maintenance or plant downtime to coincide with more sensitive periods during early morning and late afternoon.

- Requesting truck drivers not to use engine brakes whilst entering/exiting the property.
- Carefully check all plant and equipment to ensure that they are correctly tuned and well maintained to meet manufacturers specifications.
- Conduct environmental noise awareness inductions for all contractor employees and subcontractors.
- Conduct ongoing on the job training for each specific job task.

5.3.3 Buffers

The most effective means of preventing conflict is to plan for adequate separation between conflicting land uses.

The recommended minimum buffers for extractive industries were included in Chapter 6 of the *'Living and Working in Rural Areas'* Handbook. The following table summarises the applicable buffer distances.

Table 7: Recommended Minimum Buffer Distances

Mining, Petroleum Production & Extractive Industries	
	Normal Operations (m)
Residential areas & urban development	500
Rural dwellings	500
Education facilities & pre-schools	500
Rural tourist accommodation	500
Watercourses & wetlands	SSD
Bores & wells	SSD
Potable water supply/catchment	SSD
Property boundary	SSD
Roads (public)	SSD

SSD: Site Specific Determination

The separation distances outlined represent a synthesis of existing recommended and best practice minimum buffer distances. This includes: the Lismore Council Development Control Plan Chapter 11 – Buffer Areas, the Tweed Shire Development Control Plan, the Nambucca Shire Council Development Control Plan 16 – Rural Buffers, and recommendations from the NSW Department of Primary Industries and Mineral Resources. These distances are considered to reduce the potential for land conflicts and protect the values of key environmental assets and rural production areas.

5.3.4 Aboriginal Cultural Heritage Protection

A Due Diligence assessment has been carried out on site in accordance with legislative guidelines to assess the presence of Aboriginal cultural heritage on site. The result of the assessment indicated that there are no known items or places of Aboriginal heritage significance on the site.

However, there is nonetheless potential that artefacts of Aboriginal cultural heritage may be discovered on site during the course of quarry activities. In the event that Aboriginal objects are uncovered during quarrying activities on site, the following protocol will be followed:

Steps to be undertaken if a site or object of Aboriginal origin is identified involve:

- *If any object is found suspected to be of Aboriginal origin, work in that location must cease.*
- *Notify Office of Environment and Heritage on 131 555*
- *The site must be inspected by a person suitably experienced in identifying Aboriginal cultural material.*
- *Work may continue at a suitably distant location, not closer than 50m to the potential Aboriginal object.*
- *In the event that an object of Aboriginal origin is identified, appropriate action should be undertaken by the Proponent for the preservation of this site, or alternatively retain the services of an archaeologist to apply for an AHIP.*
- *If bones are uncovered, NSW Police should be immediately notified.*

In accordance with the National Parks and Wildlife Act 1974, Aboriginal objects include:

- *physical objects, such as stone tools, Aboriginal-built fences and stockyards, scarred trees and the remains of fringe camps*
- *material deposited on the land, such as middens*
- *the ancestral remains of Aboriginal people.*

The above protocol is consistent with the Office of Environment and Heritage's requirements with regards to the protection of items of Aboriginal cultural heritage on development sites. Therefore, adoption of the above protocol will ensure that the risk of harm to indigenous artefacts on site is minimised as far as practicable, such that the development does not pose a risk to indigenous heritage.

5.3.5 Health and Safety Management Measures

The proposed quarry will establish a comprehensive safety management system on site, known as the Mine Safety Management System. A Mine Safety Management System is an overarching management plan, which incorporates consideration of:

- Legislation;
- Regulations;
- Rules and Schemes prepared under legislation and regulations; and
- Codes, guidelines or standards which are used to manage and maintain a safe work environment.

Establishment of the management system will be the responsibility of the Mine Operator. All employees, contractors and visitors to the site will be required to comply with the management system to ensure that standards of workplace health and safety are maintained in accordance with best management practices.

These measures are considered to be sufficient to ensure that the proposed development does not pose a risk to health and safety of peoples present within the site.

5.3.6 Environmental Protection

Uncontrolled quarry activities have the potential to pose a risk to environmental values, through land clearing associated with establishment of the quarry, potential groundwater impacts in the event of a shallow groundwater table and through erosion from the quarry site, resulting in sedimentation of the surrounding environment and waterways.

The proposed development will adopt a suite of environmental management methods to reduce the impact of the proposed quarry. These are outlined in Table 8.

Table 8: Environmental Management Methods at Tikitere Quarry

Potential Environmental Impact	Methods to Control Environmental Impact
Land Clearing of Quarry Site	• Assessment of quarry footprint in accordance with the Biodiversity Assessment Method (BAM) under the Biodiversity Conservation Act. • Establishment of biodiversity offsets in accordance with findings of the BAM assessment. • Rehabilitation of the subject site following the conclusion of quarry operations.
Groundwater Impacts	• The quarry has been sited to avoid impacting groundwater. • Examination of available groundwater data indicates there are no shallow aquifers beneath the quarry site. Therefore, dewatering will not be required to conduct quarry operations on site. • The depth of groundwater at the site is such that the quarry is not considered to pose a risk of groundwater contamination. • The nearest known Groundwater Dependent Ecosystems (GDEs) are located over 5km from the proposed quarry site. GDEs will be protected from impact, by protecting groundwater resources and surface water resources (discussed below).
Erosion and Sedimentation	• The subject site is located above the 1 in 100 flood height, and therefore is not considered to be at risk of flooding. • The quarry site will be located within a Controlled Drainage Area (CDA). Runoff from the site will be captured and held in a sediment pond, such that surface water with elevated sediment loads is not discharged to the surrounding environment.

Potential Environmental Impact	Methods to Control Environmental Impact
	• Diversion banks will be installed to divert clean surface water from the surrounding environment around the quarry site, to prevent contamination.

5.4 Mitigated Risk Ratings

In accordance with the LUCRA Assessment Guide, the objective for mitigation is to lower the risk ranking score to 10 or below. The method of control and revised risk ranking for each identified potential conflict is summarised in Table 6.

Table 9: Management Strategy – Update Following Noise Assessment Results

Identified Potential Conflict	Management Strategy (Method of Control)	Revised Risk Ranking	Performance Target
Dust generated by machinery, heavy vehicle movements or quarry activities may impact on neighbouring properties, particularly rural residences.	Listed in Section 4.3.1; 4.3.3	8	10
Noise generated by machinery, heavy vehicle movements or quarry activities may impact on neighbouring properties, particularly rural residences.	Listed in Section 4.3.2; 4.3.3	4	10
Aboriginal cultural heritage impacts as a result of quarry activities.	Listed in Section 4.3.4	5	10
Health and safety impacts as a result of workplace hazards on site.	Listed in Section 4.3.5	9	10
Environmental harm as a result of the proposed development (such as sedimentation of waterways) may result in dispute between neighbours.	Listed in Section 4.3.6	9	10

This target has been achieved with respect to the identified risks.

6 Results

This LUCRA has identified and assessed several potential sources of land use conflict. Sources of conflict include dust generation, noise emissions and potential environmental harm as a result of quarry activities.

Subject to appropriate risk mitigation measures being implemented through development controls and engineering/construction design, all potential land use conflict activities can be reduced to a "low" risk rating. Sources of potential conflict which will require mitigation are:

- Quarry dust and noise during construction and operation. This can be addressed through available separation distances and the implementation of a site management plan.
- Traffic Noise along Croppa Creek-North Star Road. This can be addressed by limiting construction hours. Once operational, the development will have minimal impact on the roads as the commodity will be transported via internal roads and the railway network.
- Aboriginal cultural heritage. This may be protected by ensuring that all quarry personnel are aware of their legal responsibilities in ensuring the protection of Aboriginal heritage on site and are aware of appropriate protocols to follow in the event that heritage material is discovered on site during the course of the development.
- Health and safety. This may be protected by implementing a comprehensive Mine Safety Management System and ensuring that all personnel on site are aware of, and comply with, the requirements of the Management System.
- Environmental protection issues. These can be addressed through appropriate site assessment, offsetting and rehabilitation measures, stormwater management and sediment and erosion controls.

The proposed mitigation measures are specific, easily understood, easily designed and relatively easy to implement. With these measures in place the potential for land use conflict will be unlikely and of minimal consequence.

7 Conclusions and Recommendations

The land use conflict risk assessment has identified a suite of potential sources of land use conflict and has proposed a series of management strategies to minimise the impact of these activities. Risk mitigation strategies include:

- Appropriate siting of the quarry with adequate buffer distances in place from nearest sensitive receptors;
- Implementation of management strategies to minimise noise and dust emissions;
- Implementation of a Mine Safety Management System to ensure protection of the health and safety of employees and visitors on site;
- Adoption of heritage protection protocols to ensure protection of Aboriginal cultural heritage, in the event that heritage items are discovered during the course of quarry operations;
- Siting of the quarry site at a location such that it is not within a flood zone and will not result in disturbance of groundwater resources;
- Design of the quarry site to minimise environmental impacts through the establishment of a Controlled Drainage Area; and
- Creation of site rehabilitation plans to ensure the long-term protection of environmental resources.

Overall, adoption of risk management strategies have resulted in a minor risk of the occurrence of land use conflict. On the basis that the risks are able to be adequately mitigated it is recommended that the proposed development process, subject to the implementation of the recommended mitigation measures.

Appendix 7: Aboriginal Heritage Information Management System Search Results

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 17-146

Client Service ID : 304442

SMK Consultants

P O Box 774
Moree New South Wales 2400

Attention: Hayley Greenham

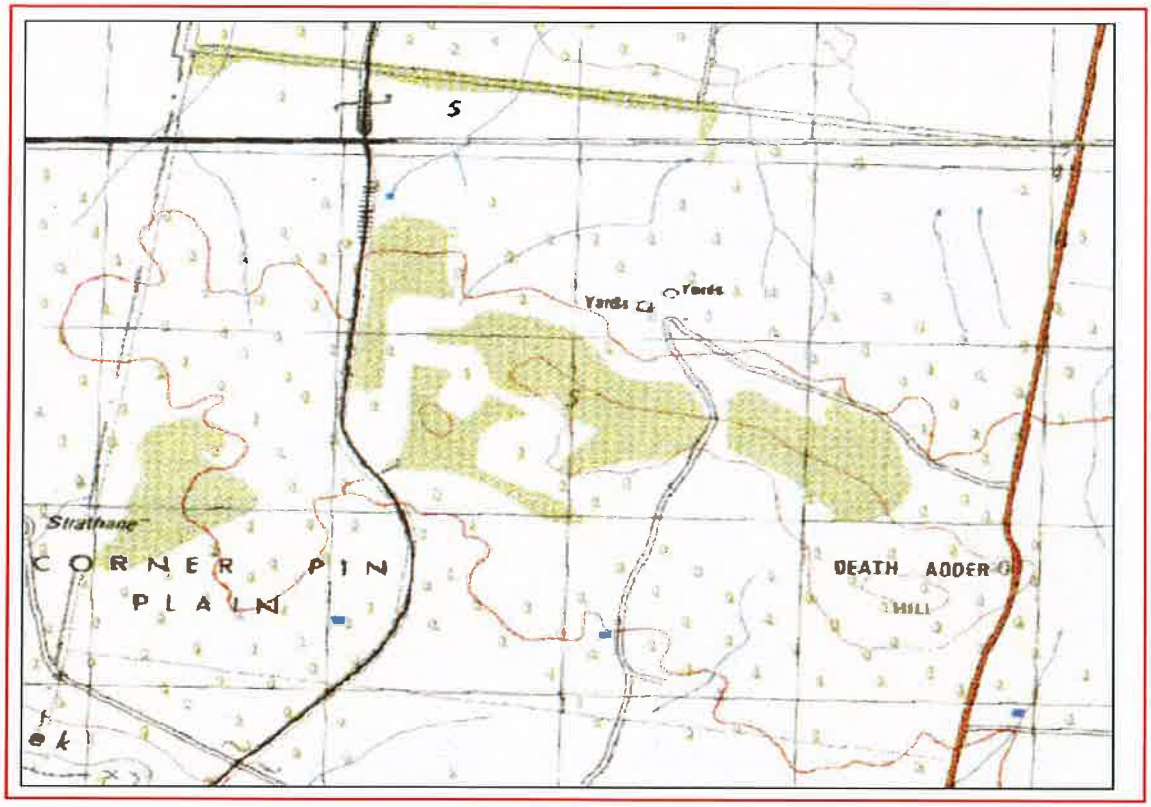
Email: hayley@smk.com.au

Date: 29 September 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 5, DP:DP755984 with a Buffer of 50 meters, conducted by Hayley Greenham on 29 September 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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