GROUNDWORK plus

MEPPEM QUARRY

ENVIRONMENTAL IMPACT STATEMENT

Prepared for:
John Meppem

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Recipient	
John Meppem	1e
Moree Plains Shire Council	1e

Groundwork Plus ABN: 80 829 145 906

Queensland
6 Mayneview Street, Milton Qld 4064
PO Box 1779, Milton BC, Qld 4064
P: +61 7 3871 0411
F: +61 7 3367 3317

South Australia
2/1 First Street, Nuriootpa SA 5355
PO Box 854, Nuriootpa SA 5355
P: +61 8 8562 4158

E: info@groundwork.com.au

TABLES

FIGURES

DRAWINGS

2519.DRG.002	Site Location
2519.DRG.003	Site & Surrounds
2519.DRG.004	Conceptual Site Layout Plan
2519.DRG.005	Conceptual Quarry Development Plan
2519.DRG.006	Conceptual Final Landform
2519.DRG.006A	Conceptual Final Landform Cross Sections A and B
2519.DRG.006B	Conceptual Final Landform Cross Sections C and D
2519.DRG.011	Haul Route to the Newell Highway
2519.DRG.012	Proposed Vegetation Clearing Stages

ATTACHMENTS

Attachment 1	Secretary's Environmental Assessment Requirements
Attachment 2	Site Office
Attachment 3	Amenities Building
Attachment 4	Environmental Management Plan
Attachment 5	Biodiversity Impact Assessment Report
Attachment 6	Aboriginal Cultural Heritage Assessment Report
Attachment 7	European Heritage Assessment Report
Attachment 8	Surface Water Assessment
Attachment 9	Air Quality Assessment
Attachment 10	Noise and Blasting Assessment
Attachment 11	Traffic Impact Assessment
Attachment 12	Resource Assessment
Attachment 13	Council Water Supply Letter
Attachment 14	Polo Citrus Information

Executive Summary

John Meppem (the proponent) proposes to establish a hard rock quarry (the proposal) at Manamoi Road, Bellata, New South Wales on the land identified as Lot 10 DP751753 and Lot 110 DP257328 (the site). The site is approximately 9 kilometres east of the Inland Rail Project (IRP) and approximately 50 kilometres North of Narrabri, 44 kilometres south of Moree and 10 kilometres north-east of Bellata, in New South Wales (refer Figure 1 – Site Location and Figure 2 – Site & Surrounds).

The proposal is not classified as a State Significant Development (SSD), pursuant to the *State Environmental Planning Policy (State and Regional Development) 2011*, as the extraction volume is 490,000 tonnes per annum, the total available resources is less than 5 million tonnes and extraction will not occur from an environmentally sensitive area of State significance. The proposal is 'Designated Development' as described in Part 1, Section 19 of Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) for 'Extractive Industries'. Therefore, under Part 4, Division 2 of the *Environmental Planning Act and Assessment Act 1979* (EP&A Act) development consent is required.

The proposal will extract 490,000 tonnes of material per annum, consent is being sought for a period of up to ten (10) years, subject to the progress of the IRP and associated road upgrade projects, not including any necessary time for completion of any rehabilitation works once the resource is exhausted. The proposal includes extraction, processing, stockpile and water management areas of 8.34ha with vehicular access being obtained from Manamoi Road (refer Figure 3 – Conceptual Site Layout Plan and Figure 4 – Conceptual Quarry Development Plan). The proposal includes a construction phase and an operational phase. The proposal would impact a total of 7.5ha of existing native vegetation over three clearing stages and the proponent intends to retire the offset obligation for each vegetation clearing stage separately. The haul route to the Newell Highway is north via Manamoi Road, Boo Boo Road, Gurley Creek Road into the township of Gurley.

The proposal would produce a number of products, suitable for the needs of the IRP and associated road upgrade projects. Upon completion of supply of materials to the project, the operation of the quarry will be rehabilitated to a suitable landform for continuing rural activities (refer Figure 5 – Conceptual Final Landform and Figure 6 – Conceptual Final Landform Cross Section A and B and Figure 7 – Conceptual Final Landform Cross Section C and D).

The proposal would contribute to local employment and training opportunities through direct and indirect employment opportunities, including creation of new project specific positions, in addition to non-direct employment growth for local businesses supplying good and services to the IRP. Archaeology and historic heritage, traffic, biodiversity, noise and air quality, vibration and surface water are key aspects of the proposal which could potentially cause environmental impacts. Accordingly, these matters were considered in further detail through a series of specialist assessment reports. The assessment of heritage, biodiversity, noise and air quality found that the proposal would either avoid areas of significance or would require only minimal management measures to minimise and mitigate the risk of potential impacts. The assessment of potential traffic impacts determined that the there is sufficient capacity in the local road network to accommodate the vehicle movements generated by the proposal subject to the reasonable works and a contribution to road maintenance as required by Moree Plains Shire Council.

This Environmental Impact Statement (EIS) has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued by the Secretary of the Department of Planning and Environment on 24 August 2018 (refer Attachment 1 – Secretary's Environmental Assessment Requirements).

This version of the EIS has been prepared due to a revision to the proposal as follows:

1. The haulage route of the proposal has changed and now relies only on local roads under the control of Moree Plains Shire Council to reach the Newell Highway via Manamoi Road, Boo Boo Road and Gurley Creek Road;
2. The internal access road from the quarry footprint to Manamoi Road has been moved to the middle of the site to address concerns previously raised by the landowner to the west regarding perceived potential noise, dust or surface water impacts from the internal access road; and
3. Vegetation clearing for the development would occur in 3 vegetation clearing stages; and
4. Financial contributions for biodiversity offsets would be made in 3 corresponding stages; and
5. In the event that the proposal is not self-sufficient for water, the proposal will source water for dust suppression from Moree Plains Shire Council or other appropriately licenced water suppliers rather than groundwater bores as originally proposed.

Figure 1 – Site Location Plan

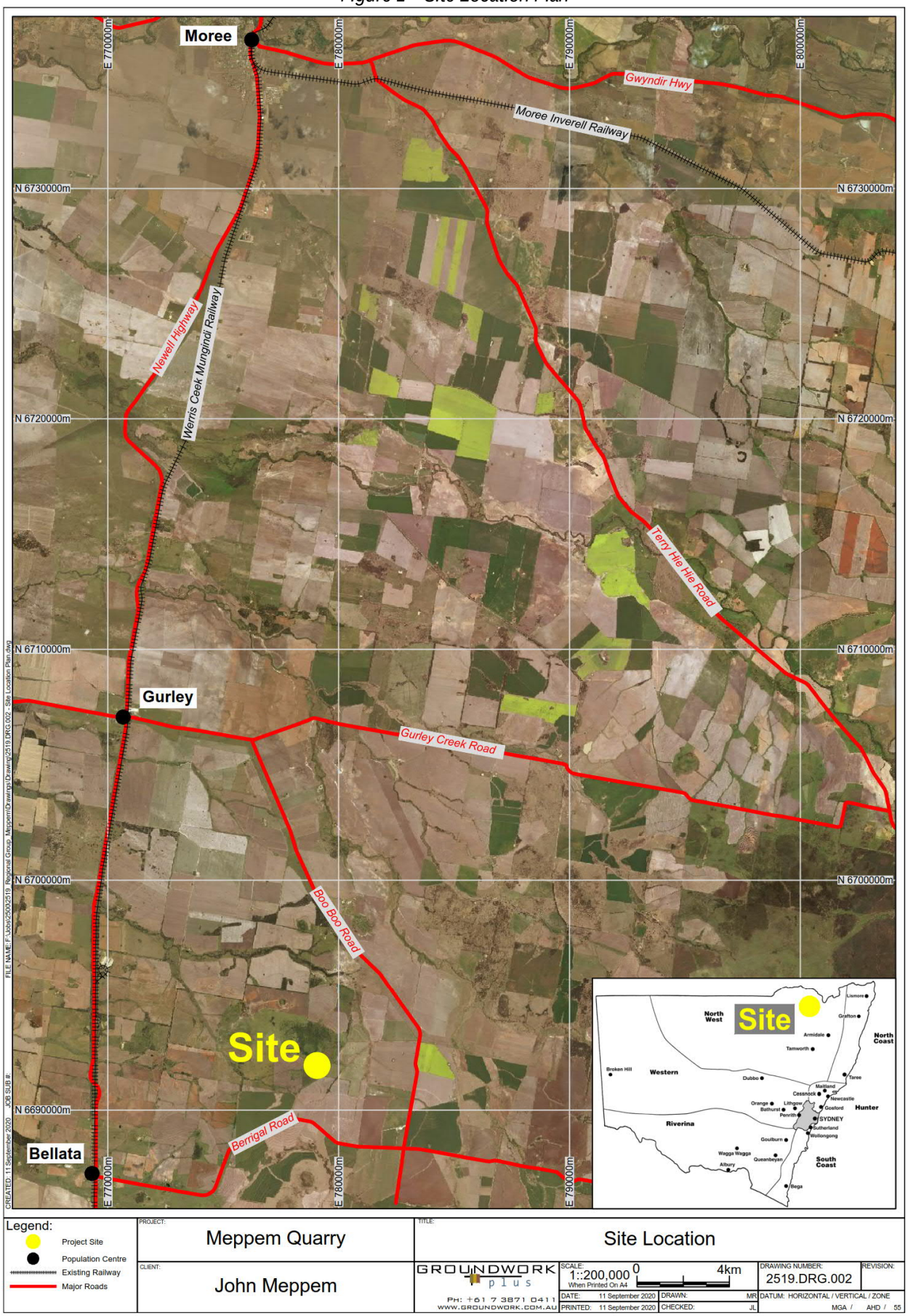


Figure 2 – Site & Surrounds

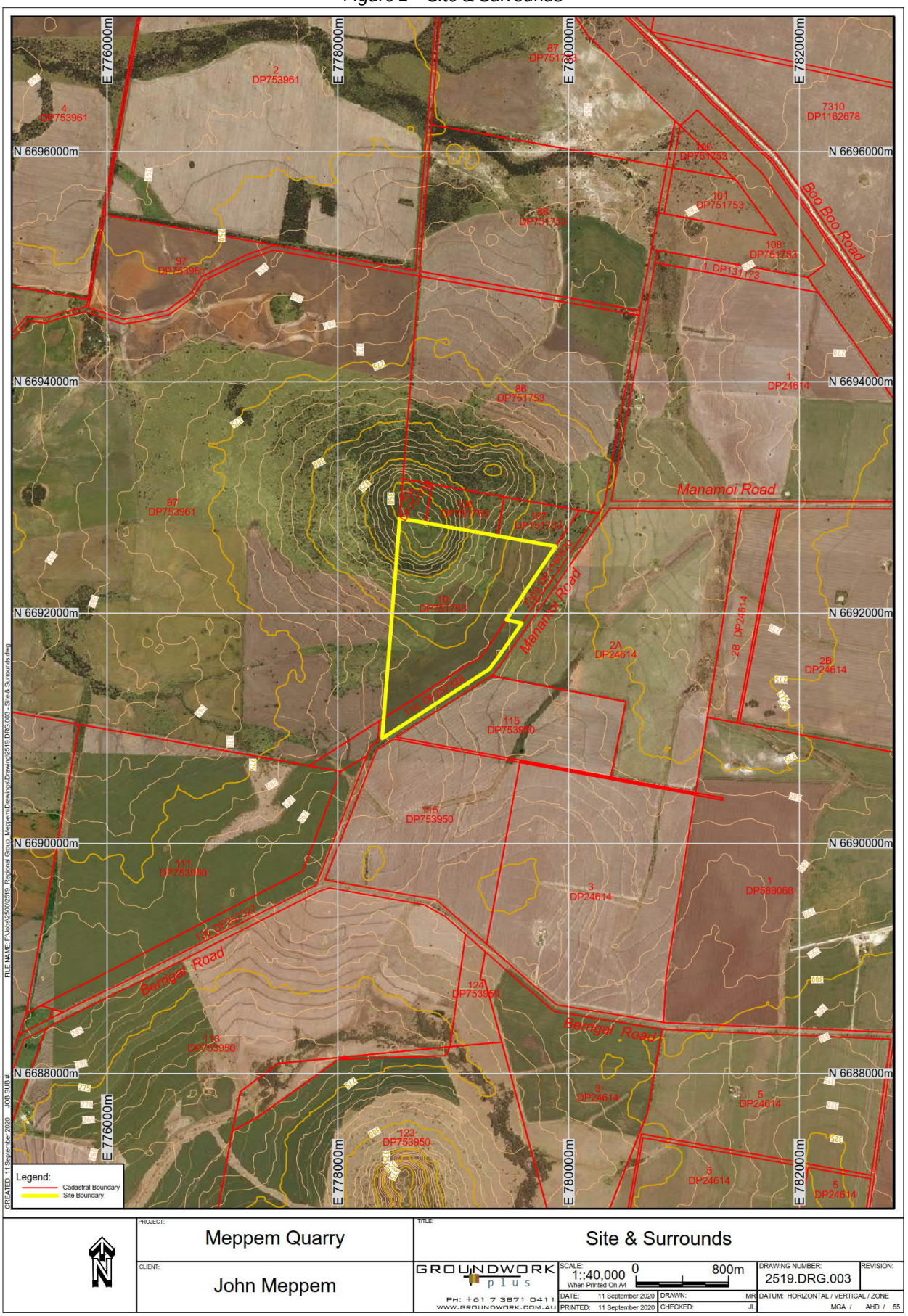


Figure 3 – Conceptual Site Layout Plan

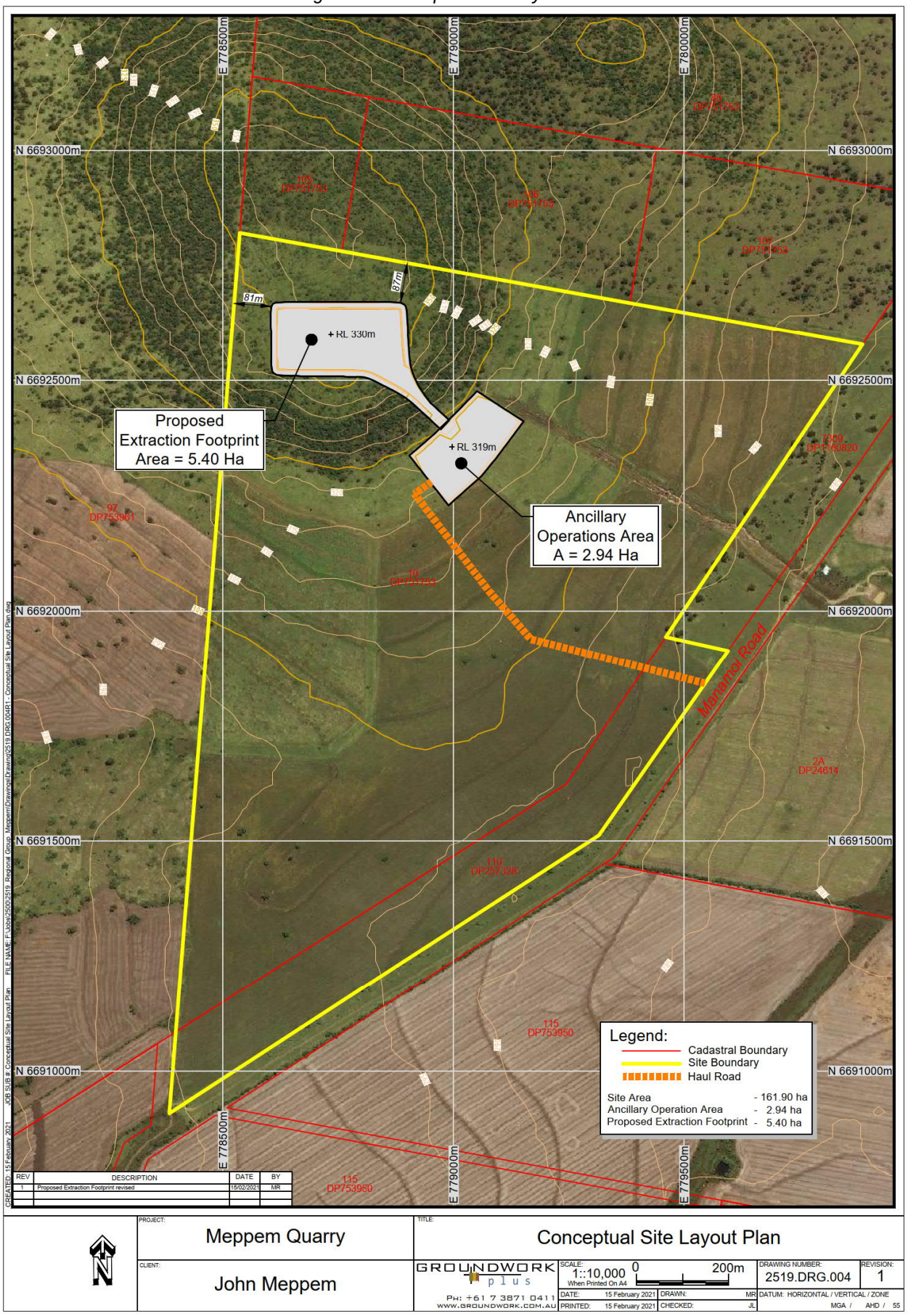


Figure 4 – Conceptual Quarry Development Plan

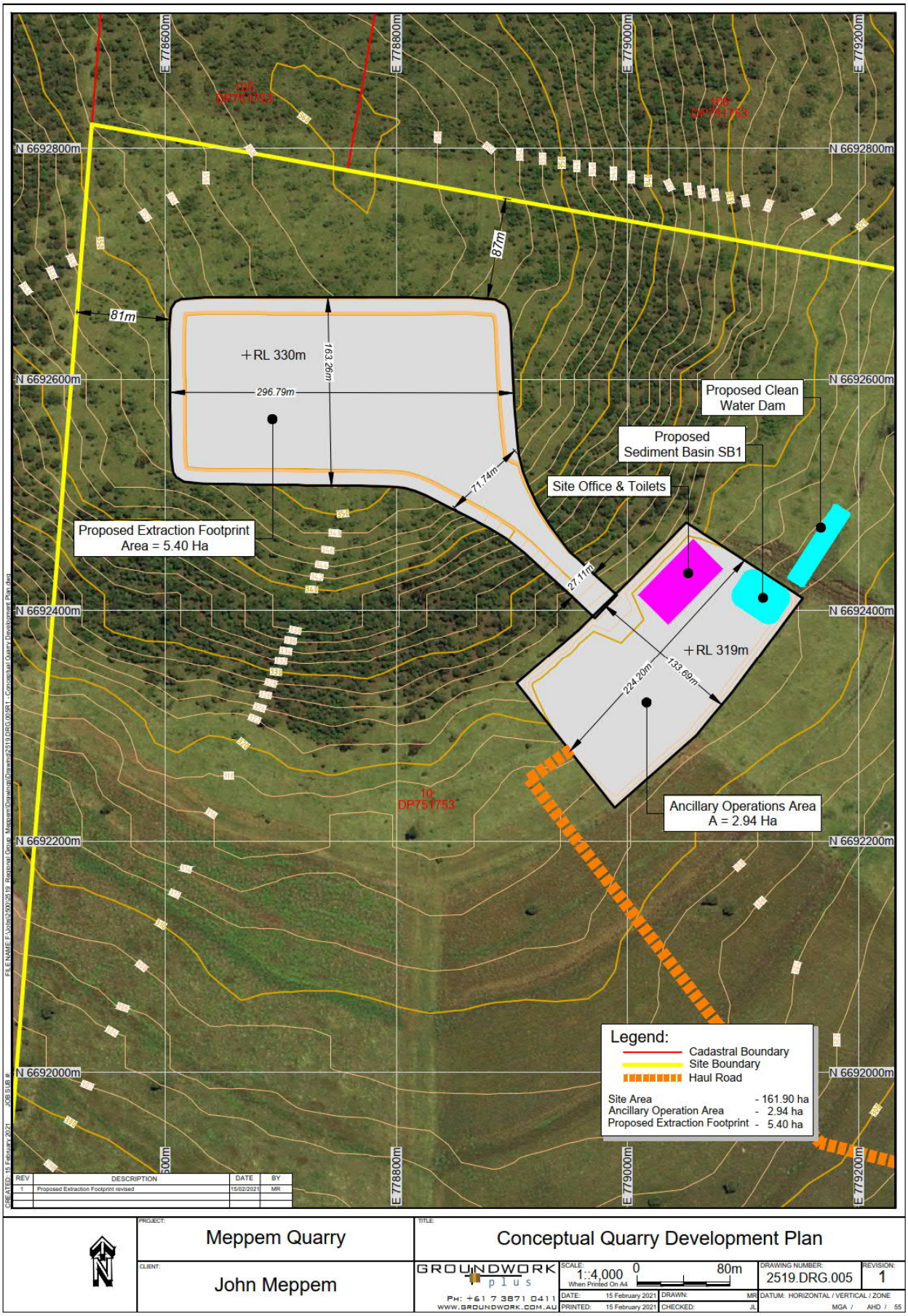


Figure 5 – Conceptual Final Landform

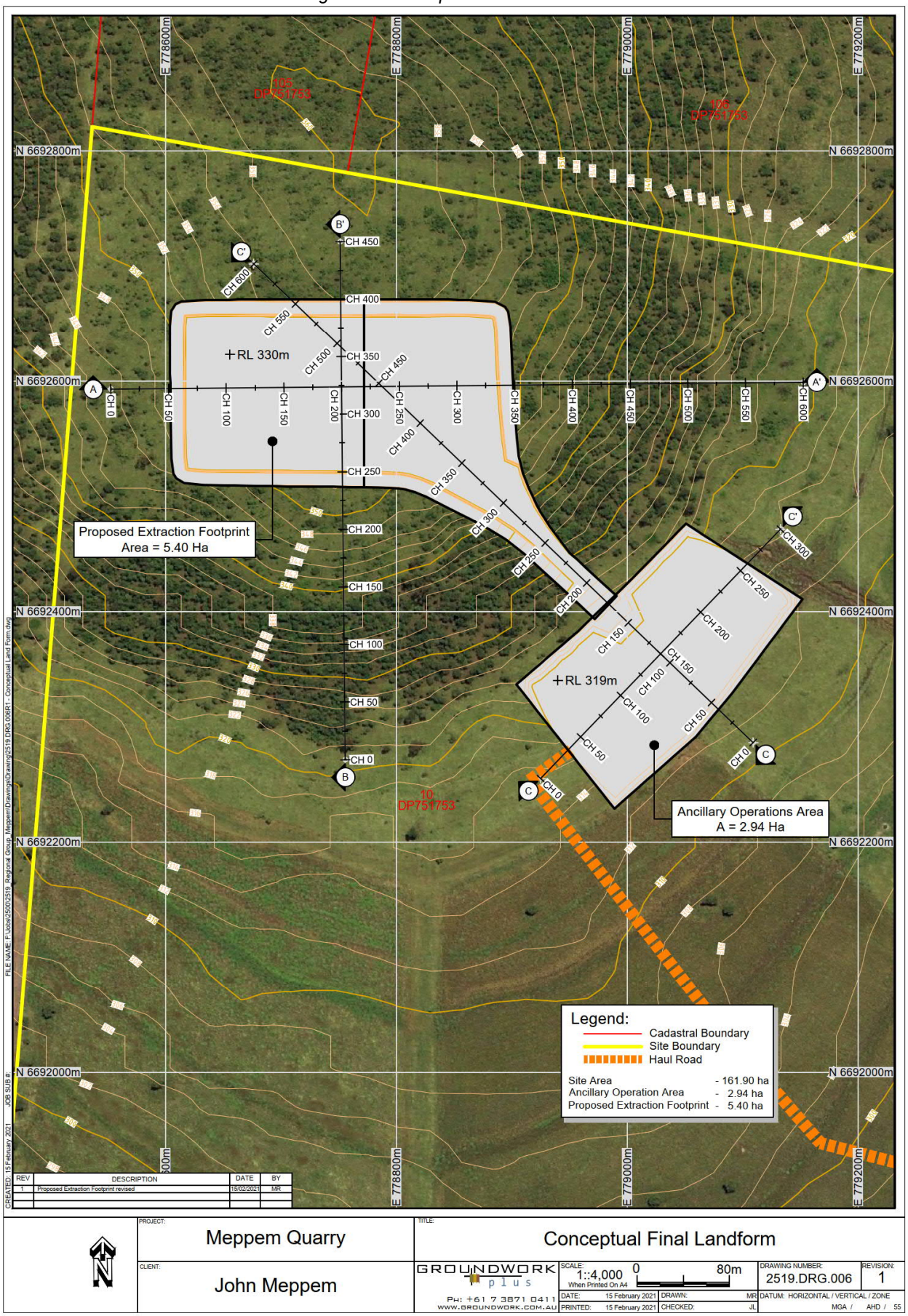


Figure 6 – Conceptual Final Landform Cross Section A and B

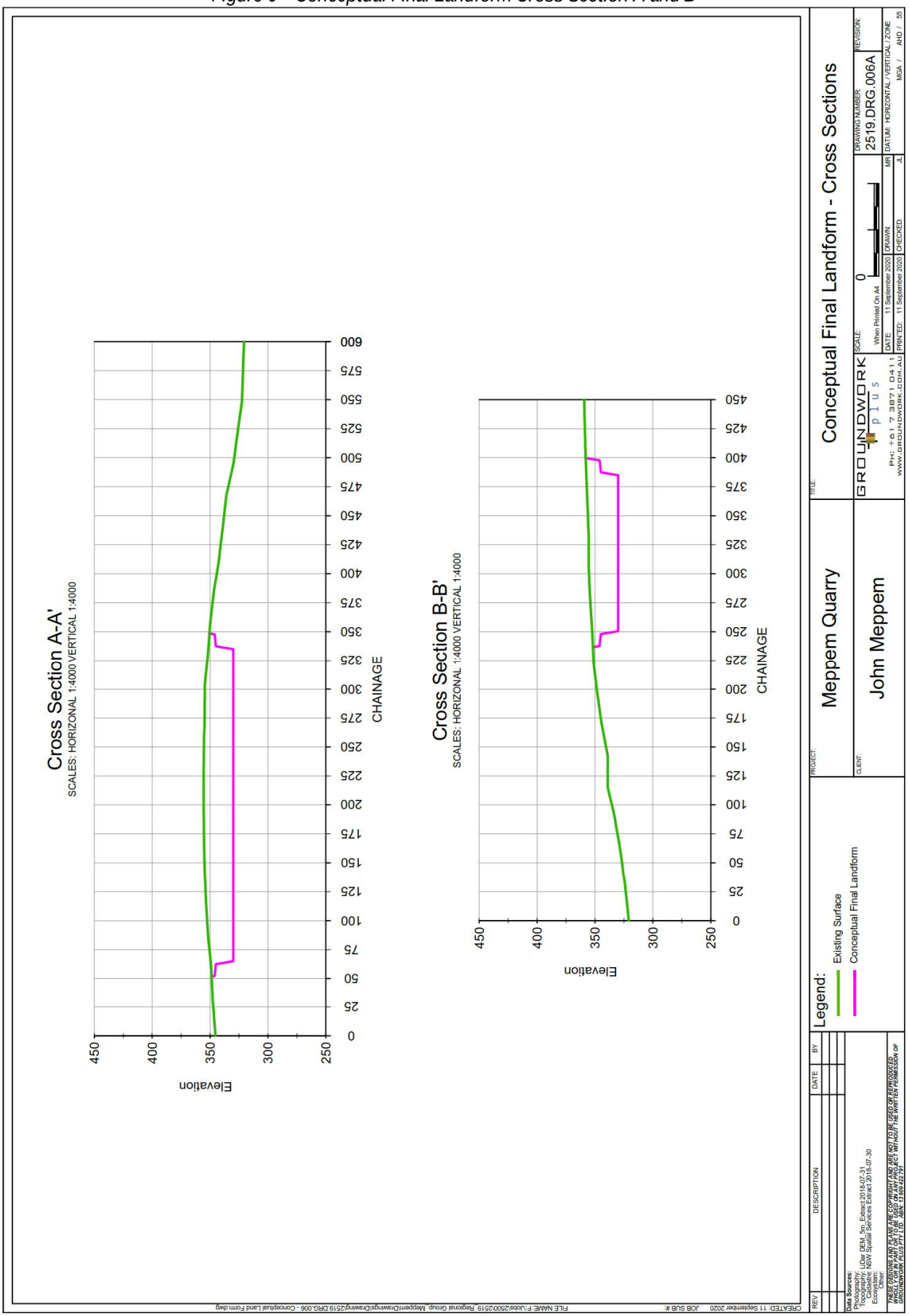
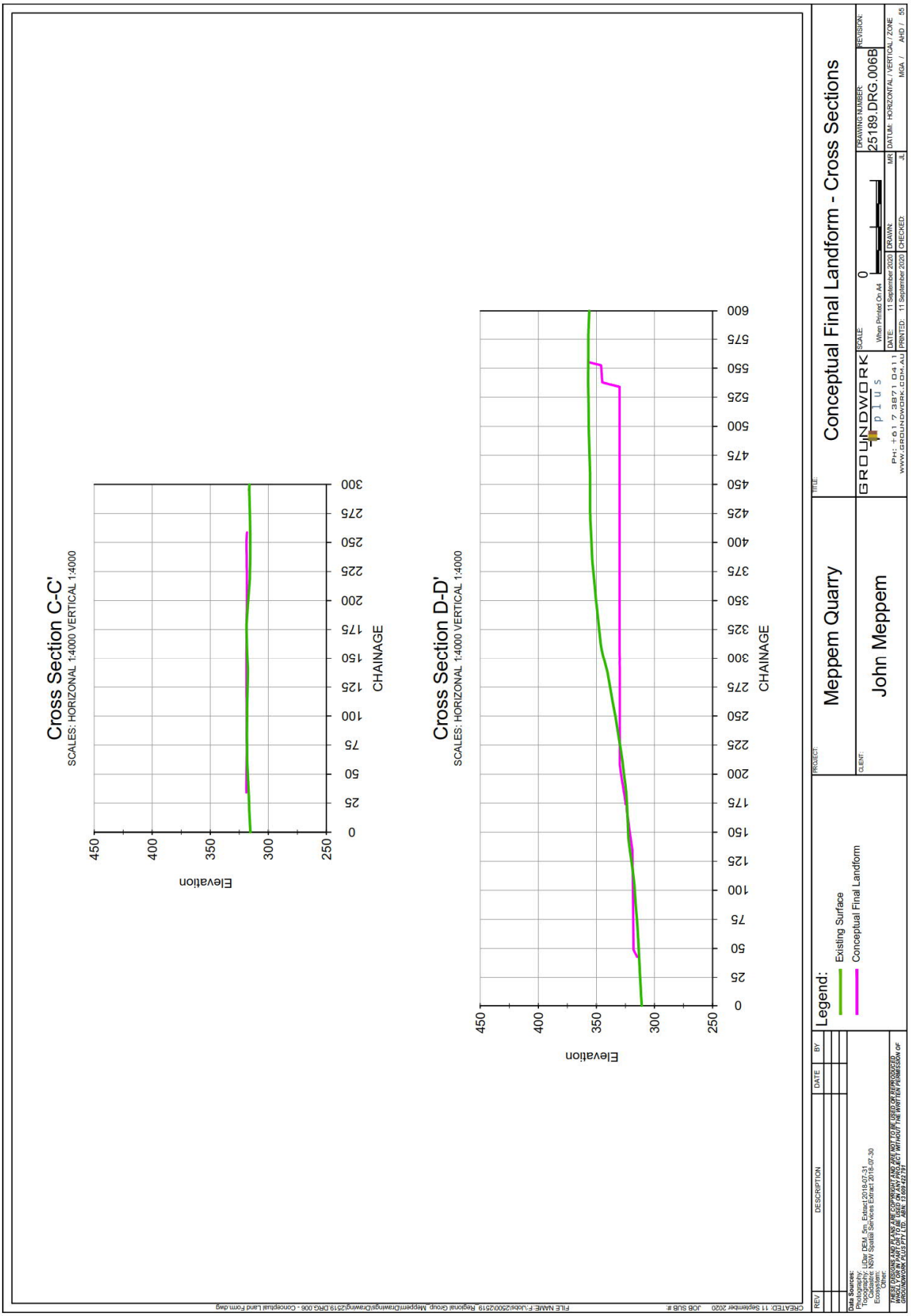


Figure 7 – Conceptual Final Landform Cross Section C and D



1. Introduction

Groundwork Plus has been commissioned to prepare this Environmental Impact Statement (EIS) on behalf of John Meppem (proponent). The EIS has been prepared for a Development Application to the Moree Plains Shire Council to establish and operate a 490,000 tonne/year hard rock quarry (the proposal) to supply the Australian Rail Track Corporation's Inland Rail Project (SSI 7474) (IRP). Road and Maritime Service (RMS) are also undertaking a number of road upgrades in the area in association with the IRP which the proposal will also supply. The site is located at Manamoi Road, Bellata, New South Wales on the land formally described as Lot 10 DP751753 and Lot 110 DP257328 (the site).

An EIS is required as the proposal is 'Designated Development' as described in Part 1, Section 19 of Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) for 'Extractive Industries'.

The proposal will extract 490,000 tonnes of material per annum, consent is being sought for a period of up to ten (10) years, subject to the progress of the IRP and associated road upgrade projects, not including any necessary time for completion of any rehabilitation works once the resource is exhausted. The proposal includes extraction, processing, stockpile and water management areas of 8.34ha with vehicular access being obtained from Manamoi Road (refer Figure 3 – Conceptual Site Layout Plan and Figure 4 – Conceptual Quarry Development Plan). The proposal includes a construction phase and an operational phase. The proposal would impact a total of 7.5ha of existing native vegetation over three clearing stages and the proponent intends to retire the offset obligation for each vegetation clearing stage separately. The haul route to the Newell Highway is north via Manamoi Road, Boo Boo Road, Gurley Creek Road into the township of Gurley.

In accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) a development application will be lodged with Moree Plains Shire Council. The application is classified as 'Regional Development' and will be determined by the relevant Joint Regional Planning Panel under the *State Environmental Planning Policy (State and Regional Development) 2011*. Consent is being sought for a period of up to ten (10) years, subject to the progress of the IRP and associated road projects, not including any necessary time for completion of any rehabilitation works once the resource is exhausted.

Pursuant to Section 91 of the EP&A Act, the assessment is classified as 'Integrated Development' as approvals from other government agencies are required. As a 'land-based extractive activity', that involves the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials, the proposed development is classified as a 'Scheduled Activity'. An Environment Protection Licence issued under the Protection of the Environment Operations Act 1997 (POEO Act) is required.

The EIS addresses the environmental assessment requirements of the Secretary of the Department of Planning and Environment (the SEAR's), dated 24 August 2018. This EIS focuses on the key assessment requirements specified by the SEAR's and proposed mitigation measures where possible to reduce potential environmental impacts. It is supported by specialist technical reports.

The EIS is supported by the following information:

Attachment 1	Secretary's Environmental Assessment Requirements
Attachment 2	Site Office
Attachment 3	Amenities Building
Attachment 4	Environmental Management Plan
Attachment 5	Biodiversity Impact Assessment Report
Attachment 6	Aboriginal Cultural Heritage Assessment Report
Attachment 7	European Heritage Assessment Report
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Attachment 13	Council Water Supply Letter
Attachment 14	Polo Citrus Information

1.1 The Applicant

The applicant for the proposed development is John Meppem (applicant) who owns the land described as Lot 10 DP751753 and Lot 110 DP257328 (Site).

1.2 Background

The Narrabri-North Star section of the IRP is mostly an upgrade and refurbishment of the existing rail corridor from which the subject site is located approximately 9 kilometres to the East. This rail line is to be upgraded to enhance the movement of freight between Melbourne, NSW and Brisbane Ports. The construction materials requirements for the upgrade works are currently being quantified, however it is expected that an extensive amount of material will be required for roads to service the construction, the rail pad formation and rail ballast. Specifically, the materials required by the IRP will include structural fill, capping layers and ballast. In parallel to the IRP, RMS are undertaking are series of upgrade works to the Newell Highway under the fixing the country roads initiative. These projects are to enable improved access to the Inland Rail corridor and associated intermodal hubs located in a number of locations along the alignment including Narrabri and Moree. Other road upgrades include heavy duty pavements, shoulder widening and additional overtaking lanes to be installed between Narrabri and Moree.

1.3 The Site

The proposed development site is located on Manamoi Road, Bellata, approximately 9 kilometres east of the IRP. The site is approximately 50 kilometres North of Narrabri, 44 kilometres south of Moree and 10 kilometres north-east of Bellata, in north-east New South Wales. The site is predominantly used for agricultural purposes.

1.4 Property Description

The real property description of the land is Lot 10 on DP751753 and Lot 110 DP257328. The site is located within the Local Government Area of Moree Plains Shire Council and is approximately 160 hectares in size. The land is currently zoned `RU1 'Primary Production' under the *Moree Plains Local Environmental Plan 2011.*

1.5 Surrounding Land Uses

The adjoining properties are all zoned RU1 'Primary Production' and have historically been used for dryland farming. Bellata is a small town with a population of approximately 200 people, located 9.5 kilometres south-west of the subject site. Bellata is a rich agricultural region known for its natural minerals such as petrified and opalised wood and its farming productivity.

1.6 Services and Utilities

An internal access road will connect the proposed quarry to Manamoi Road. Manamoi Road is an unsealed road maintained by the Narrabri Shire Council. The site is not serviced by town water or sewer. Mobile telecommunication reception is available. The site is not currently connected to the electricity network.

1.7 Required Approvals

The following approvals are required to construct and operate the proposal:

- Development Approval for Regional Development – Extractive Industry from the Joint Regional Planning Panel (JRPP) under the *State Environmental Planning Policy (State and Regional Development) 2011.*
- Environmental Protection License from the NSW Environment Protection Authority issued under the *Protection of the Environment Operations Act (1997).*

Other approvals may be required such as a works approval from Transport for NSW but will be pursued via a separate application at a later date pursuant to conditions of development consent.

1.8 Consultation

1.8.1 Secretary's Environmental Assessment Requirements

A request for SEARs was lodged with the Department of Planning and Environment (DPE) on Wednesday 25 July 2018. SEARs were supplied on 24 August 2018. Table 1 provides the nominated requirements of the EIS and the section in which these considerations were addressed.

Table 1 – Planning Secretary's Environmental Assessment Requirements

Requirements		Section of Report Requirement Addressed
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.	Pg 1 1 & 5.2 2.2 2 5 & 7 5.18 and EMP 5 1.7 & 4 4 2 & 5 9 10
Consultation	In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and	1.8

Requirements		Section of Report Requirement Addressed
	service providers and any surrounding landowners 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 Noise Policy for Industry and NSW Road Noise Policy respectively; - reasonable and feasible mitigation measures to minimise noise emissions; and - monitoring and management measures; • Blasting & Vibration – - 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	5.7 5.7 5.6 5.8 & 5.9

Requirements		Section of Report Requirement Addressed
	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 undertaken in accordance with Sections 7.3 and 7.7 of the Biodiversity Conservation Act 2016; and - 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. • 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	5.10 5.11 5.13 5.2, 5.3, 5.4 & 5.16

Requirements		Section of Report Requirement Addressed
	- 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; - potential impacts on agricultural land including land capability and agricultural productivity; • 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 potential bushfire risks and 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.	5.14 5.12 5.5 5.17 & 6 5.18 and EMP
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/Assess-and-Regulate/Development-Assessment/~/media/4A89C0947A8C4D70A983F8EE1D7B9790.ashx In addition, the EIS must assess the development against the *Moree Plains Local Environmental Plan 2011* and any relevant development control plans/strategies.	4

1.8.2 Government Agency Consultation

On the 27th July 2018 the following agencies were consulted by DPIE as part of preparation of the SEARs:

- Moree Plains Shire Council;
- Narrabri Shire Council;
- NSW Department of Primary Industries (NSW DPI) Agriculture;
- NSW Department of Planning & Environment – Division of Resources & Geoscience, Geological Survey of New South Wales (GSNSW);
- Environment Protection Authority (EPA);
- NSW Roads and Maritime Services (RMS);
- NSW Office of Environment & Heritage (OEH); and
- NSW Rural Fire Service (RFS)

Moree Plains Shire Council
The Moree Plains Shire Council was contacted on Tuesday 28 August 2018, to discuss the Moree Plains LGA – Bush Fire Prone Land Map. On the 29th of January 2019 and at other times in 2020, Moree Plain Shire Council where also contacted in relation to traffic generating development surrounding the site.

The Moree Plains Shire Council requested additional information in December 2020 and January 2021 in relation to matters such as water sourcing and surface water management, specific SEPPs and traffic impacts. This revised EIS incorporates a response to the request for additional information in the form of a revised scope of proposed works on the surrounding road network and a revised surface water assessment.

Narrabri Shire Council
The Narrabri Shire Council was contacted at various times throughout 2018, 2019 and 2020 including site visits and face to face meetings which resulted in the proposal revising the proposed haulage route to only rely on local roads within Moree Plains Shire Council.

NSW Rural Fire Service (RFS)
On Wednesday 29 August 2018, the NSW Rural Fire Service was contacted, seeking confirmation that the Site was mapped within Bushfire Prone Land. Correspondence with RFS indicated that the site was mapped within Council's Bush Fire Prone Land Map (BFPL map). NSW Rural Fire Service were further consulted on 23/08/19 and it was agreed that the quarry itself would form a buffer around quarry assets providing the required 10m of defendable space.

NSW EPA
NSW EPA provided General Terms of Approval by letter dated 26 July 2019. Those GTAs have been reviewed against the revised proposal and it is anticipated that no changes are required to the GTAs.

In November 2020 the NSW EPA requested additional information. This revised EIS incorporates a response to the request for additional information in the form of a revised Air Quality Impact Assessment and Noise Impact Assessment and Surface Water Assessment.

Transport for NSW (TfNSW)
Transport for NSW provided written comment to Moree Plains Shire Council by letter dated 10 December 2020. The applicant has no objection to the TfNSW recommendations.

1.8.3 Surrounding Landholders

The applicants land holdings extend to over 1km towards the North, East and South from the subject site. The subject site is bounded to the west by Lot 97 DP753961 which is under separate private ownership. The applicant did consult with the neighbouring landholder of this property after the original submission of the EIS.

2. The Proposal

2.1 Objectives

The primary objective of the proposal is to establish a hard rock quarry that meets the requirements for materials and products to be used for the IRP and associated road projects. The proposal will meet or exceed current best practice in terms of environmental performance and environmental guidelines. This objective will be met by:

- Undertaking and managing all activities in a manner that minimises impacts on the site's biodiversity, water, soil, cultural and other values.
- Developing and implementing environmental management systems that incorporates robust monitoring and review processes consistent with current best practice standards.
- Developing and implementing sustainable waste management procedures in all activities.

2.2 Resource Description

The geology of the site is defined by a distinctive hill which represents a residual basalt flow surrounded by and overlying sedimentary rock types. Drilling and field mapping have identified that the site consists of a significant high-quality basalt resource which forms a prominent hill, locally known as Black Hill. The hill is interpreted to be a remnant basalt flow, potentially up to 50m thick, and extending for about 1,000m long by 800m wide. Approximately two-thirds of the basalt on Black Hill occurs on the site. The basalt is predicted to be well-suited to a broad range of industrial applications including Unbound Pavements, Cover Aggregate, Aggregate for Concrete, Rail Ballast CT147, Manufactured Sand and Gabion/Revetment and a suitably qualified geologist has determined that it would be capable of providing materials meeting the requisite specifications for the IRP. For engineering purposes, the rock may be summarised as:

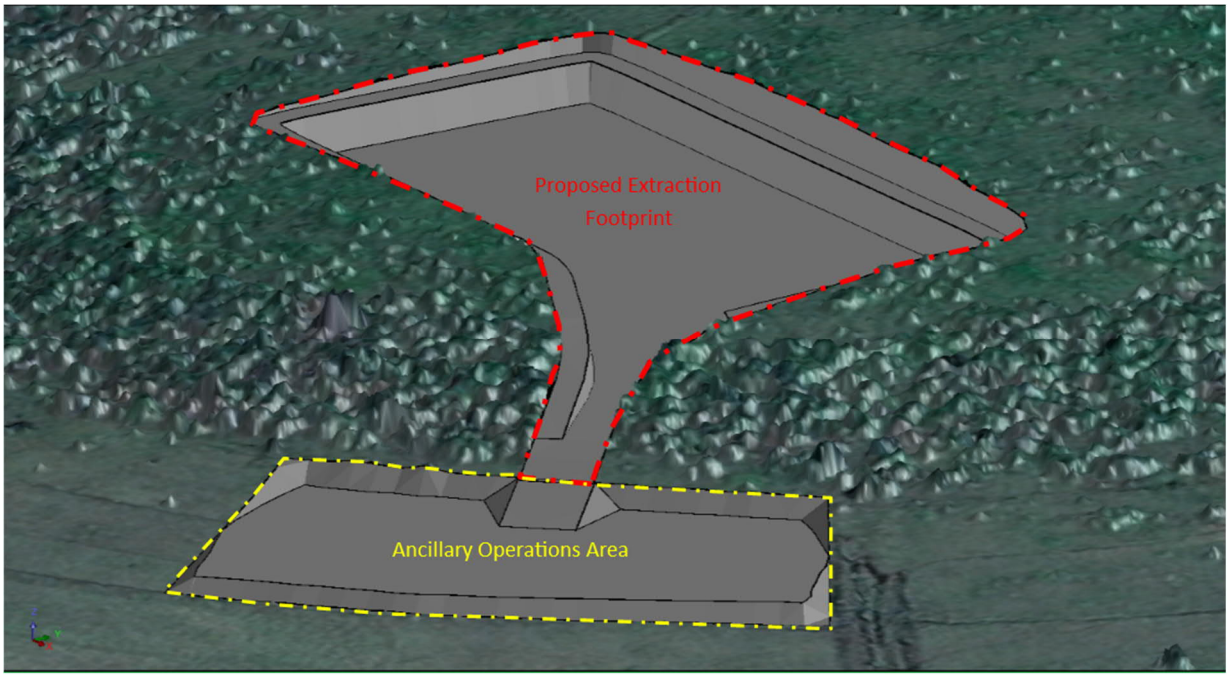
- Olivine Basalt, a Basic Igneous Rock.
- Essentially unweathered to slightly weathered with generally texturally isolated weak-secondary phases (9%) and minor vesicular smectite.
- Hard, of high strength and regarded as durable.
- Non-porous with minor residual vesicular voids and no heir-line fractures.
- Containing 2% free silica as remnant ferromagnesian volcanic glass. On this basis the basalt is considered innocuous in relation to ASR in concrete provided significantly more glassy material is not encountered.

A total of eighteen (18) percussion drill holes were completed over the site in July 2018 by an air track top hammer rig during this time with samples retrieved at each site for further analysis and digitisation into logs. Brief reconnaissance style geological mapping of the site was also completed to inform hole locations and confirm the broad nature and distribution of the rock types on site. Overburden on the hill consists of a very thin veneer of residual basaltic soil (<500mm) and cobbles. The basalt at the site is a black, fine grained, sparsely vesicular basic igneous rock, displaying a basaltic mineral assembly consisting of abundant plagioclase laths and ubiquitous ferromagnesian phases including pyroxene, olivine and magnetite. Olivine crystals form 0.2 to rare 0.5mm green or weathered brown phenocrysts. The rock displays slight weathering as ferruginous staining and occasional argillic infill of sparse vesicles. The basalt displays otherwise competent, granular broken faces and is likely to produce well-shaped aggregate with crushing. The rock is regarded as hard, and is of predicted high strength and durability, well suited to a broad range of engineering products. The basalt is highly magnetic. Trace sulfides as pyrite is observed.

2.3 Description of the Proposal

This Development Application seeks consent to establish a hard rock quarry to produce a maximum of 490,000 tonnes of quarry material per year for supply to the IRP and associated road projects for a period of 10 years. The proposed development on the subject site is depicted in Figure 3 and 4 and Image 1 – Oblique View of the Quarry. The proposal is shown in the drawings within this EIS and will include a construction phase and an operational phase. The total size of the resource available on site has been calculated as 1,200,000 cubic metres / 3,480,000 tonnes. The conversion from tonnes to cubic metres for the Meppem basalt is 2.9t/m^3. The material extracted from the quarry will compromise overburden and hard rock, which will be processed through a mobile crushing and screening plant before being stockpiled.

Image 1 – Oblique View of the Quarry



The construction phase will include:

- Marking out disturbance areas with highly visible permanent markers;
- Construction of the internal access road and access onto Manamoi Road;
- Construction of the other external road works on the haul route;
- Progressive vegetation clearing and soil removal within the areas approved for disturbance. Vegetation would be chipped for use in rehabilitation of the site. Any soil, where present and recoverable, would be stripped and either stockpiled for future use in rehabilitation activities or directly transferred to an area to be revegetated. Soil that is not immediately applied to active rehabilitation areas would be stockpiled, most likely within the processing and stockpile area, from where it would be easily accessed, when required. Topsoil that needs to be stockpiled for more than one month would be seeded to establish a stabilising groundcover.
- Construction of the sediment basin and surface water management measures;
- Construction of the processing and stockpile area;
- Delivery of the mobile processing plant and other mobile equipment; and
- Delivery and establishment of the site office and amenities and other ancillary components.

The operational phase will include:

- Extraction of a maximum of 490,000t/yr for a period of 10 years from a total resource of 3,480,000t
- A maximum depth of extraction of RL 330m AHD;
- Conventional drill and blast techniques to extract the hard rock resource;
- Mobile plant to crush and screen the extracted material to produce a range of quarry products, including aggregates, railway ballast, road base and general fill;
- Processing and stockpiling of quarry products;
- Front end loaders with calibrated scales will be used for loading of material into road trucks and quantifying extraction quantities and as such a weighbridge is not anticipated to be required as part of the operation;
- Loading and transportation of quarry products via the internal access road to Manamoi Road;
- Surface water management measures including sediment basins, diversion bunds and drains;
- Ancillary infrastructure, including temporary demountable site office and amenities (refer Attachment 2 – Site Office and Attachment 3 – Amenities Buildings);
- Chemical storage may include a bunded lockable container for oils and lubricants for minor servicing. Any chemical / hydrocarbon storage areas will comply with relevant Australian Standards;
- Progressive rehabilitation of the site to achieve a post extraction landform suitable for rural activities including but not limited to cattle grazing or cropping.

The site is approximately 161.90ha and the total area of the proposal is 8.34ha including:

- The ancillary operations area for processing and stockpiling of materials of 2.94ha
- The extraction footprint of 5.4ha
- A sediment basin and associated surface water management measures and the internal access road.

Vegetation clearing will occur in three (3) vegetation clearing stages including:

- Stage 1 (the ancillary operations area for processing and stockpiling of materials) of 2.94ha;
- Stage 2 (extraction area) of 2.70ha;
- Stage 3 (extraction area) of 2.70ha;

2.4 Hours of Operation and Staff Employment

The hours of operation are anticipated to be 6:00am to 6:00pm Monday to Friday and 6am to 1pm on Saturdays with no operation on Sundays and Public Holidays. Blasting if required, will generally be limited to 9:00am and 3:00pm Monday to Friday. Between 5 and 10 staff are anticipated to be required for the operation of the quarry. Staff will be accommodated in Moree or Narrabri.

2.5 Traffic

Construction traffic generated for the commissioning and decommissioning of the quarry site will be minimal and consisting of vehicle movements for floating plant and equipment to and from the site. The operational traffic generation is based on the proposed hours of operation of the proposal and the demand for quarry products from the IRP and associated road projects. The haulage route will be Manamoi Road to Boo Boo Road to Gurley Creek Road to the Newell Highway which relies on roads only within the Local Government area of Moree Plains Shire Council. No haulage of material will occur on Berrigal Road within the Narrabri Shire Council Local Government area. Assuming demand is evenly spread across each day and week in a year this could equate to an average of 9800t of material moved per week by an average of 94 truck movements per day. However, quarries do not work on an average basis and must meet demand which fluctuates outside of the control of the quarry operator. This is specifically the case where a quarry may supply large infrastructure projects such as the IRP and associated road projects. The delivery program for construction activity in the area has not been confirmed. It is expected that the demand for construction materials will fluctuate. Demand for construction materials might reach up to 5000t per day. Therefore, during peak demand periods the proposal may result in up to 264 truck movements per day. Peak demand periods are unlikely to occur on a prolonged basis, but flexibility is required in operating conditions so that the requirements of construction projects during peak demand periods can be met. The peak periods will be offset by wet weather days and lower demand periods which may generate less material deliveries.

2.6 Water Supply and Surface Water Management

Operational water would be required for dust suppression for the proposal. This water would be sourced primarily from the sediment basin for the proposal. The sediment basin would be designed, constructed and operated to retain the disturbed area runoff at the site in accordance with DECC (2008) Managing Urban Stormwater - Soils and Construction (Volume 2E). Dams that are solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a Government agency or Local Government to prevent contamination of a water source, are exempt from both the requirement of holding a water supply work approval & from the requirements of the Harvestable Rights Order. If the sediment basin was dry, water would be sourced from an appropriately authorised and licenced water supplier such as Moree Plains Shire Council (refer Attachment 13). Polo Citrus Haulage DC will be implemented as part of the proposal as an additive to dust suppression water to minimise water consumption and maximise dust control (refer Attachment 14). A 2.0ML clean water dam is proposed under to the proponent's harvestable rights as a source of water for dust suppression for the proposal. Based on the site being approximately 160ha the maximum harvestable right dam capacity is 10.4ML.

2.7 Capital Investment Value

The proposed development is expected to require a capital investment of $26,320. This investment includes the works to establish the site such as the earthworks associated with the construction of the sediment pond system, road upgrades and rehabilitation costs. All plant and equipment associated with the quarry have a lifecycle beyond the operational life of the quarry and will be redeployed from the site once the construction projects in the region are complete.

3. Project Objectives, Need and Feasible Alternatives

3.1 Project Objectives

The objectives of the development are to realise the full potential of an extractive resource (hard rock), while minimising impacts on the natural and built environment through sensitive design and appropriate environmental management practices. The project seeks to extract a maximum of 490,000 tonnes per annum, for the IRP and associated road projects and thereby support and enhance the economic viability of the region.

3.2 Need for the Project, Alternatives and Options Considered

Quarried products are used in the building and construction industries and are essential components for providing shelter and infrastructure. The quarry industry is market driven and therefore is focused on price, quality and service. The industry is dominated by a few large, national, vertically integrated companies. However, independent quarries provide market choice and special services and contribute significantly to the vitality and strength of local businesses and industry. Extractive industries are a significant contributor to the material needs of local and regional communities and to economic activity and development. Extractive resources are site specific, limited in occurrence by geological conditions and are finite. Because they are high-volume, low-cost materials, they need to be located close to the communities that use them as the cost of transport to the end user contributes greatly to the overall cost of the delivered product. Extractive resources underpin all urban and infrastructure development and make a major contribution to the ongoing economic growth of the community through direct and indirect employment opportunities. The Australian Government has committed $9.3 billion for ARTC to deliver the IRP. Construction materials are required to complete the project. By establishing the proposal in close proximity the rail alignment it enables the cost of raw construction materials to be minimised, impacts on traffic networks to be reduced and the local communities disrupted from construction activities to benefit from local employment opportunities and spending in the local community that might not otherwise be the case should construction materials were to be hauled from further afield.

Option 1 – Do nothing

The ‘do nothing’ option would not satisfy the proposal objectives and would not allow for the establishment of the project. This option would rely upon the availability of suitable quality materials in the necessary volumes from existing quarries in the region introducing project risk associated with consistency of product, operational hours, output capacity and varying haulage routes. This option could result in significant adverse economic impacts to the IRP through delayed delivery of construction materials and a higher cost of transporting material from areas further from the project alignment.

Option 2 – Meppem Quarry

The preferred and chosen option is to proceed with the development which includes extraction of a maximum of 490,000 tonnes per annum. The site comprises a resource capable of contributing to the construction materials demand for the IRP.

The preferred option

Option 2 is the preferred option and is considered to be the most appropriate in terms of balancing commercial viability with environmental impacts and outcomes. Option 2 is considered more favourably given that potential impacts to the limited biodiversity values of the site can largely be avoided and other potential impacts to surrounding land uses can be mitigated through a range of typical management measures commonly employed for quarry operations.

Design refinements

An iterative design process has resulted in several revisions to the site layout to minimise potential environmental impacts on biodiversity values. The more recent revision of the proposal is to alter the haulage route to the Newell Highway to avoid impacts to roads under the control of Narrabri Shire Council.

4. Legislation

The proposal is 'Designated Development' and 'Integrated Development' under Part 4 of the *Environmental Planning Assessment Act, 1979.* The following section of the report describes how the proposal will address and/or comply with the local planning policies; state and federal legislation and relevant guidelines. The applicable policy and/or objects of each piece of legislation is provided, followed by a statement outlining how the development will address and/or comply with the planning policies; and state and federal legislation.

4.1 Commonwealth Legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

Under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), referral is required to the Australian Government for proposed actions that have the potential to significantly impact on Matters of National Environmental Significance (MNES) or the environment of Commonwealth land. The assessment of the proposal's impact on MNES and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant MNES or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment and Energy (DoEE) under the EPBC Act.

4.2 State Legislation

4.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* provides the framework for NSW Planning Legislation. Under this Act, local councils prepare Local Environment Plan (LEPs) that specify planning controls for specific parcels of land. The Act also provides for State Environmental Planning Policies (SEPPs) and Regional Environmental Plans (REPs). Applicable SEPPs are discussed in the section below.

Development consent is required for the proposal pursuant to Part 4 of the EP&A Act. The proposal is classified as Regional Development and will be determined by the Joint Regional Planning Panel (JRPP) under the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011.*

Pursuant to Section 4.10 of the Act and Schedule 3(1)(19) of the *Environmental Planning and Assessment Regulation 2000,* the proposal is identified as 'Designated Development' as a land based extractive industry which seeks to extract, process or store more than 30,000m^3 of extractive material per year and will disturb a total surface area of more than 2ha of land.

The proposed development is also classified as 'Integrated Development' pursuant to Section 4.46 of the Act as approval from the NSW Environmental Protection Authority is required.

The EIS has been prepared in accordance with the requirements of the EP&A Act. It provides an environmental impact assessment and details of how the Quarry will be developed and operated to protect the environment, the community and provide for ecologically sustainable development.

4.2.2 Protection of the Environment Operations Act 1997

Pursuant to Schedule 1(1)(19) of the *Protection of the Environment Operations Act 1997* (POEO Act), the proposed development is identified as a 'Scheduled Activity' as a land based extractive activity involving the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials. The proposal therefore requires an Environmental Protection License (EPL) under Section 48 of the POEO Act. The Environment Protection Authority (EPA) administers the management of EPLs. A license will be applied for once development consent is granted.

4.2.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act 2016) provides a framework for the management of flora and fauna on lands within NSW. Under this Act the principles of ecologically sustainable development are used to achieve the conservation and protection of biodiversity values. In conjunction with this the BC Act 2016 the Biodiversity Assessment Method (BAM) is a model for undertaking biodiversity assessments on all major projects. The BAM provides a classification and credit system to ensure that there is no net loss of biodiversity values across the state. As the proposed clearing is above the thresholds under clause 7.23 of the *Biodiversity Conservation Regulation 2017* a full assessment has been conducted against the relevant provisions of the BAM. This assessment has calculated the staged biodiversity offset requirements to ensure the project will not have a net impact to the biodiversity values of NSW.

4.2.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (the NPW Act) aims to conserve and manage natural resources and aboriginal heritage. The proposal has been prepared in accordance with the requirements of this Act. There are no national parks, nature reserves, regional parks, state conservation areas, historic sites, karst conservation areas or Aboriginal areas within the subject area.

4.2.5 The Heritage Act 1977

The *Heritage Act 1977* (the Heritage Act) aims to conserve and manage the States Heritage, whether they are places, buildings, works, relics, movable objects or precincts of Local or State Heritage significance. A property is a heritage item if it is listed in the heritage schedule of the Local Council's Local Environmental Plan or on the State Heritage Register, a register of places and items of particular importance to the people of NSW. If an item of heritage value was identified, then consultation would be undertaken with Moree Plains Shire Council and an assessment undertaken in accordance with OEH guidelines for Assessing Heritage Significance (Heritage Office 2001). The heritage statement is the basis for policies and management structures that will affect an item's future. As part of this assessment the relevant checks have been carried out which have concluded that there are no known heritage items present at the subject site.

4.2.6 Water Management Act 2000

The objective of the *Water Management Act 2000* is the sustainable and integrated management of the State's water sources for the benefit of both present and future generations by applying the principles of ecologically sustainable development to protect, enhance and restore water sources and their associated ecosystems, ecological processes and biological diversity and their water quality. The objectives of this Act were considered throughout the planning and design phases of this development. A quarry requires a secure and reliable water supply to operate. The watercourses and groundwater in the vicinity of the property will be protected through rigorous design and management practices, including diversion banks and sediment traps. Appropriate buffers are to be maintained in order to minimise the risk of stream pollution.

4.2.7 State Environmental Planning Policy – State and Regional Development 2011

The State and Regional Development SEPP identifies significant development and infrastructure and confer functions on Joint Regional Planning panels to determine development applications. The proposal is classified as 'Regional development' and will be assessed by the Moree Plains Shire Council and determined by the Joint Regional Planning Panel under the State Environmental Planning Policy (State and Regional Development) 2011. The *SEPP (State and Regional Development) 2011* designates certain development as State Significant Development (SSD). The relevant sections of the *SEPP (State and Regional Development) 2011* are provided below:

> *Section 8 Declaration of State significant development: section 4.36*
> *(1) Development is declared to be State significant development for the purposes of the Act if:*
> *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
> *(b) the development is specified in Schedule 1 or 2.*
>
> *Schedule 1 State Significant Development – General (7) Extractive Industry*
> *(1) Development for the purpose of extractive industry that:*
> *(a) extracts more than 500,000 tonnes of extractive materials per year, or*

(b) extracts from a total resource (the subject of the development application) of more than 5 million tonnes, or
(c) extracts from an environmentally sensitive area of State significance.

Pursuant to Schedule 1 of *SEPP (State and Regional Development) 2011*, the proposed extractive industry operation does not constitute a State Significant Development as:

1. no more than 490,000 tonnes of extractive material will be extracted per year
2. site geological assessments and regional geology mapping estimates that approximately 3.48 million tonnes
3. the extraction will not be from an environmentally sensitive area of State significance (Table 2 below).

Table 2 – Environmentally Sensitive Area of State significance

Criteria	Response
(a) coastal waters of the State, or	The site does not comprise coastal waters of the State.
(b) land to which State Environmental Planning Policy No 14—Coastal Wetlands or State Environmental Planning Policy No 26—Littoral Rainforests applies, or	The State Environmental Planning Policy No 14—Coastal Wetlands or State Environmental Planning Policy No 26—Littoral Rainforests does not apply.
(c) land reserved as an aquatic reserve under the Fisheries Management Act 1994 or as a marine park under the Marine Parks Act 1997, or	The site does not contain aquatic reserves or marine parks.
(d) a declared Ramsar wetland within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth, or	The site does not contain a declared Ramsar wetland.
(e) a declared World Heritage property within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth, or	The site is not a declared World Heritage property.
(f) land identified in an environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance, or	The site is not identified as containing high Aboriginal cultural significance or high biodiversity significance.
(g) land reserved as a state conservation area under the National Parks and Wildlife Act 1974, or	The site does not contain a state conservation area.
(h) land, places, buildings or structures listed on the State Heritage Register under the Heritage Act 1977, or	No heritage sites are listed for the site.
(i) land reserved or dedicated under the Crown Lands Act 1989 for the preservation of flora, fauna, geological formations or for other environmental protection purposes, or	The site is not reserved or dedicated under the *Crown Lands Act 1989.*
(j) land identified as being critical habitat under the Threatened Species Conservation Act 1995 or Part 7A of the Fisheries Management Act 1994.	The site does not contain critical habitat.

4.2.8 State Environmental Planning Policy – Mining, Petroleum Production and Extractive Industries 2007

The Mining, Petroleum Production and Extractive Industries SEPP recognises the importance of mining, petroleum production and extractive industries to NSW and aims to provide for the proper management and the orderly development of land containing minerals, petroleum products and extractive materials. The SEPP aims to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment and sustainable management of these resources.

Clause 12AB 'Non-discretionary development standards for mining', is not applicable in this instance as the proposal is not for a mine.

Clause 12 'Compatibility of proposed mine, petroleum production or extractive industry' is applicable as follows.

> *12 Compatibility of proposed mine, petroleum production or extractive industry with other land uses.*
> *Before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must—*

(a) consider—

(i) the existing uses and approved uses of land in the vicinity of the development, and

(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and

(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and

(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii), and

(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).

Section 1.5 of this EIS outlines that the surrounding land use of the site which are rural in nature. Section 5 of this EIS provides an assessment of the potential environmental impacts of the proposal and outlines the measures that will be implemented to minimise those potential environmental impacts. Section 5.4 specifically addresses the matter of land use conflict. Section 5.17 evaluates and compares the public benefits of the development. This EIS concludes that the proposal is compatible with the rural setting of the site and the surrounding rural land uses.

Clause 12A 'Consideration of voluntary land acquisition and mitigation policy' is not applicable in this instance as the proposal is not State Significant Development.

Clause 13 'Compatibility of proposed development with mining, petroleum production or extractive industry' is not applicable because the proposal is not for development adjacent to mining, petroleum production or extractive industry.

Clause 14 'Natural resource management and environmental management', is applicable as follows.

14 Natural resource management and environmental management

1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following—

a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,

b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,

c) that greenhouse gas emissions are minimised to the greatest extent practicable.

2) Without limiting subclause (1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.

3) Without limiting subclause (1), in determining a development application for development for the purposes of mining, the consent authority must consider any certification by the Chief Executive of the Office of Environment and Heritage or the Director-General of the Department of Primary Industries that measures to mitigate or offset the biodiversity impact of the proposed development will be adequate.

Section 5.8 addresses how potential surface water impacts are minimised to the greatest extent practical. Section 5.9 addresses how potential groundwater impacts are avoided by not intercepting groundwater and not relying on groundwater for operational water for the proposal.

Section 5.10 addresses how potential impacts to threatened species and biodiversity are minimised to the greatest extent practicable and where there is a significant residual impact how it will be offset in accordance with the relevant State legislative requirements.

Section 5.6, Table 13 – 'Greenhouse gas management', addresses how greenhouse gas emissions will be minimised to the greatest extent practicable by the proposal.

Clause 15 'Resource recovery' is applicable as follows.

15 Resource recovery

1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.

2) Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.

3) The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.

Section 5.14 addresses the waste anticipated to be generated by the proposal. Section 2.1 states that 'overburden on the hill consists of a very thin veneer of residual basaltic soil (<500mm) and cobbles'. On that basis, large overburden stockpiles are unlikely to be required and Table 24 confirms that any surplus overburden materials will be reused onsite for construction safety bunds and erosion and sediment controls, internal roads. Overburden and topsoil materials will also be reused in the rehabilitation of the site at the end of life of the proposal. On that basis, the proposal will recover the extractive materials in an efficient manner and will minimise the creation of waste.

Clause 16 'Transport' is applicable as follows.

16 Transport

1) Before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any one or more of the following—

a) require that some or all of the transport of materials in connection with the development is not to be by public road,

b) limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,

c) require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.

2) If the consent authority considers that the development involves the transport of materials on a public road, the consent authority must, within 7 days after receiving the development application, provide a copy of the application to—

a) each roads authority for the road, and

b) the Roads and Traffic Authority (if it is not a roads authority for the road).

4. Note—

5. Section 7 of the Roads Act 1993 specifies who the roads authority is for different types of roads. Some roads have more than one roads authority.

3) The consent authority—

a) must not determine the application until it has taken into consideration any submissions that it receives in response from any roads authority or the Roads and Traffic Authority within 21 days after they were provided with a copy of the application, and

b) must provide them with a copy of the determination.

4) In circumstances where the consent authority is a roads authority for a public road to which subclause (2) applies, the references in subclauses (2) and (3) to a roads authority for that road do not include the consent authority.

Section 5.13 addresses traffic and access impacts for the proposal. Section 5.13.5 identifies that there is no school in Gurley but that a school bus does run on the haul route of the proposal and considers that the risk of conflict between the bus and haulage trucks is manageable. Table 23 identifies that a driver code of conduct will be prepared for the proposal subject to development consent. The matters in clause 16 2), 3) and 4) are matters for Council to address.

Clause 17 'Rehabilitation' is applicable as follows.

> *17 Rehabilitation*
> *1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.*
> *2) In particular, the consent authority must consider whether conditions of the consent should—*
> *a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*
> *b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or*
> *c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under clause 3 of Schedule 6 to the Act and the Contaminated Land Management Act 1997), or*
> *d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

The EIS sets outs that the proposal will be rehabilitated to a suitable landform for continuing rural activities. Section 5.18 addresses rehabilitation of the proposal and the Environmental Management Plan (EMP) provides further information about this matter. Section 5.14 addresses waste and the EMP provides further information about this matter including a Rehabilitation Management Plan. A condition of development consent can address these matters if necessary.

4.2.9 State Environmental Planning Policy No. 44 – Koala Habitat

The SEPP 44 encourages the conservation and management of areas of natural vegetation that provide habitat for koalas, to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. Schedule 1 identifies the local government areas (LGA) subject to assessment under the policy of which Moree Plains LGA is included, making assessment for koala habitat a requirement for the proposed development. An assessment of potential koala habitat on site was conducted as part of the ecological impact assessment carried out by Advitech. Accordingly, the assessment concluded that the proposed development is a low likelihood of Koalas on the site and none were recorded during the field work carried out for the survey. On that basis the land is not considered to be potential koala habitat for the SEPP 44.

In accordance with Part 2 of the SEPP the following assessment is provided:

Step 1 – Is the land potential koala habitat

> *1) Before a council may grant consent to an application for consent to carry out development on land to which this Part applies, it must satisfy itself whether or not the land is a potential koala habitat.*
> *2) A council may satisfy itself as to whether or not land is a potential koala habitat only on information obtained by it, or by the applicant, from a person who is qualified and experienced in tree identification.*
> *3) If the council is satisfied:*
> *a) that the land is not a potential koala habitat, it is not prevented, because of this Policy, from granting consent to the development application, or*
> *b) that the land is a potential koala habitat, it must comply with clause 8.*

For the SEPP, potential koala habitat means '*areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component*'. One species of trees listed in Schedule 2 of the SEPP is found on site being the Eucalyptus populnea (Bimblebox) which the BDRA describes as occurring within the PCT 147 vegetation occurring 'infrequently along the midslope of the hill'. But none were found within the quadrant searches conducted for the BDAR within the quarry footprint. Furthermore, the BDAR prepared for the EIS identifies that there is a low likelihood of occurrence / impact and that the nearest record of Koala is the township of Bellata to the west of the site and that there is no vegetation connectivity to continuous or large isolated patches of vegetation to the proposal site. On that basis, the land is not a potential koala habitat for the purpose of SEPP 44 and the Council is not prevented from granting consent to the development application. However, if Council disagrees, from an abundance of caution the assessment will progress to Step 2.

Step 2—Is the land core koala habitat?

1) *Before a council may grant consent to an application for consent to carry out development on land to which this Part applies that it is satisfied is a potential koala habitat, it must satisfy itself whether or not the land is a core koala habitat.*
2) *A council may satisfy itself as to whether or not land is a core koala habitat only on information obtained by it, or by the applicant, from a person with appropriate qualifications and experience in biological science and fauna survey and management.*
3) *If the council is satisfied:*
   a) *that the land is not a core koala habitat, it is not prevented, because of this Policy, from granting consent to the development application, or*
   b) *that the land is a core koala habitat, it must comply with clause 9.*

For the SEPP, core koala habitat means, '*an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population*'. As outlined in the BDAR for the EIS, no evidence of Koala was found on site. Therefore, the land is not core koala habitat for SEPP 44. Having considered the above, it is evident that Council is not prevented from granting consent to the development application by the SEPP 44.

4.2.10 State Environmental Planning Policy N. 55 – Remediation of Land

The SEPP 55 promotes the remediation of contaminated land for the purpose of reducing the risk of harm to human health or other aspects of the environment. SEPP 55 requires consideration of whether there have been activities carried out on the land in the past that may have resulted in contamination. If contamination may be present, the proponent is required to undertake suitable investigation and, if necessary, remediation works. On 20th of February 2019 a search of the NSW contaminated land register was undertaken. The site is not listed as contaminated land as it has not historically been subjected to any contaminating activities. Upon the cessation of resource extraction, the proposal will involve full rehabilitation of the site.

4.2.11 State Environmental Planning Policy – Infrastructure 2007

The infrastructure SEPP provides a consistent planning regime for infrastructure and the provision of services and public works across NSW, along with providing for consultation with relevant public authorities during the assessment process. The proposal is not identified in Schedule 3 of the SEPP as traffic generating development to be referred to the Roads and Maritime Services. The proposed development is therefore taken to be 'Any other purpose' under Schedule 3 and it will not generate 200 or more motor vehicle movements per hour.

4.3 Local Planning Instruments

4.3.1 Moree Plains Local Environmental Plan 2011

The site is in the Moree Plains local government area. The Moree Plains Local Environmental Plan 2011 (MPLEP) is the current local government planning policy for land administered by Moree Plain Shire Council. The site is in the RU1 'Primary Production' zone which permits an extractive industry with consent. The proposal is consistent with the objectives of the zone RU1, which are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To permit development for certain purposes if it can be demonstrated that suitable land or premises are not available elsewhere.

The proposed land use is defined as 'extractive industry' under the MPLEP, *"extractive industry means the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming"*

An extractive industry land uses within the RU1 Primary Production zone is a permissible land use with development consent.

5. Environmental Impact Assessment

5.1 Meteorological and Climatic Data

Understanding climate data is essential for planning for environmental management of quarry sites, most importantly for air quality, stormwater, noise and site rehabilitation works. To this end, a review of available meteorological and climate data has been undertaken to inform subsequent management measures required for the proposal. The site is within the Gwydir River catchment which is characterised by a temperate to sub-tropical climate, with a considerable gradient from east (cooler and wetter) to west (hotter and drier). Average rainfall ranges from 1,000 mm per year in the east to around 500 mm in the west. Annual rainfall at Moree totals around 600 mm (DPI Water, October 2017 https://www.industry.nsw.gov.au/__data/assets/pdf_file/0006/145392/Gwydir-SW.pdf)

For the site specifically, the following information has been sourced from the Bureau of Meteorology (BOM) information for the Bellata Post Office (Station: 53003), which is the closest BOM station that could provide comprehensive rainfall data. This weather station has been operational since 1912. The weather station is located approximately 10 km south east of the site and is considered suitable for use in understanding the expectant rainfall conditions at the site. Rainfall data for the area is summarised below in Table 3 – Rainfall Summary – Bellata Post Office 53003 (1912-present) below.

Table 3 – Rainfall Summary – Bellata Post Office 53003 (1912-present)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Rainfall	84.2	68.3	45.2	34.9	39.6	41.5	42.2	34.3	35.6	48.8	62.0	67.1
Median	64.2	52.6	35.6	22.1	28.6	32.2	33.9	27.2	25.6	36.1	47.8	57.1
Highest Daily	164.4	173.0	76.2	85.6	100.3	77.8	64.4	49.8	112.0	76.2	86.6	164.0

Rainfall statistics show a mean average rainfall at Bellata Post Office of 603.7 mm per annum, which accords with the characteristics with the Gwydir River catchment with the majority of total rainfall occurring in the summer months. Based on an annual average evaporation of 2000 mm (DPI Water, October 2017) and an annual average rainfall of 603.7 mm, the site generally has a moisture deficit on an annualised basis of >1300 mm. The closest weather station to provide comprehensive climate data is the Moree Aero BOM sire (Station: 53115). The weather station has been operational since 1995 and is located approximately 40 km north of the site. Salient weather statistics from this weather station is provided below in Table 4 – Climatic Information – Moree Aero 53115 (1995-present).

Table 4 – Climatic Information – Moree Aero 53115 (1995-present)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Av. Max Temp (°C)	34.0	33.2	31.1	27.3	22.6	19.0	18.1	20.4	24.5	27.1	30.8	32.7	26.8
Av. Min Temp (°C)	20.2	19.7	17.3	12.8	8.2	6.0	4.5	5.2	8.9	12.7	16.4	18.5	12.5
Mean No. Rain Days	7.2	6.8	6.1	4.1	4.9	6.6	6.0	4.6	5.3	6.7	8.0	8.7	75.0
Mean No. Rain Days > 10 mm	2.5	1.9	1.7	0.8	1.3	1.3	1.2	0.9	1.3	1.5	2.4	2.1	18.9
Mean No. Rain Days > 25 mm	0.7	0.8	0.5	0.2	0.1	0.3	0.3	0.1	0.3	0.4	0.7	0.6	5.0

It can be seen from the above, that the number of high rainfall days (> 25 mm) is on average less than once per month. This is not to say that high rainfall events do not occur, rather it is the case that they are infrequent in nature. Predictably the summer months yield the most rainfall days, with a reduction over the drier winter periods. Wind roses have been sourced from the BoM for Moree Aero Station, these are provided below as Figure 8 to Figure 12, which show both the annual and seasonal wind characteristics. Wind roses summarise the occurrence of winds at a location, showing their strength, direction and frequency. These are particularly important when planning for potentially high dust generating activities, and selection of appropriate mitigation measures.

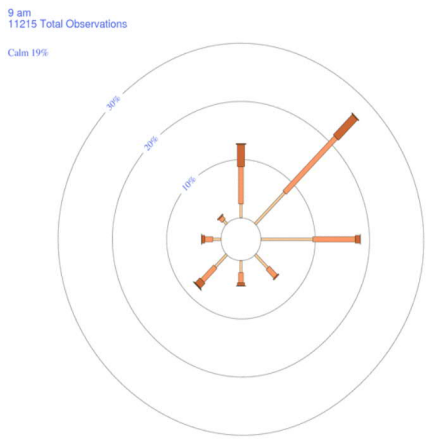


Figure 8 – Annual – Calm 19%

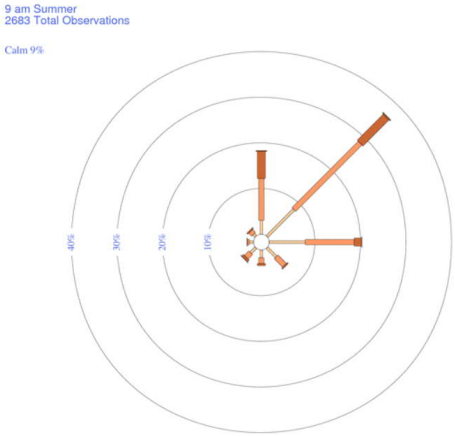


Figure 9 – Summer – Calm 9%

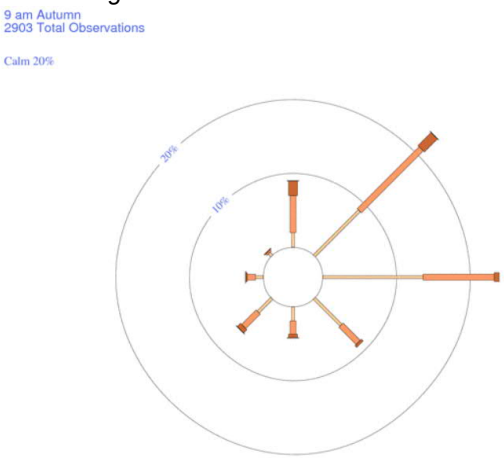


Figure 10 – Autumn – Calm 20%

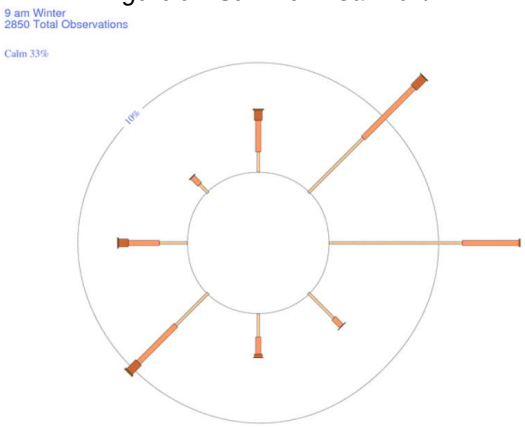


Figure 11 – Winter – Calm 30%

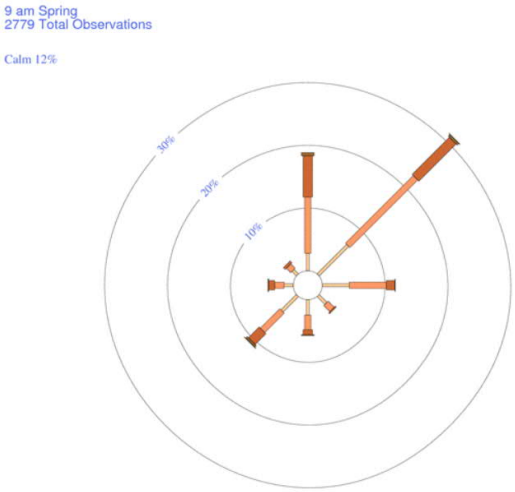
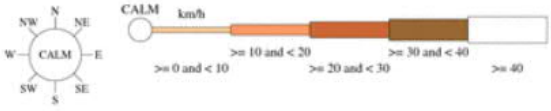


Figure 12 – Spring – Calm 12%



The wind rose data shows that Winter has the highest proportion of calm conditions, the highest wind speeds are over the Winter period and the predominant wind direction over the annual period is from the north east.

Climatic data detailed above, forms a basis for environmental management, particularly with regard to air, water, noise and land management. Mitigation measures for each of these is detailed in their respective sections of this EIS.

5.2 Topography, Soils and Geology

5.2.1 Existing Environment – Topography

The site was historically cleared, with remnant vegetation present surrounding the proposed quarry footprint. The site is locally referred to as Black Hill, at approximately 345 m AHD at its peak. As this is a knoll, the site drains in all directions.

The proposal would be on the south east of the knoll, resulting in the drainage from the site being largely in a south / south eastern direction. Given this, the site will drain overland to lower order ephemeral drainage lines which connect to Waterloo Creek.

Cross sections as depicted in Figures 13-15 for the site have been prepared below, sourced from Google Earth, to provide an appreciation of the current condition of the site with respect to existing topographical characteristics.

Cross Section A shows the cross section in a north west to south east direction. The maximum slope in this area is 15.4 %, associated with area that grades towards the unnamed ephemeral lower order drainage feature. Whilst the quarrying activity will be limited to the higher elevation areas of Black Hill, and thus areas of less steep grades, surface runoff will be directed down slope over areas of steep grades.

Cross Section B shows the cross section in a north to south east direction. The maximum slope in this area is 16.0 %, associated with area that grades towards the unnamed ephemeral lower order drainage feature. This aspect of Black Hill is the steepest, with the crest of the hill giving way to steep grades before grading into slightly undulating land towards the drainage feature.

Cross Section C shows the cross section in a west to east direction. The maximum slope in this area is 16.0 %, associated with area that grades towards Waterloo Creek. It is observed that the start of this cross section, grades west over the western aspect of Black Hill. The proposed quarry activity will be positioned on south and south eastern aspect of Black Hill.

Figure 13 – Cross Sections

Figure 14 – Meppem Quarry Cross Section A (North West to South East)

Figure 15 – Meppem Quarry Cross Section B (North to South)

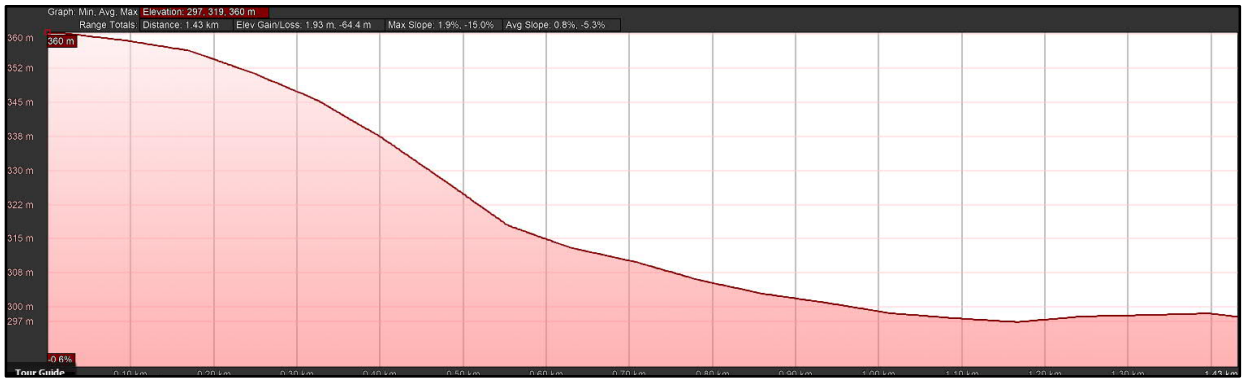
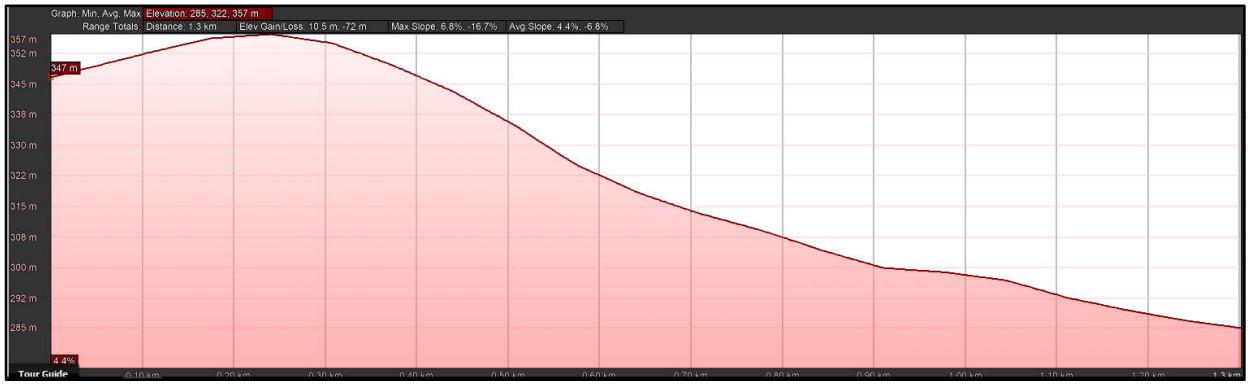


Figure 16 – Meppem Quarry Cross Section C (West to East)



5.2.2 Existing Environment – Soils

A review of available mapping, and information from site visits and resource investigations have been used to inform the description of the existing soils of the site. The NSW Soil and Land Information Database, eSPADE, managed by the NSW Office of Environment and Heritage, has been referred to for assessing the likely soil conditions for the site: The soil distribution for the site is provided below, along with a summary of the main soil characteristics and their limitations.

Figure 17 – Soil Distribution (source eSPADE 2018)

Black Hill Soil	Landscape - Isolated rolling rises of Tertiary basalt caps and stony outcrops. Slopes 10 - 25%, local relief 10 - 50 m, elevation 270 - 320 m. Generally uncleared vine thickets. Geology - Two geological units dominate: the Nandewar Volcanic Complex//Basalt extrusive (Tnt1), consisting of hawaiite, trachyandesite, tristanite, trachyte, minor peralkaline trachyte and tuff; and the Nandewar Volcanic Complex/Unnamed basalt (Qctb) consisting of tholeiite alkali basalt, basanite, nephelinite, limburgite, trachyte and rare obsidian. Soils - Shallow to moderately deep (well-drained to moderately well-drained Brown, Grey and Black Vertosols and Dermosols (Stony Brown and Grey Clays, Black Earths and Lithosols) on crests and slopes. Qualities and limitations - widespread shallow soils, localised steep slopes, widespread rock outcrop hazard, localised foundation hazard, localised woody weeds, widespread recharge zone, localised sheet erosion hazard.
Manamoi Soil	Landscape - Isolated rolling rises of Tertiary basalt caps and stony outcrops. Slopes 10 - 25%, local relief 10 - 50 m, elevation 270 - 320 m. Generally uncleared vine thickets.

	Geology - Geology mapping identifies this area being dominated by Tertiary Volcanics/Nandewar Volcanic Complex (Tnt1) consisting of hawaiite, trachyandesite, tristanite, trachyte, minor peralkaline trachyte and tuff. Soils - Deep to very deep (>150 cm), moderately well-drained, self-mulching Black Vertosols (Black Earths) on slopes and imperfectly to poorly-drained self-mulching Grey Vertosols (Grey Clays) on lower slopes. Moderately deep (50 - 150 cm) Brown Dermosols (Chocolate Soils/Brown Clays) expected on steeper slopes associated with in situ development on bedrock. Qualities and limitations - localised foundation hazard, widespread productive arable land, widespread recharge zone, localised discharge zone, localised gully erosion hazard, widespread sheet erosion hazard, widespread high run-on.

The proposal is largely contained within the Black Hill soil area, the description of which accords well with observations made during the site inspections and resource investigations. Stockpiling and processing areas are likely to be located on the Manamoi Soil. In addition to the above soil characteristics, other considerations with regard to soil resources have been assessed, specifically Acid Sulfate Soils and Biophysical Strategic Agricultural Land (BSAL). The following information is provided in regard to these aspects:

- The site is not mapped as containing Acid Sulfate Soils (ASS), and given its location and geological characteristics, these would not be present in this region.
- The proposal is not mapped as containing Biophysical Strategic Agricultural Land (BSAL) which is endowed with high quality soil and water resources capable of sustaining high levels of productivity. BSAL is mapped within the wider site on land adjacent to the stockpile area, as shown below in Figure 18 – BSAL Distribution. The extraction and operational areas are not proposed to be undertaken in areas of BSAL.

The BSAL generally correlates with the Manamoi Soil distribution within the site. The Black Hill Soil however, which the soil type Meppem Quarry footprint is located on is not regarded as BSAL. The Meppem Quarry will not disturb areas mapped as BSAL, and the existing access road to site, although within an area mapped as BSAL will be used to access the quarry.

Figure 18 – BSAL Distribution
Source - https://www.planningportal.nsw.gov.au/find-a-property/751753_10

5.2.3 Existing Environment – Geology

The site is characterised by two geological units being the following:

- The Nandewar Volcanic Complex//Basalt extrusive (Tnt1), consisting of hawaiite, trachyandesite, tristanite, trachyte, minor peralkaline trachyte and tuff; and
- The Nandewar Volcanic Complex/Unnamed basalt (Qctb) consisting of tholeiite alkali basalt, basanite, nephelinite, limburgite, trachyte and rare obsidian.

5.2.4 Potential Impacts

Potential impacts on topography, geology and soils predominantly relates to secondary impacts to soil resources such as loss through erosion, surface water and groundwater quality degradation, geotechnical stability and air quality impacts. Quarrying activities by their very nature result in disturbance to land, resulting in exposure of soil which may result in dust generation and sediment loss from stormwater overland flow. A summary of potential impacts is as follows:

- Change to topography characteristics that redirects or retains overland flow.
- Loss of soil resource because of wind erosion
- Loss of soil resource because of water erosion
- Impacts on waterways associated with sediment loss
- Impact on air quality as a result of dust generation
- Erosion of soil surface as a result of concentrated stormwater flows

As noted above, impacts from disturbance of problematic soils (i.e. ASS) won't occur. Likewise, there will be no impacts on BSAL. The impacts identified can be readily managed by implementing appropriate soil conservation, erosion and sediment control, and air quality management measures.

5.2.5 Management and Mitigation Measures

Conservation of soil resources will be required during the operation of the site, and for those areas requiring disturbance, management of the soil resource and associated potential impacts will be required to be undertaken. Likewise, at the cessation of quarrying activities the site will be required to be rehabilitated to restore the cultivation capacity of the disturbance areas.

Table 5 – Soil Management

Aspect	Control
Erosion and Sediment Controls	• See Section 4.8 Surface Water.
Soil Management	<u>*Topsoil Stripping*</u> • A nominal stripping depth of 100 mm has been allowed for the proposed quarry area. • The operator shall remove topsoil from within the limits of disturbance to a depth of 100 mm unless determined otherwise through the site validation. • All grass, root fibre, decayed vegetable matter and any other organic or deleterious material shall be removed and stockpiled for use in rehabilitation. <u>*Prior to Stripping Commencing*</u> • Topsoil stripping depths will be determined and marked on site for earthmoving plant operators to follow. • Earthmoving plant operators are to be made aware of stripping depths and the topsoil stripping management plan. • Prior to stripping activities, Aboriginal cultural heritage clearance approvals will need to be in place (see Section 4.11). • Suitable stockpile areas (as required) will be nominated. • Suitable areas for direct return of topsoil (if available) will be nominated. <u>*Stripping*</u> • The topsoil removed shall be applied directly on to a prepared rehabilitation area. If no rehabilitation areas exist topsoil shall be stockpiled at appropriate locations.

Aspect	Control
	• Topsoil will be recovered using appropriate equipment. Depending on compaction and recovery rates, deep ripping may be required to maximise topsoil recovery with care taken not to mix topsoil with problematic subsoil. • It is preferable for material to be stripped when it is in a lightly moist condition. • Contractors bringing machinery onto the site will be required to present such machinery in a weed-free condition (ss Section 4.15). • Disturbance areas will be stripped progressively, as required, in order to reduce erosion and sediment generation, to reduce the extent of topsoil stockpiles and to utilise stripped topsoil as soon as possible for rehabilitation. • Rehabilitation of disturbed areas, such as roads, embankments and batters, will be undertaken as soon as practicable after these structures are completed / no longer required or as areas are no longer required for quarrying purposes. *Stockpiling* • Topsoil shall be stockpiled in low mounds. • The side slopes of stockpiles shall not be steeper than 1 vertical in 4 horizontals. • Surface drainage of the stockpiles shall be managed to minimise loss of material through erosion. Stockpiles shall not be located so as to impede the drainage from upstream catchment areas. • Stockpile locations will be subject to the following management actions. • Grazing stock, machinery and vehicles will be excluded. • Overland water flow onto or across stockpile site will be kept to a practical minimum. • Where possible, stockpile sites will be selected to maximise protection from `the prevailing winds, particularly if the material is friable in nature (e.g. sand or silt). • Drainage from higher areas will be diverted around stockpile areas to prevent erosion. • As required, install sediment controls downstream of stockpile areas to collect any run-off. • Topsoil stockpile locations would be located to assist the sequence of future rehabilitation. *Respreading of Topsoil* • Topsoil shall be respread evenly over the rehabilitated area and access tracks. • Maximise the opportunities for direct placement of topsoil from pre-strip to rehabilitation areas. • During removal of soils from the stockpiles, minimise structural degradation of the soils. • Respread topsoil material in even layers at a thickness appropriate for the landform and land capability of the area to be rehabilitated. • Contour rip to encourage rainfall infiltration and minimise run-off. • Construct contour banks in accordance with the applicable landform design criteria to limit slope lengths and control run-off. • Construct drains and sedimentation dams to collect run-off and remove suspended sediment. • Regularly inspect and maintain rehabilitation areas to monitor revegetation success. • Regularly inspect rehabilitated areas for declared plants and environmental weeds, and control significant weed outbreaks using chemical or mechanical control methods.
Rehabilitation	• See Management and Mitigation Measures detailed in Section 5.3 Land Capability
Commitments	• Prepare an Erosion and Sediment Control Plan (prepared in accordance with DECC, 2008 *Managing Urban Stormwater Soils and Construction vol 2E*) prior to works commencing on site. • Environmental Management Plan is to include a Rehabilitation Management Plan.

5.2.6 Assessment of Impacts

Whilst the proposal will disturb the land, appropriate mitigation measures will manage the potential impacts. Erosion and sediment controls will minimise potential impacts to water and air quality, and rehabilitation of the site as a free draining landform suitable for the continuation of agricultural activities will also ensure that the land capability is restored.

5.3 Land Capability

5.3.1 Existing Environment

Land and soil capability assessment is a function of the biophysical aspects of the subject land, including the parameters - slope, wind hazard, soil pH, surface structural stability, salinity, rocky outcrop, water logging, potential and existing erosion of a landform. Land capability is classified into a numerical system with 1 being the land with the fewest limitations for agricultural uses, and 8 being land with extreme limitations and the least capability to support agricultural activities. The NSW Soil and Land Information Database, eSPADE, managed by OEH, has been referred to for assessing the mapped land capability of the site, which is shown below in Figure 19 – Land Capability. Table 6 – Land Capability Summary, details the land capability classification for the site. It is important to note that the all quarrying activities will be wholly contained within the area mapped as Land Capability Class 5.

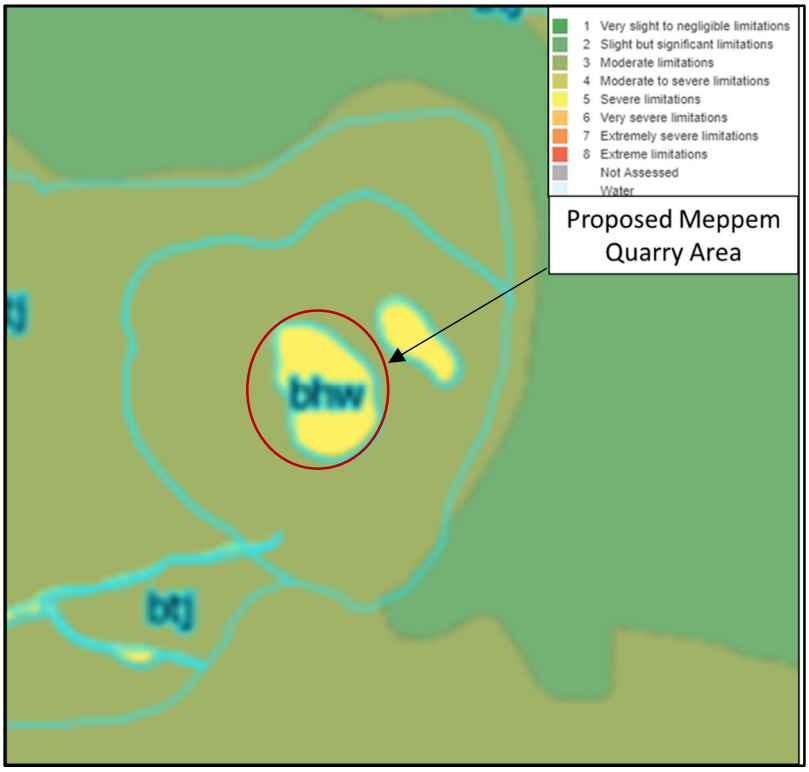


Figure 19 – Land Capability
(Source: eSPADE)

Table 6 – Land Capability Summary

Area on site	Land Capability	Comment
Proposed Quarry Site	5 – Severe Limitations	The proposed quarry is contained within the Black Hill soil type which is class 5 land. Limitations are likely owing to topographical and geological constraints such as existing erosion, shallow soils, steep slopes and rock outcrops resulting in the inability to effectivity utilise the land for cultivation for high value crops.
Areas adjacent to the proposed quarry site	4 – Moderate to Severe Limitations	It is noted that this area is under active cultivation.

5.3.2 Potential Impacts

The proposal will alter the topography and soil resource through extraction of the basalt resource. This impact will be limited to the area mapped as Land Capability Class 5. The potential impacts include the erosion of disturbed areas, the mobilisation of rock, further shallowing of the soil resources and formation of a benched landform. The management of these potential impacts are outlined in the table below.

5.3.3 Management and Mitigation Measures

The proposal would include the following management and mitigation measures.

Table 7 – Soil Management

Aspect	Control
Erosion and Sediment Controls	• See Section 4.8 Surface Water.
Weeds	• See Section 4.15 Biosecurity
Rehabilitation	*Removal of Infrastructure* • Site buildings, plant and equipment will be removed at the cessation of the extraction activities. • There are no site services that will require rehabilitation at closure as these services will be made available through alternative means (i.e. generator for power, rainwater or bore water for water use, satellite phones for communications etc.). • Roadways and haul roads that are not required post quarrying land use will be decommissioned and rehabilitated. These areas will be reprofiled to match surrounding rehabilitation profile, ripped and seeded to encourage vegetation regrowth. • All refuelling will be done via service truck to eliminate the need to store large quantities of fuel onsite. If necessary, any contaminated soils will be preferentially treated on-site in accordance with the recommendations of a Site Based Management Plan (SBMP) or any recommendations from the site-specific contaminated land assessment. *Rehabilitation of Sediment Basins* • Any sediment basins will be retained as agricultural dams • Alternatively, sediment basins may be filled to a level consistent with the surrounding landform. *Landform Shaping* • When the floor level for a working area has been excavated to its final extraction level and is no longer required for ongoing quarry activities, the floor will be graded to encourage water drainage in the appropriate direction. • Once desired landform shape has been achieved the area will be top soiled and seeded to achieve ground cover and stable landform *Soil Preparation* • Remove any weed species which may be present in the overburden and topsoil stockpiles prior to using in the rehabilitation works. • Carry out soil tests to determine whether any soil ameliorants (e.g. nutrients, lime, gypsum) are required to improve the quality of the topsoil and overburden for supporting vegetative growth. • Spread topsoil a minimum depth of 0.1 m. The topsoil should be moist but not wet when spread. • Incorporate any required soil ameliorants during the spreading works. • Topsoil is to be levelled to achieve an even but roughened surface. • If the operational requirements permit, topsoil and overburden materials can be placed directly over quarry floor areas as an alternative to stockpiling these materials. *Revegetation* • Return the land to a condition capable of sustaining the ongoing rural land uses.
Commitments	• Prepare an Erosion and Sediment Control Plan (prepared in accordance with DECC, 2008 *Managing Urban Stormwater Soils and Construction vol 2E*) prior to works commencing on site. • Environmental Management Plan to include a Rehabilitation Management Plan and Pest and Weed Management Plan.

5.3.4 Assessment of Impacts

The proposal will alter the topography and soil resource. The disturbance will be limited to the area mapped as Land Capability Class 5, and not in the higher land capability class areas. Rehabilitation will be progressive as areas become available. All disturbed areas will be rehabilitated to a condition suitable of supporting the ongoing rural use of the land similar to its predevelopment capability.

5.4 Land Use Conflict

5.4.1 Surrounding Land Uses

The surrounding land uses in the local setting of the site are dominated by similar agricultural land uses comprised by broadacre crop production. Sensitive receptors in the area are rural dwellings on the surrounding farms. The locations of the nearest sensitive receptors were identified in Figure 2 of AQIA which is replicated below as Figure 20 – Sensitive Receptors. The distances of each receptor to the proposed quarry have been included in Table 8 – Separation Distances from Sensitive Receptors.

Figure 20 – Sensitive Receptors

Table 8 – Separation Distances from Sensitive Receptors

Receptor	Receptor Type	Address	Distance (m)
1	Rural Dwelling	425 Manamoi Road, Gurley	1,950
2	Rural Dwelling	207 Wilgaroi Road, Bellata	3,000
3	Rural Dwelling	1499 Berrigal Creek Road, Bellata	4,700
4	Rural Dwelling	1396 Berrigal Creek Road, Bellata	4,950
5	Rural Dwelling	1733 Boo Boo Road, Bellata	6,000
6	Rural Dwelling	1215 Berrigal Creek Road, Bellata	3,000
7	Rural Dwelling	79 Wilgaroi Road, Bellata	4,900

5.4.2 Potential Impacts

The potential impacts for land use conflicts with sensitive receptors are typically caused by environmental nuisance in the form of dust, noise, odour and visual impacts. These aspects have been assessed and the table below provides an overview of the management and mitigation measures that will be adopted to minimise these impacts.

5.4.3 Management and Mitigation Measures

Table 9 – Recommended Minimum Buffer Distances below outlines minimum buffer distances recommended for mining, petroleum production and extractive industries. The recommended buffer distance for the proposal is 1km. Management and mitigation measures for potential environmental nuisance such as dust, noise, vibration, odour or visual impacts, are detailed in the relevant sections in this EIS.

Table 9 – Recommended Minimum Buffer Distances

Mining, Petroleum Production & Extractive Industries		
Receptor	Normal Operations (m)	Blasting (m)
Residential areas & urban development	500	1000
Rural dwellings	500	1000
Educational facilities & pre-schools	500	1000
Rural tourist accommodation	500	1000
Watercourses & wetlands	SSD	SSD
Bores & wells	SSD	SSD
Potable water supply/catchment	SSD	SSD
Property boundary	SSD	SSD
Roads (public)	SSD	SSD

SSD: Site Specific Determination.
Source: Department of Primary Industries (2007) Living and Working in Rural Area Handbook.

5.4.4 Assessment of Impacts

The closest sensitive receptor is located approximately 1.95 kilometres to the north-east of the site. Therefore, the proposal exceeds the minimum buffer distance requirements identified in Table 9 – Recommended Minimum Buffer Distances. It is therefore considered that the proposal is sufficiently separated from nearby sensitive land uses surrounding the site and therefore the risk of land use conflict and adverse amenity impacts associated with the development is minimal.

The development is considered permissible within the current zoning and complies with all recommended separation distances. With the implementation of the proposed mitigation and management measures described in this EIS, the proposal is unlikely to result in significant impacts to amenity of surrounding sensitive land uses and rural residents. The proposed development is therefore not considered to pose a significant risk to any land use conflict within the locality.

5.5 Visual Amenity

5.5.1 Existing Environment

The proposal is located on Black Hill. The surrounding area is rural, with the nearest sensitive receptor located approximately 1.95 km north east of the site. Mature vegetation is established between the site and the nearest sensitive receptor. The site is located off Manamoi Bellata Road, via an unsealed access road. Black Hill is a dominant feature in the landscape, set amongst mildly undulating land.

5.5.2 Potential Impacts

Key potential impacts to visual amenity that may result from the proposal include:

- Increased visual permeability.
- Change in landscape from cultivated land to quarry operation.
- Impacts to air quality (i.e. dust generation) during operations.
- Increased traffic on the haul roads.

5.5.3 Management and Mitigation Measures

The following management measures would minimise the visual impact of the proposal.

Table 10 – Visual Amenity management

Aspect	Control
Quarry Design	• The quarry design utilises the receding rim technique to minimise the extent of the quarry that will be visible as shown on Figures 21 and 22.
Vegetation	• Retain vegetation outside the identified extraction zone to screen and soften visual appearance. • Clear the site in stages to minimise disturbance including the retention of vegetation until areas are required to meet operational requirements. • Where perimeter bunds or stockpiles are formed these areas are to be seeded to minimise the amount of exposed areas.
Rehabilitation	• Undertake the rehabilitation of disturbed areas when they are available and no longer required by the operation.
Air Quality	• See Section 5.6 Air Quality.

5.5.4 Assessment of Impacts

To understand the extent to which the quarry is likely to be visible from land to the south east of the site a series of visualisations was undertaken in SURPAC based on a camera height of 1.5m above ground. The visualisations suggest the quarry will be most visible from Line 2 Point 2 (which is located at the boundary of the site) and a distant feature in the landscape from Point 1 on Line 1, 2 and 3. This is illustrated on Figures 21 and 22 below.

The proposal is surrounded by a buffer of existing remnant vegetation in the mid-section of the hillslope which will be retained and will not be cleared. However that existing vegetation will not fully screen the ancillary operations area or the ramp into the extraction area from some surrounding vantage points. Nevertheless, the extent of the visibility of the ancillary operations area and the narrow ramp into the extraction area is limited to a small percentage of the overall visual catchment of the area.

The proposal will not be visible from the Newell Highway which is approximately 10 kilometres west of the site. The nearest sensitive receptor is 1.95 kilometres to the north-east and will be screened from the operations by the existing topography of the hill and an existing tree line running along the western boundary of the adjoining lot. Sensitive receptors located to the south east of the quarry may have line of sight to the disturbance area. The proposal but it will not be visible from the S, SW, W, NW, N or NE of the site.

Extractive industries are common in a rural landscape and through careful design incorporating a narrow ramp to access the extraction area rather than a more traditional quarry design of fully exposed benches the proposal will minimise the potential visual amenity impacts to the area.

Figure 21 – Visualisation Sight Lines

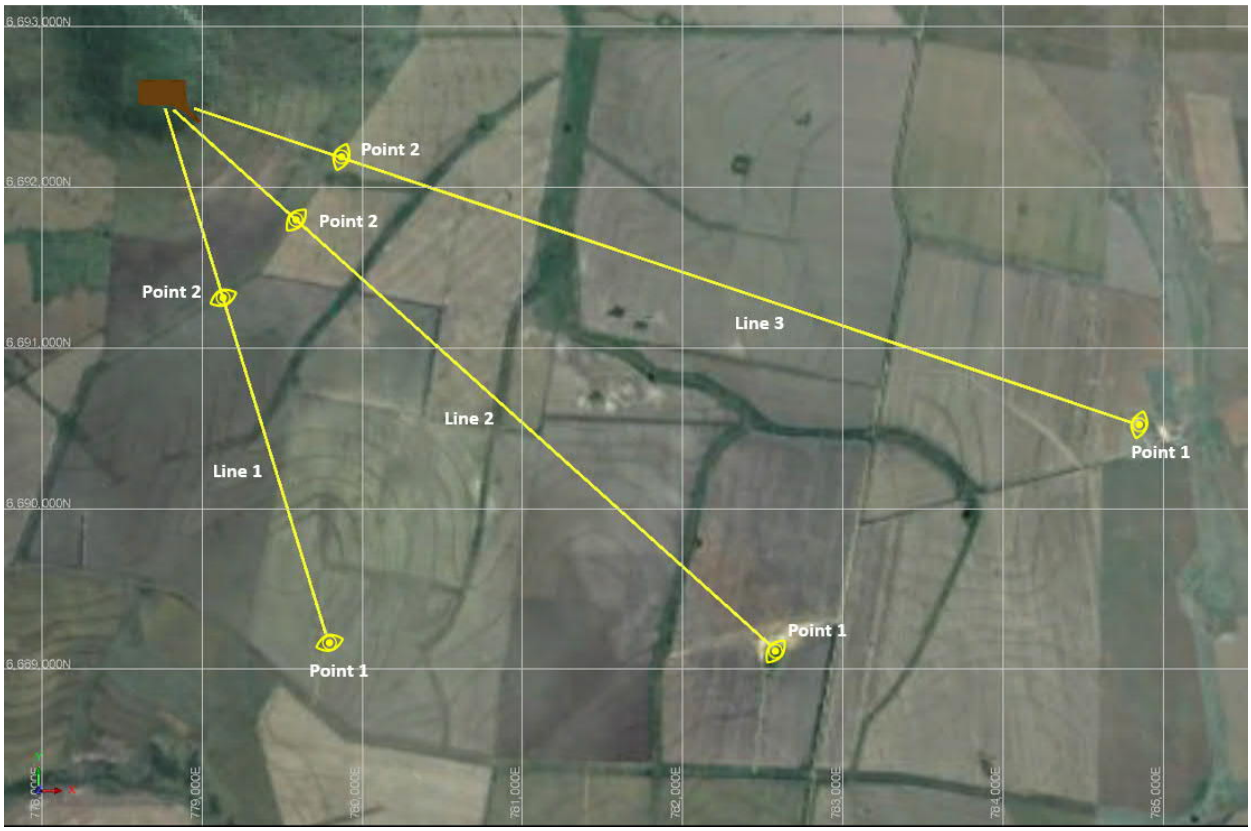
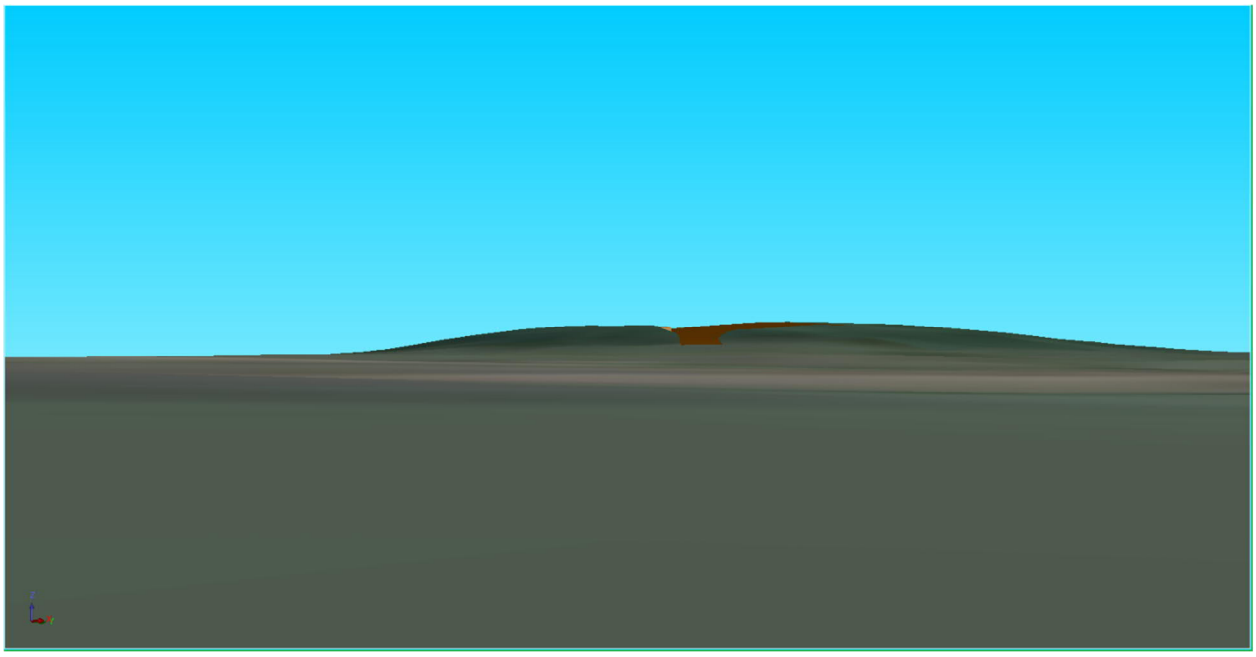


Figure 22 – Visualisation from Line 2 Point 2



5.6 Air Quality

Advitech Pty Limited trading as Advitech undertook a Air Quality Impact Assessment (AQIA) for the proposal (refer Attachment 9). This AQIA aims to provide an assessment of the air quality impacts of the proposal in accordance with relevant assessment criteria and guidelines. The AQIA was revised to address the request for additional information from the NSW EPA. As such, this AQIA supports the Environment Impact Statement (EIS) completed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for the proposal.

5.6.1 Existing Environment

Assessment of background air quality data has been undertaken for the airshed surrounding the proposed Meppem quarry operation.

The NSW Department of Environment, Energy and Science (DEES) operate an air quality monitoring program that collects accurate real-time measurements of ambient level pollutants at 28 monitoring sites within the air quality monitoring network (AQMN), located around the greater metropolitan area of Sydney, the Illawarra, the Lower Hunter and selected rural sites around NSW (refer to Section 9, Reference 8). Given the absence of background air quality data for 2015 in the Narrabri region, the nearest monitoring location at Tamworth was applied for the purpose of the assessment.

The Tamworth monitoring station commenced operation in 2000 and provides hourly meteorological data and particulate concentrations. It should be noted that PM2.5 concentration monitoring began in August 2016 at the Tamworth monitoring station. In the absence of long term PM2.5 monitoring measurements, this report has assumed a PM2.5 to PM10 ratio of 0.5 (that is, 50% of PM10 is PM2.5). A review of available PM2.5 data (2016 - 2019) from the Tamworth station suggests the ratio is appropriate.

A summary of the ambient particulate data applied to this assessment is provided in Table 11 – Ambient Air Quality, below.

Table 11 – Ambient Air Quality

Station	Pollutant	Averaging Time	Ambient (µg/m³)		Source
Regional Station Tamworth	PM10	Annual Average	15.3		Clearing the Air New South Wales Air Quality Statement 2017
	PM2.5	Monthly Average	17.8		
Local Station Narrabri	PM10	Monthly Average	Dec 17	11.9	Narrabri PM10 monthly average derived from 1h average (µg/m³)
			Jan 18	15.4	
			Feb 18	12.6	
			Mar 18	10.9	
			Apr 18	14.8	
			May 18	14.9	
			Jun 18	10.9	
			Jul 18	9.5	
	PM2.5	Monthly Average	Dec 17	5.4	Narrabri PM2.5 monthly average derived from 1h average (µg/m³)
			Feb 18	6.6	
			Mar 18	5.1	
			Apr 18	4.4	
			May 18	5.8	
			Jun 18	4.7	
			Jul 18	4.4	
			Dec 17	4.4	
			Jan 18	5.4	
General	Dust deposition	Annual average	40 mg/m²/day 1.2 g/m²/month		Assumption based upon typical data

5.6.2 Potential Impacts

The main sources of air emissions generated through the operation of the proposal are identified as follows:

- Vehicles driving along unsealed internal haul roads and access roads leading to the site.
- Topsoil stripping and overburden removal and placement.
- Extraction will result in the disturbance to in-situ rock and soil which will require the use of heavy machinery equipment to remove and relocate the material.
- Haulage of material from the extraction areas to processing plant.
- Loading and unloading of quarry products
- Haulage of final product off-site.
- Dust generation caused by blasting.
- Combustion engines (i.e. exhaust smoke).

Considering the above, the following air emissions require management techniques:

- Particulate emissions
- Greenhouse gas emissions.

Each of the identified sources of air emissions can be reasonably managed through proactive site management measures as identified in Table 12. Emissions of airborne pollutants, specifically particulates, if not controlled and managed, may have the following impacts to the surrounding environment:

- Reduction in visibility in atmosphere
- Smothering of vegetation
- Degradation of water quality leading to aquatic impacts

Similarly, particulates also have impacts on human health quarry workers and surrounding residents as follows;

- Short-term exposure (hours to days) can lead to:
    - Irritated eyes, nose and throat
    - Worsening asthma and lung diseases such as chronic bronchitis (also called chronic obstructive pulmonary disease or COPD)
    - Heart attacks and arrhythmias (irregular heart beat) in people with heart disease
    - Increases in hospital admissions and premature death due to diseases of the respiratory and cardiovascular systems
- Long-term exposure (many years) can lead to:
    - Reduced lung function
    - Development of cardiovascular and respiratory diseases
    - Increased rate of disease progression
    - Reduction in life expectancy

5.6.3 Management and Mitigation Measures

The following management and mitigation measures would be adopted for the proposal.

Table 12 – Air Quality Management

Aspect	Control
General	• Ensuring all vehicles are to a road registered standard which includes exhaust systems that minimise gaseous and particulate emissions meeting vehicle design standards. • Training of site personnel to include awareness for dust minimising behaviours and practises will be provided to the workforce personnel including any subcontractors. • Signage will be erected around the site to remind workers of suitable dust minimising behaviours. • A complaint management system will be used to ensure that complaints are recorded, investigated and responded to within a reasonable timeframe. • Burning of vegetation waste, waste tyres or any other waste products is not permitted on site. • Routinely monitor site conditions to ensure that mitigation measures are being implemented and are suited to the conditions. Records can also be reviewed in the event of a complaint or report of a safety concern.

Aspect	Control
Site Establishment	• Limiting vegetation and soil clearing to areas only necessary for operations, minimising the total area of exposed dust generating surfaces. • All active work areas and haulage roads will be routinely treated with water or suitable dust suppressant additive as required. • Reducing disturbance activities during periods of excessive wind or periods where dust generation and dispersal is more likely to occur.
Plant and Equipment	• Clearing spillages from side rails, tailgates and draw bars of trucks (following loading and tipping). • Levelling loads prior to truck exit from the site • Securing tailgates of all haulage vehicles prior to loading. • Haulage vehicles transporting products to and from the site must have their loads covered and secured at all times, apart from loading and unloading in the processing areas. • Monitoring operations to minimise trucks queuing and idling of plant and equipment. • Vehicles and equipment must be fitted with appropriate emission control equipment and routinely maintained. Plant should be switched off when not in use. • All plant, equipment and vehicles are to be regularly serviced according to the manufacturer's specifications. This will include daily prestart checklists to identify any faults that may lead to excessive emissions. A maintenance schedule will be established prior to commencement of works and all maintenance records will be kept on site. • Air emissions from plant, vehicles and equipment should be visually monitored throughout construction. • Site speed limits are to be clearly displayed upon entry to the site. Drivers are to obey on-site speed limits and adopt driving practices that minimise dust generation.
Disturbed Areas	• All disturbed areas such as excavations, processing areas, haulage routes, stockpile area and other disturbed areas will be treated with a water spray or suitable dust suppressant (i.e. tackifier or soil binder) as required. • Vegetation clearing and topsoil stripping will be staged to minimise disturbance of the quarry footprint until areas are required by the operation. This also includes restricting vehicles access to these areas until necessary for operations. • Monitoring meteorological forecasts when planning dust generating activities to ensure these can be timed with favourable weather conditions. • Where possible integrate dust suppressants into the use of the mobile crushing and screening plants or other dust generating equipment on the site.
Stockpiles	• Using water sprays as required during winds likely to generate dust releases. • Stabilising and revegetating topsoil stockpiles where possible. • Using dust suppressants and shielding/wind breaks/screens where possible.
Internal Trafficable Areas	• Enforce a maximum speed on internal roads. • Keep trafficable areas well maintained, at a reasonable grade and free of loose dust generating material. • Dampen down trafficable areas using water sprays and/or dust suppressants. (i.e. chemical additive used in conjunction with water truck). Watering of all haul roads and access roads at a rate of at least 2 litres/m^2/hour at times when dust emissions are visible from vehicle movements
Odour	• The use of odorous substances or particulates, which create or are likely to create objectionable conditions for the public are not permitted for use on the site.
Blasting	• Unless prior approval is obtained from the administering authority; blasting is only permitted during the hours of 9am to 3pm Monday to Friday, and from 9am to 1pm on Saturdays. Blasting is not permitted at any time on Sundays or public holidays • Handling, transport and use of explosives shall be carried out in accordance with the requirements of AS 2187.2-2006 Explosives - Storage and use - Use of explosives, and the Mining and Quarrying Safety and Health Act 1999 (MQSH Act) and associated Regulation. • Only suitably experienced and qualified blasting personnel shall be employed or contracted to provide blasting services. • The maximum instantaneous charge or charge mass per delay will be limited to the lowest possible level.

Aspect	Control
	• A blast plan shall be prepared for each blast, containing blast hole layout, initiation sequence, charging, stemming type and height, charge weight and any other design element, required for good blasting practice. • Blast areas may be dampened down prior to blasting to minimise dispersion of dry and fine materials where practicable, or where it is identified as a source of potential dust nuisance. • Each blast will be monitored, and the blast plan and design reviewed in the event where excessive dust in generated.
Mobile equipment	• Where possible integrate dust suppressants such as water sprays around the working areas of all dust generating mobile equipment.
Commitments	• Prepare an Air Quality Management Plan prior to works commencing on site. • Incorporate the Air Quality Management Plan into the Environmental Management Plan prior to works commencing on site. • Water sprays are to be applied to dust generation sources when dust plumes are visible. • Enforcement of a maximum speed of 40km/hr on unsealed internal roads.

The proposal will result in the production of greenhouse gas emissions. By limiting greenhouse gases production through the use of the following measures the impacts to air quality can be minimised.

Table 13 – Greenhouse Gas Management

Aspect	Control
Procurement:	• Procurement guidelines will consider a suite of environmental sustainability requirements prior to product acceptance at the site which may include but not limited to: - Consideration of the energy efficiency ratings of equipment. - Fit for purpose plant and equipment - Sustainability to be adopted into whole of lifecycle asset management strategy - Identification of waste streams and quantities of waste being generated through the sourcing of imported materials. - Waste minimisation strategy which has developed targets commitment to reducing waste. - Opportunities to source hybrid plant and equipment or those that use alternative fuels such as biodiesel. - Sourcing of materials from local suppliers to minimise traveling time.
Vehicles, Traffic and Transport Panning	• Implementation of vehicle operating guidelines to encourage correct and efficient operation of vehicles that seeks to; • Reduce the number of vehicles and/or trips required for transport • Uses buses for transportation of large numbers of personnel to minimise number of vehicles operating • Implementation of a wider fuel management strategy which encourages use of more efficient plants and vehicles, planning, logistics, driver education and maintenance • Driver and operator training in relation to efficient operation of vehicles, plant and equipment. • Sustainability to be adopted into whole of lifecycle asset management strategy • Workforce awareness to be raised around driver behaviour that minimises diesel consumption and wear and tear on parts. • Undertake daily prestart checks to flag any faults with the plant and equipment that may lead to excessive air quality pollutants. • Regularly service vehicles, plant and equipment such that exhaust systems and fuel consumption comply with manufacturers' specifications. • Minimise transportation distances within the site wherever possible. • Operate and maintain air conditioning systems in accordance with manufacturer's instructions and Guide to Best Practice Maintenance & Operation of HVAC Systems for Energy Efficiency (Council of Australian Governments National Strategy on Energy Efficiency January 2012 • Provide workforce bus to ensure carpooling between nearest township and the worksite can occur.

Aspect	Control
Waste	• The site will be planned to ensure products such as overburden and topsoil are stockpiled efficiently around the site to ensure that onsite reuse can occur with the minimum of fuel consumption and product handling subsequently reducing the amount of vehicle movements and overall fuel usage during the quarry lifecycle. • Offsite disposal of waste is unlikely however the nearest lawful place of disposal will be identified based on the waste stream being generated. • See Section 5.14.
Communications	• Use of teleconferencing and video conferencing to reduce travel to and from offices and associated gaseous emissions from fuel combustion.
Vegetation Clearing	• Vegetation clearing will be restricted to the required footprint only and will be done progressively in a staged approach.

5.6.4 Assessment of Impacts

The AQIA (refer Attachment 9) for the proposal included modelling (CALMET and CALPUFF) to predict the potential impacts of the proposal and assessed the proposal against the NSW EPA air quality criteria. The assessment has concluded that the proposal can operate below all NSW EPA air quality criteria even if control factors (for example, water sprays on the processing plant and disturbed areas) were not adopted.

Nevertheless, the air quality management practices outlined in Table 12 and 13 are consistent with best management practices for the prevention and/or minimisation of particulate matter from extractive industries and would be adopted by the proposal. An Air Quality Management Plan incorporating these management practices is included in the Environmental Management Plan for the proposal.

5.7 Noise and Vibration

Advitech Pty Limited trading as Advitech undertook a Noise Impact Assessment (NIA) for the proposal (refer Attachment 10). This NIA aims to provide an assessment of the noise impacts of the proposal in accordance with relevant assessment criteria and guidelines. The NIA supports the Environment Impact Statement (EIS) completed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for the proposal. The NIA was revised in February 2021 in response to a request for additional information from the NSW EPA.

5.7.1 Existing Environment

The site and surrounding environment are comprised by rural land comprised mostly by agricultural activities. As such the ambient background noise is comprised by the following noise sources:

- Agricultural equipment
- Traffic on public and private roads, including sealed and unsealed roads
- Livestock and other fauna (birds, insects etc.)
- Wind in vegetation
- Occasional aircraft movements

Advitech was engaged to undertake a noise impact assessment of the site to determine the existing environment and predict the impact that the proposed development would have of the locality. As part of this report the ambient noise levels were determined for the site and haulage route through attended monitoring. The results are shown below in Table 14.

Table 14 – Details of operator attended monitoring

Location	Date	Measured Noise dB(A)			Observations
		LA90	LA1	LAeq	
Development site, adjacent Manamoi Road	9/01/2019 12:58	25	41	32	Birds, insects, gusting wind
Bellata township, adjacent Newell Highway	9/01/2019 14:52	40	74	64	Road traffic noise, birds, insects, gusting wind
Gurley township, adjacent Newell Highway	23/09/2020 09:30	41	87	72	Road traffic noise, domestic noise
Boo Boo Road	23/9/2020 08:50	24	53	39	Birds, windblown vegetation

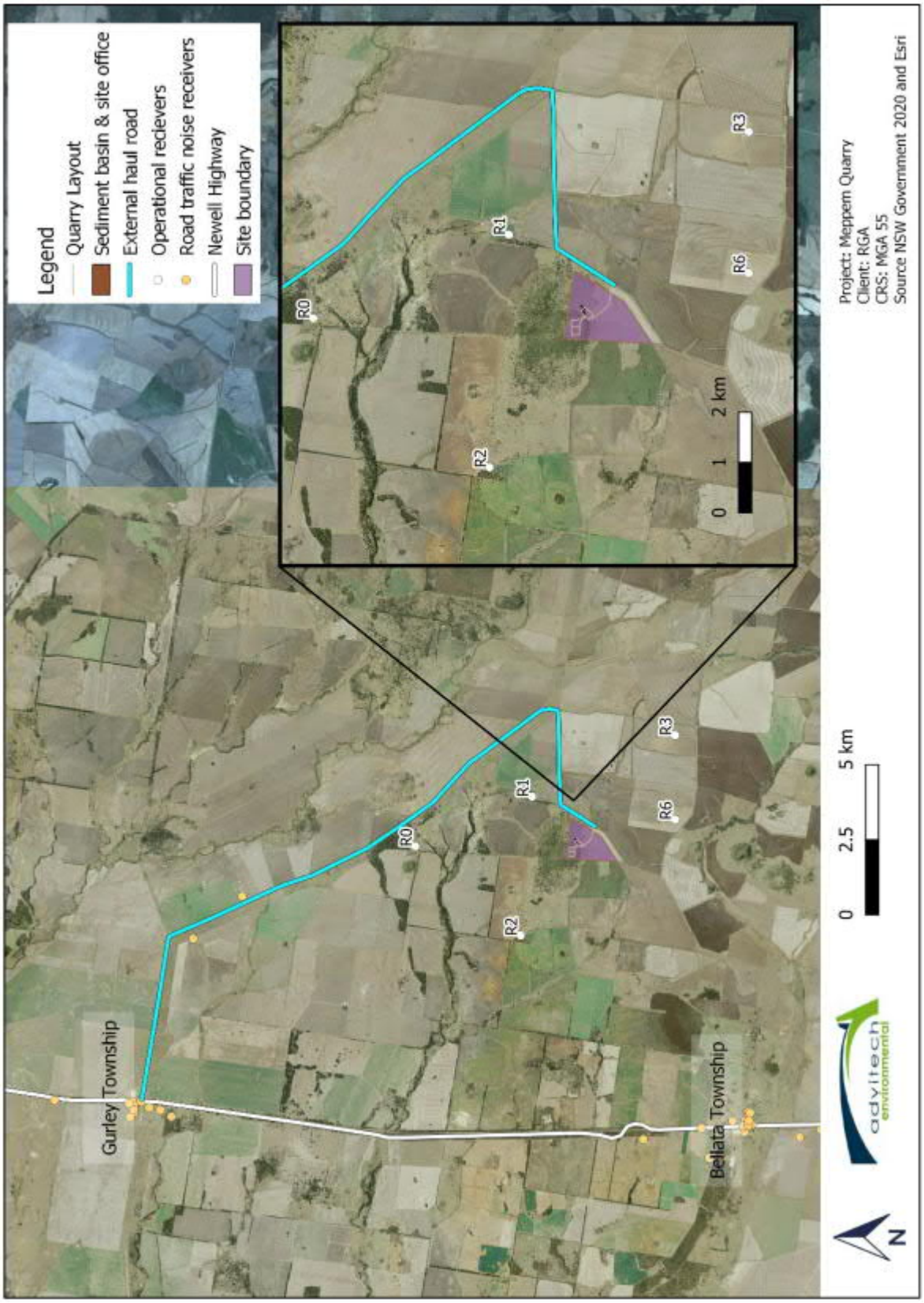
Notes: Table adapted from Advitech Meppem Noise Impact Assessment.

The results of the attended noise monitoring are reflective of the rural setting however significant road traffic noise is noted in the monitoring taken near the Bellata township and Gurley Township. In lieu of completing a long-term monitoring campaign, the Rating Background Levels (RBL) of the Noise Policy of Industry (NSW) were adopted for the purposes of this assessment. The sensitive receptors in the locality surrounding the site are predominately rural dwellings. The locations of the nearest sensitive receptors for the purposes of the NIA are identified in Figure 23 – Sensitive Receptors and are as follows:

- R0 – Black Ridge, 73 Wilgaroi Road
- R1 – Manamoi, 425 Manamoi Road
- R2 – Wilgaroi, 207 Wilgaroi Road
- R3 – Saltwell, 1499 Berrigal Creek Road
- R6 – Baringa, 1215 Berrigal Creek Road

Analysis was undertaken to identify receivers within 600m of the proposed haulage route as per the guidance of the Road Noise Policy. Approximately 125 receivers were identified. Those receivers were classified into four (4) catchments, being Boo Boo Road, Gurley Town, Bellata Town and the Newell Highway.

Figure 23 – Sensitive Receptors



5.7.2 Potential Impacts

Noise from extraction, processing and transportation associated with the proposal may result in noise impacts. The potential noise impacts may include, disturbance to the public during work activities, recreational activities, sleep and relaxation and disturbance to native fauna nesting adjacent to the site. This may result from site activities including, clearing and grubbing, topsoil stripping and stockpiling, drilling and blasting, extraction, handling of materials, plant and equipment use (e.g. transfer of materials, processing materials), use of plant and equipment, haulage and vehicle movements to and from the site, and other associated workforce and subcontractor activities.

5.7.3 Management and Mitigation Measures

The following management and mitigation measures would be implemented for the proposal.

Table 15 – Noise Management

Aspect	Control
General	• Operating only during approved operating hours. • Do not operate the processing plant until 7am. • Noisy operations and equipment shall be located as far away as possible from a sensitive place or places. • All plant and equipment to be regularly maintained and fitted with high efficiency mufflers. • Maintaining access roads in good condition. • Operating the site with well-maintained plant, vehicles and equipment, and ensure all plant, vehicles and equipment are serviced in accordance with manufacturers' specifications. • Avoiding unnecessary idling of plant and equipment and the unnecessary revving of engines. • Raise awareness amongst workforce about noise minimising behaviours, i.e. no shouting driver behaviour, avoiding metal on metal contact or dropping load from unnecessary heights during load and haul operations. • Ensuring that equipment at the site is used for the intended purpose. • Avoiding the use of compression braking on product delivery trucks.
Construction Activities	• Undertake construction activities only during standard work hours (7am to 6pm on Weekdays and 8am to 1pm on Saturdays). • Where possible, erect temporary noise barriers between highly affected receivers and works associated with the intersection at Gurley. • If concrete sawing is required, the saw should only be operated when no other plant is running.
Plant and Equipment	• All equipment must be fitted with appropriate noise reduction devices (e.g. mufflers) and comply with any relevant Australian Standards. Equipment and noise reducing devices should be maintained in good working order as per manufacturer's instruction. • All compressors and generators must be "sound reduced" models fitted with properly lined and sealed acoustic covers or enclosures, which must remain closed whenever the machines are in use. • Switch off plant when not in use, or where this is not practicable, throttled down to a minimum. • Plant and equipment must be regularly serviced according to the manufacturers specifications to minimise screeching and squealing. • Where possible, plant and equipment must be located away from residences to reduce noise. • Plant in fixed locations such as generators or lighting towers will be located with consideration to proximity to sensitive noise receptors. Noise attenuation devices will be implemented at these locations if necessary.
Traffic and transportation	• Suitable haulage routes travel times must be identified prior to commencement of the haulage operation to reduce disturbance to the residents and other sensitive land uses. • Carryout regular inspection of the haulage route to identify surface conditions that may require maintenance to reduce road noise. • Consult with residents adjacent to the Haul Route • Implement an effective traffic management plan that ensures drivers adhere to sign-posted speed limits, maintain and operate vehicles in a manner that does not generate excessive

Aspect	Control
	noise, schedule haulage of product to maximum periods of respite and contains a mechanism for monitoring adherence to the plan and for responding to complaints. • Include noise mitigating behaviour in the driver code of conduct.
Blasting	The following control measures may be implemented to assist in mitigating potential noise and vibration nuisance from blasting associated with the Site activities: • Unless prior approval is obtained from the administering authority; blasting is only permitted during the hours of 9am to 3pm Monday to Friday, and from 9am to 1pm on Saturdays. Blasting is not permitted at any time on Sundays or public holidays • Handling, transport and use of explosives shall be carried out in accordance with the requirements of *AS 2187.2-2006 Explosives - Storage and use - Use of explosives*, and the *Mining and Quarrying Safety and Health Act 1999* (MQSH Act) and associated Regulation. • Only suitably experienced and qualified blasting personnel shall be employed or contracted to provide blasting services. • The maximum instantaneous charge or charge mass per delay will be limited to the lowest possible level. • A blast plan shall be prepared for each blast with consideration of the surrounding sensitive receivers. The blast plan will contain blast hole layout, initiation sequence, charging, stemming type and height, charge weight and any other design element, required for good blasting practice. • Any complaint received following blasting will trigger a review of the blast plan and its parameters to identify necessary corrective actions in order to reduce noise.
Commitments	• Environmental Management Plan to include a Noise Management Plan. • Environmental Management Plan to include a Blasting Management Plan. • Traffic Management Plan and Driver Code of Conduct to be implemented prior to commencement of activities and maintained for the life of the quarry.

5.7.4 Assessment of Impacts

A NIA has been prepared for the proposal (refer Attachment 10). Section 11 of the NIA provides the assessment and recommendations which have been incorporated below.

Assessment conditions and criteria

Analysis of background noise monitoring indicates that the receiving environment 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.

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 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. To achieve PTNL during the evening and night period, it is recommended that crushing and processing activities is restricted to the day period (7:00 to 18:00). This analysis does indicate that stockpile maintenance and loading of trucks may be undertaken during the evening and night period (including the early morning shoulder prior to 7:00) without expectation of adverse impact.

Maximum Noise Levels

Materials' handling within the quarry 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 quarrying or stockpiling operations are required to take place during the night period. Notwithstanding, review of modelling results indicates that LAMax 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.

Construction Noise

The results of modelling indicate that noise emissions from construction activities are likely to be below NMLs for all receivers adjacent to the site. It is recommended that any crushing activities at natural surface level (during construction period) be restricted to standard work hours (7:00 to 18:00) to ensure NML are achieved.

Road Traffic Noise

Assessment indicates that receivers along the proposed haulage route already experience high levels of noise associated with the Newell Highway. Despite potential for high levels of traffic noise, assessment indicates that the majority of exceedances are situated in Bellata and Gurley townships and along the Newell Highway where existing levels are already exceeded or close to exceeding. Increases of road traffic noise are expected to be no more than 2dB above the criteria are predicted at any receivers in close vicinity to the Newell Highway at Bellata and Gurley.

Road traffic noise is expected to exceed the relative increase criteria (existing traffic LAeq+ 12dB) during the day period at the two identified receivers along Boo Boo Road. Although there is predicted to be a significant increase in road traffic noise contributions under the build option, it should be noted that road traffic noise contributions from the development will still be well below the most stringent noise assessment criteria for road traffic noise for both the day and night periods.

Given there is potential for community response due to significant increases in road traffic noise at two receivers along Boo Boo Road, the following recommendations are provided to minimise adverse road noise impacts:

- Consultation with residents adjacent to the Haul Route;
- Developing an effective traffic management plan to ensure that drivers:
    - adhere to sign-posted speed limits;
    - maintain and operate vehicles in a manner that does not generate excessive noise;
    - schedule haulage of product to maximise periods of respite;
    - contains a mechanism for monitoring adherence to the plan, and for responding to complaints; and
- Where practical, utilise larger capacity vehicles to minimise the number of movements.

Road Construction Noise

The results of modelling indicate there are potential noise impacts at one residence near Manamoi Rd, two residences along Boo Boo Rd, and at many of the receivers in Gurley Township. Both earthworks and paving were predicted to have the potential to cause noise impacts, although modelled impacts were generally higher for paving activities. Two receivers in Gurley Township were predicted to fall into the "Highly Affected" category (LAeq,15min of 75 dB(A) or greater) for works at the intersection of Gurley Creek Rd and Newell Highway.

The CNVG recommends mitigation measures which assist with community management. Relevant measures have been identified for each receiver in the various modelling scenarios. The construction works are predicted to be short (3 weeks or less at any one location), which will reduce the overall community impact. In addition, the following recommendations are provided in order to minimise noise impacts as far as possible:

- Construction activities should be limited to standard hours only (Weekdays 7am-6pm, Saturday 8am-1pm);
- Where possible, erect temporary noise barriers between highly affected receivers and works associated with the intersection at Gurley township; and
- If concrete sawing is required, the saw should only be operated when no other plant is running.

Blasting Impacts

Assessment of the resource indicates that blasting would be required as part of the extraction process. Criteria for both ground vibration and overpressure were adopted from the ANZEC guidelines for the purposes of assessing blast impacts. Assessment of preliminary blast design indicates compliance with these guideline values. Notwithstanding, it is recommended that monitoring of blasts be undertaken as per the typical requirements for extractive industry. It is also recommended that a strategy for notifying neighbours of planned blasts be developed and implemented, and a method for receiving, investigating and responding to complaints is provided.

With regards to potential impacts on livestock and infrastructure (eg groundwater bores) the regulatory blast over pressure and vibration levels are considerably lower than other sources of overpressure that horses or livestock are likely to be already subjected to such as lightning strikes which are typically between 120dBZ and 130dBZ.

Recommendations

Assessment indicates that the proposed quarry operations will comply with the established PTNL, and that the PNTL may be adopted as appropriate criteria for the proposed development. It is likely that the development will be audible at some receivers, and it is suggested that the above recommendations be put in place to minimise the noise impacts at the surrounding sensitive receivers. It is additionally recommended that systems are put in place to monitor and respond to potential concerns from adjacent sensitive receivers.

Conclusion

Advitech Environmental was engaged to prepare an assessment of potential noise and vibration impacts associated with the development of the proposed Meppem Quarry. The development is proposed to service bulk construction material requirements of the proposed Narrabri to North Star section of the IRP. The operation may produce up to 490ktpa 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.

While adverse operational, construction and blasting 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.

Assessment indicates that receivers along the proposed haulage route already experience high levels of noise associated with the Newell Highway. Despite potential for high levels of traffic noise, assessment indicates that the majority of exceedances are situated in Bellata and Gurley townships and along the Newell Highway where existing levels are already exceeded or close to exceeding. Increases of road traffic noise are expected to be no more than 2dB above the criteria are predicted at any receivers in close vicinity to the Newell Highway at Bellata and Gurley.

Road traffic noise is expected to exceed the relative increase criteria (existing traffic LAeq+ 12dB) during the day period at the two identified receivers along Boo Boo Road. Although there is predicted to be a significant increase in road traffic noise contributions, it should be noted that road traffic noise contributions from the development will still be well below the most stringent noise assessment criteria for road traffic noise for both the day and night periods.

Road construction noise is expected to cause noise impacts at one receiver near Manamoi Rd, all receivers near Boo Boo Rd, and all receivers in Gurley Township. During construction, it is recommended that appropriate mitigation measures should be applied to minimise these impacts as far as possible.

5.8 Surface Water

As Surface Water Assessment (SWA) has been prepared for the proposal (refer Attachment 8) in accordance with the SEARs for the proposal. The SWA has been revised to address additional information requests from NSW EPA and Moree Plains Shire Council.

5.8.1 Existing Environment

The site is located within the Gwydir River Catchment. The Gwydir River begins high in the Great Dividing Range of northern New South Wales and flows westwards through steep valleys and out onto wide plains. The river splits into many anabranches and creeks on the floodplain, where wetlands and swamps soak up much of the flow of the river. During a flood, water flows across the floodplain to the Barwon River.

As discussed in Section 5.2.1, the proposal drains in southern direction to an unnamed tributary of Waterloo Creek. The unnamed tributary drains approximately 2.0 km to connect to Waterloo Creek where it drains in a north then north westerly direction. Waterloo Creek is an uncontrolled stream, whose flow patterns are largely natural. Flows occur in these streams from local runoff. Uncontrolled streams are typically ephemeral (flowing only during floods and freshes). Frequently, they open into or flow through wetlands and billabongs.

Water quality information is not available for Waterloo Creek, or the unnamed tributary. The site is within the lowland region of the Gwydir River Catchment, reference to DPI NSW, Gwydir Water Resource Plan, has yielded the following general description of the lowland region.

> *In the lowland part of the catchment, dissolved oxygen was frequently recorded at concentrations outside of the target ranges. Turbidity and suspended sediment were high throughout most of the lowland including the Gwydir Wetlands. High levels of turbidity can be a result of a number of factors including land use, bank and riparian condition, and the presence of invasive carp. Clay dominated soils have an increased susceptibility to re-suspension within the water column (DPI Water 2016a). Nutrient concentrations were mostly at medium to high levels in the lowland. Upstream of the wetlands, nutrients were generally associated with runoff and erosion during rainfall events. However, this relationship was not as strong downstream of the wetlands. 'Improved' soils associated with cropping and irrigation are a potential source of excess nutrients in the lowland, as well as nutrients associated with suspended sediment. Algal blooms are rare in the lowland, though there are occasional blooms of non-harmful species. Isolated algae blooms occurred in the wetlands. Salinity in the lowland was generally excellent for irrigation purposes with specific adsorption ratios being low at all times. Historically pesticides have been a major pollutant in the lower Gwydir catchment however, pesticide levels were reducing until the mid-2000s when monitoring ceased. Although spray drift and bioaccumulation of historical contamination have been reported in the wetlands, limited information on the current status of pesticide or toxicant pollution is available (DPI Water 2016a).*

5.8.2 Potential Impacts

Environmental impacts on water quality as a result of the operation of the proposal may include:

- Erosion and subsequent degradation of water quality
- Release of sediment to water through erosive processes
- Changes in downstream flows
- Spills and leaks and subsequent degradation of water quality.
- Large spills of environmentally hazardous materials, or leaks that continue over extended periods contaminating the groundwater and surface water.

These impacts may result from the following:

- Vegetation clearing
- Topsoil stripping
- Overburden removal
- Construction and maintenance of internal roads and hardstands
- Stockpiling of topsoil and Quarry product
- Accidental spillage during handling of materials
- Storage, handling and use of hydrocarbons and other environmentally hazardous substances

5.8.3 Management and Mitigation Measures

The following measures would be implemented for the proposal.

Table 16 – Water Quality Management

Aspect	Control
Storing fuels, chemicals, wastes and other potentially environmentally hazardous substances	• All waste will be stored in a suitable receptacle and removed from site as required. • All hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of: o AS 1692-2006 – Steel tanks for flammable and combustible liquids o AS 3780:2008 – The storage and handling of corrosive substances o AS 1940:2004 – The storage and handling of flammable and combustible liquid o AS 3833:2007 – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers • Bunds will be kept in good condition (e.g. no cracks, gaps or leaks). • Roofed storage facilities are to be provided where possible. • Stormwater captured within bunding is to be removed as soon as practicable and appropriately disposed of as contaminated water. • Empty hydrocarbon and chemical containers are to be stored closed, in place on a concrete hardstand or within a bunded area. • A collection sump or valve must be provided in the floor of the bunding to facilitate the removal of liquids. • Where vehicle access to the bunded area is required, access must be by way of a rollover bund. • Develop site-specific procedures for storing hazardous materials including details on: o Quantities of hazardous materials will be kept to a minimum, commensurate with their usage and shelf life. o Safety Data Sheets of stored hazardous materials will be readily accessible at the place of storage. o Permanent and temporary containers that hold hazardous materials will be labelled with the relevant safety and risk phrases. o The volume and types of hazardous materials stored will be known, current and documented and will not exceed the design capacity of the storage area. o Hazardous materials that may degrade in storage and thus become more dangerous will be identified and managed. o Storage and containment areas (including secondary containment) will be inspected for signs of loss or damage and any deficiencies will be addressed. o Hazardous materials no longer in use will be identified and assessed to determine if they should be removed from site. o Dangerous goods will not be held in transport storage areas for longer than five consecutive working days. Where they are required to be stored for longer periods, they will be moved to permanent hazardous materials storage areas.
Refuelling	• Temporary bunding, drip trays or impermeable matting must be used to prevent spillage from any in field refuelling or maintenance of plant and equipment, or any other activity that could result in spillage of a chemical, fuel or lubricant to soil. • Refuelling of plant and vehicles must be conducted in designated areas away from sensitive receptors and at least 100 m away from watercourses, water holes, lakes or wetlands. All in field refuelling must include the use of a temporary bund to contain any spills. • Refuelling will utilise auto shut off valves. • Maintain appropriate spill kits and PPE at designated locations on site (e.g. refuelling locations, chemical storage facilities, mobile equipment). • Ensure employees are familiar with, and trained in the use of, proper spill clean-up procedures.
Vehicles and Equipment	• All vehicles, plant and equipment must be maintained in accordance with manufacturer's specifications and kept in good working order. • Routine maintenance and inspections of earthmoving equipment must be conducted.

Aspect	Control
	• All scheduled maintenance activities must be undertaken at designated workshop areas. Any in field maintenance or refilling should utilise small volumes to limit the quantity of material that could be potentially spilt. Vehicle, plant and equipment maintenance activities will be undertaken off site where possible.
Dewatering of Stormwater	• Runoff from disturbed areas are to be captured within the sediment basin to be designed and installed in accordance with DECC (2008) *Managing Urban Stormwater - Soils and Construction (Volume 2E).* • Water collected within sediment basins will be monitored prior to release. • Only water meeting discharge requirements will be released.
Erosion and Sediment Control	Installation • Erosion and sediment controls will be installed prior to, and during, initial clearing and grading works, and regularly inspected as part of the day-to-day tasks. • Strategies / mitigation measures for the management of surface water runoff and erosion and sediment transport from the site will be implemented in accordance the relevant approval conditions. • The sediment basin must be designed assuming the full catchment is going to be disturbed. The associated inflow catch drains must be constructed also prior to earthworks commencing on site. Site Management • Land-disturbing activities must be undertaken in such a manner that allows all reasonable and practicable measures to be undertaken to: o Allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities up to the specified design storm discharge. o Consider a staged approach to clearing to ensure that ground covers remain in place and that unnecessary disturbance does not contribute to sediment loss. o Minimise soil erosion resulting from rain, water flow and/or wind. o Minimise adverse effects of sediment runoff, including safety issues. o Prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff. o Ensure that use of land/properties adjacent to the development are not diminished as a result of the adopted ESC measures. Site Access • Site exit points must be appropriately managed to minimise the risk of sediment being tracked onto public roadways. Drainage Control • Wherever reasonable and practicable, all stormwater runoff entering the site from external areas must be diverted around or through disturbed areas in a manner that minimises soil erosion. All site water from contaminated or sediment laden areas is required to be collect in a sediment basin specifically designed for the site's catchment and climatic characteristics. • Within the internal drainage area reporting to the sediment basin, silt traps and sediment control devices will be implemented to slow the velocity of the water, ensuring no unnecessary erosion occurs and that the sediment basin remains efficient in settling out sediments within a 5-day period. Sediment Control • Sediment traps must be installed and operated to both collect and retain sediment. • Where sediment basins and other sediment control devices pose a safety risk to workers these areas should be isolated (fenced) from commonly accessible areas to maintain site safety. • All reasonable and practicable measures must be taken to prevent the release of sediment from the site. • Suitable all-weather maintenance access must be provided to all sediment control devices. • Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event, whether natural or artificial, if the device's sediment retention capacity falls below 75% of its retention capacity. Site Maintenance • All erosion and sediment control measures, including drainage control measures, must be maintained in proper working order at all times during their operational lives.

Aspect	Control
	• Sediment removed from sediment traps and places of sediment deposition must be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm. Soils Management *Topsoil* • Topsoils will be stockpiled separately and not mixed with subsoils, mulch or other materials. • Topsoils must be stripped and handled with care to minimise compaction and structural degradation and where practicable, stripped topsoil should be re-used by application to areas where a similar soil type is required for rehabilitation. • Topsoils stockpiled for extended periods (>28 days) must be evaluated and treated to prevent erosion and weed infestation, stockpiles may be vegetated, covered or sprayed with a soil binder. • Topsoil stockpiles height must be not greater to 3 m. • Topsoils are to be stripped and stockpiled separately to subsoil and overburden materials for use in the rehabilitation process. *Stockpiling* • Excavated materials will be stockpiled in designated areas and stored separately from other materials (e.g. vegetation, mulch, water tyres, topsoil, overburden). Signage and/or survey plans will be used to delineate the separate stockpiles. • Stockpiles will be located to minimise loss of material from water and wind erosion and avoid subsequent sediment release. The stockpiles will also be contained by the use of erosion and sediment measures. • Stockpiles must not be located where there is the potential to result in sedimentation or acidification of land or surface water. Soil containment measures (e.g. berms) should be used as necessary. • Stockpiled soil must be placed in a designated area, which does not impede the movement of fauna and or vehicles. • Stockpiles should not impede natural or constructed surface drainage channels or access tracks. Stockpiles must be located above flood level. • Stockpiles will be visually monitored for erosion and or weeds and appropriate controls implemented when required. • All soil and vegetation or other stockpiles will be stored within the approved construction area. Stockpiles will be located away from discharge zones and placed in locations where they will not be disturbed by other activities. Stockpiles will not be located against fence lines, or within vegetation to be retained including the tree protection zones of vegetation to be retained. • Stockpiles of material that has the potential to cause environmental harm if displaced, must be: o Adequately protected from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows. o Located at least 5 m from any hazardous area, retained vegetation or concentrated drainage line. o Located up-slope of an appropriate sediment control system. o A suitable flow diversion system must be established immediately up-slope of a stockpile. o Prior to wet season (Nov - March) soil stockpiles should be managed or located out of concentrated stormwater flow paths.
Commitments	• Erosion and Sediment Control Plan (prepared in accordance with DECC (2008) *Managing Urban Stormwater - Soils and Construction (Volume 2E)* to be prepared prior to works commencing. • Environmental Management Plan to include surface water management measures identified in the Surface Water Assessment. • Groundwater will not be extracted from the site for dust suppression water.

5.8.4 Assessment of Impacts

Surface Water Management Strategy

The SWA (refer Attachment 8) has been prepared to adequately address the requirements of the SEARs for the proposal. It is proposed to manage the disturbed quarry area by diverting all surface water to a sediment basin in the lower ancillary operations area (RL 319m AHD). Clean water upstream is proposed to be diverted around the quarry area and return to natural pre-developed drainage lines. In order to meet the requirements of the EIS, the sediment basin is proposed to be designed, constructed and operated to retain the disturbed area runoff at the site in accordance with DECC (2008) *Managing Urban Stormwater - Soils and Construction (Volume 2E).*

The quarry proposes to harvest surface water for reuse in operations through construction of the sediment basin and the clean water dam as shown in the Surface Water Assessment. The sediment basin is proposed to be used for the treatment of surface water, and also for reuse into quarry operations. The total volume for the sediment basin is proposed to be 4.0ML. An existing surface water harvesting system exists onsite, and a portion of this system is proposed to be used for the collection of additional surface water for reuse into quarry operations. The clean water dam is proposed to be constructed with a capacity of 2ML.

Water Balance

A detailed water balance assessment was conducted. The operations are proposed to occur 5.5 days per week (Monday to Saturday morning) for a maximum of 50 weeks per year. Based on these expected operating days, the daily usage figures were revised from the earlier estimated usage (reducing by approximately 25%) when compared to the projections for operating 365 days per year. This clarification revised the annual expected usage down to 68.7ML, compared to 91.2ML as originally stated for operating 365 days per year. In addition to the above consideration, the applicant has identified a proprietary product that can reduce water usage for the purposes of dust mitigation, with an average reduction of 30% (Haulage DC, by Polo Citrus Australia Pty Ltd) (refer Attachment 14). This product would further reduce water usage by around 45kL/day (105kL/day for dust mitigation, down from 150kL/day). Based on the above clarifications and proposed strategy, the annual water usage is therefore estimated to be 60.6ML per year, with a supply of 88.2ML and 41.5 ML for above and below average rainfall years respectively.

It is expected that water will be required to be sourced from external licensed water suppliers from time to time to meet the anticipated shortfalls for quarry operations. As outlined in the water balance assessment results, up to around 19.0ML per annum is expected to be required in a drier than average year. The available rainfall records indicate the 10th percentile annual rainfall is 376.9mm, and the analysis was based on an annual rainfall of 324mm. Therefore, overall it is expected that the quarry will be moderately self-sufficient in water supply.

In the driest scenario (2018 rainfall), the water balance indicates water will need to be imported 137 days per year. In the above average rainfall scenario (2016 rainfall), the water balance indicates water will need to be imported 32 days per year. It is noted that these scenarios assume a total dam volume of 6ML.

Construction and operation of the development can be undertaken with any additional water requirements being reasonably obtained from an appropriately authorised and reliable licensed water supplier. The quarry will be responsible to ensure that any licensing requirements and other approvals required under the Water Act 1912 and/or Water Management Act 2000 are obtained.

During the days in the year where water could not be sourced from the quarry dam, the quarry would need to import up to 155m3 (155,000L) of water for dust suppression (per day). In these events, water for dust suppression would be sourced from an appropriately authorised and licenced water supplier such as Moree Plains Shire Council (refer Attachment 13 – Council Water Supply Letter).

The proposal does not include extraction of groundwater for dust suppression from the site.

Water Discharges

The surface water infrastructure will be managed to minimise the likelihood and frequency of water releases by reuse of captured water for dust suppression. Site specific water quality information is not currently available therefore the default discharge criteria has been adopted which is an approach consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000). The SWA anticipates that there will be instances where water will be discharged due to the sediment basin and/or clean water dam exceeding capacity. As demonstrated in the water balance assessment, there are 34 days per annum expected where water will be discharged due to the sediment

basin and/or clean water dam exceeding capacity in the above average rainfall scenario, and 8 days per annum expected in the below average rainfall scenario. In those events, the water will be sampled and treated prior to discharge into the existing on site farm drain. It is proposed that the quarry would adopt water quality discharge parameters of:

- pH of 6.5 to 8.5; and
- Total Suspended Solids (TSS) of 50 mg/L.

Conclusion

While the proposal has the potential to generate sediment an adequately sized sediment basin designed to capture site run off. This provides a controlled environment where the site can capture and treat water prior to discharge thus minimising the impacts to the receiving environment. Based on the adoption of the management measures outlined the site can be managed to minimise the potential impacts on water quality and will be moderately self sufficient and where there is a water shortfall it can be addressed by importing water from an appropriately licenced water supplier.

5.9 Groundwater

5.9.1 Existing Environment

The site is located within the Gwydir River Catchment which has a number of applicable water sharing plans. The relevant water sharing plans for the site are as follows:

- Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008
- Water Sharing Plan for the NSW Great Artesian Basin Shallow Groundwater Sources 2011
- Water Sharing Plan for NSW Murray Darling Basin Porous Rock Groundwater Sources – Gunnedah 2011

The site is also within the Surat Groundwater Source. The Surat Groundwater Source underlies the catchment west of Moree. The Surat Groundwater Source covers an area of 73,418 km^2 and the water is primarily used for stock, domestic, commercial purposes such as spa bath industries and mining. The area is characterised by a high density of bores, particularly in the south, and high flowing bores with numerous bore drains in the north.

The Groundwater Aquifer is described as Inland Alluvial, as per the NSW Office of Water resources and management overview – Gwydir catchment 2011, which further broadly describes the are as being of moderate quality, ranging from 500 – 1,500 Total Dissolved Solids mg/L, suitable for domestic, stock and some irrigation purposes. Figure 24 – Groundwater Aquifer Type – Gwydir Catchment shows the approximate site location in relation to the aquifer type.

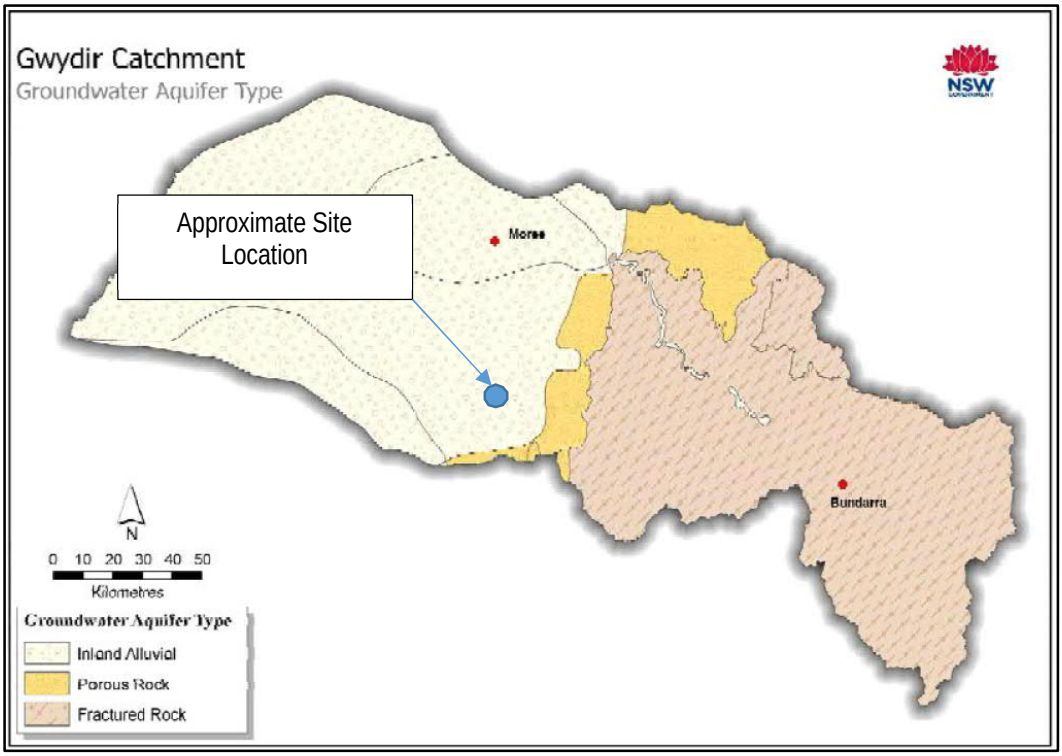


Figure 24 – Groundwater Aquifer Type – Gwydir Catchment
(source http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548936/catchment_gwydir_overview.pdf)

There are no active groundwater monitoring stations in reasonable proximity to the site. A number of bores have been identified from the Water NSW database. These are shown below in Figure 25 – Groundwater Bores.

Figure 25 – Groundwater Bores

A summary of available information from these groundwater bores is provided below in Table 16 – Groundwater Data Summary. The bores are used for stock and domestic purposes and have been installed to target deep aquifers suitable for supporting high yields. A search has been undertaken to determine if any shallower aquifers exist in close proximity to the site as these may be more susceptible to impacts from site operations.

Table 17 – Groundwater Data Summary

Bore ID	Date	Depth	Standing Water Level	Salinity Description	Purpose
GW005969	1935	43.5 m	39.6 m	Slightly brackish	Stock
GW029476	1968	79 m	53	Fresh	Stock

Groundwater dependent ecosystems (GDEs) are defined as ecosystems which have their species composition and their natural ecological processes determined by groundwater. A search of the GDE Atlas (Source: BoM) has been undertaken for the three types of GDEs:

- Aquatic ecosystems that rely on the surface expression of groundwater - this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs. Marine and estuarine ecosystems can also be groundwater dependent, but these are not mapped in the Atlas.
- Terrestrial ecosystems that rely on the subsurface presence of groundwater–this includes all vegetation ecosystems.
- Subterranean ecosystems which includes cave and aquifer ecosystems.

The presence of the Aquatic and Terrestrial GDE's in relation to the site is provided below in Figures 26 and 27 respectively. Note that there are no mapped Subterranean GDE's in the region. The mapping indicates there are no mapped areas of Aquatic GDEs near the site. It is however evident that the unnamed tributary and the Waterloo Creek may contain areas of Terrestrial GDEs. The Terrestrial GDE for the site is described as Mock Olive – Wilga – peach Bush – Carissa semi evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion (source, BoM 2018). It is noted that this is regarded as a low potential GDE, and given the position in the landscape, atop Black Hill, well above the groundwater table it is unlikely that the proposal contains a GDE. Furthermore, field work for the biodiversity assessment did not identify any GDE.

Figure 26 – Aquatic GDE

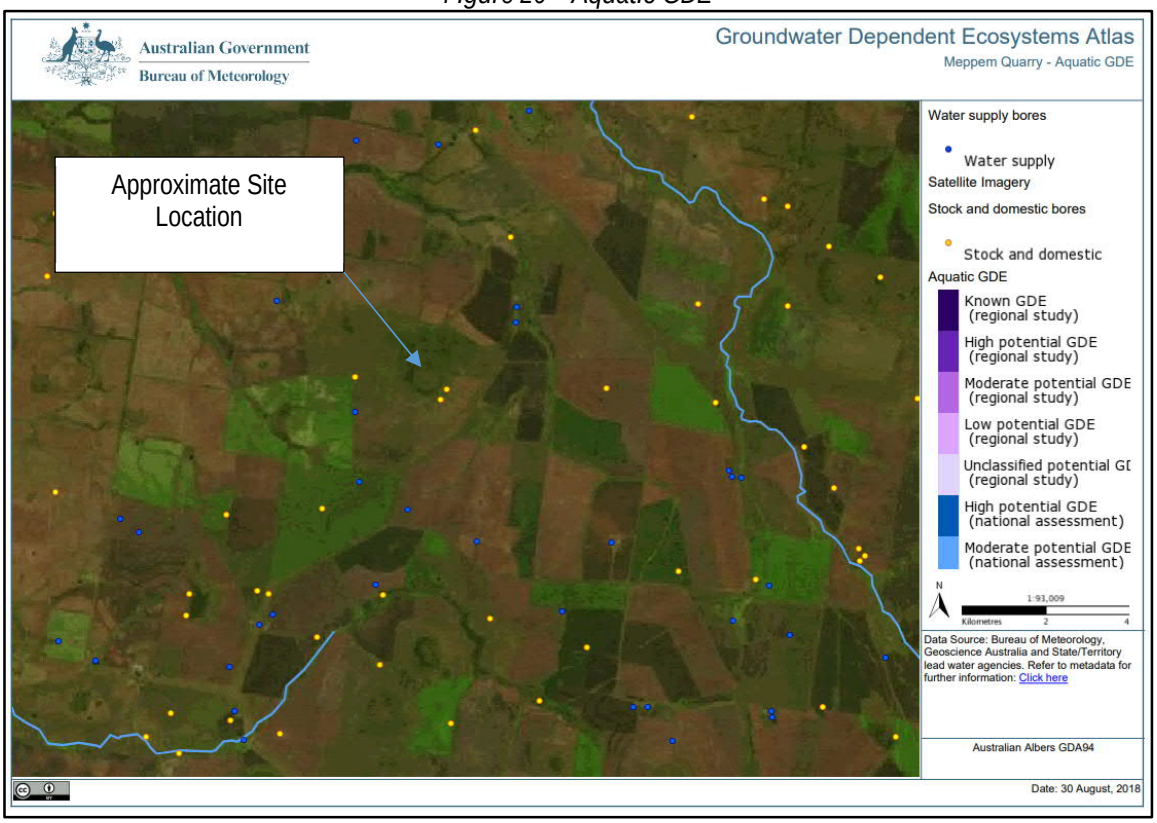
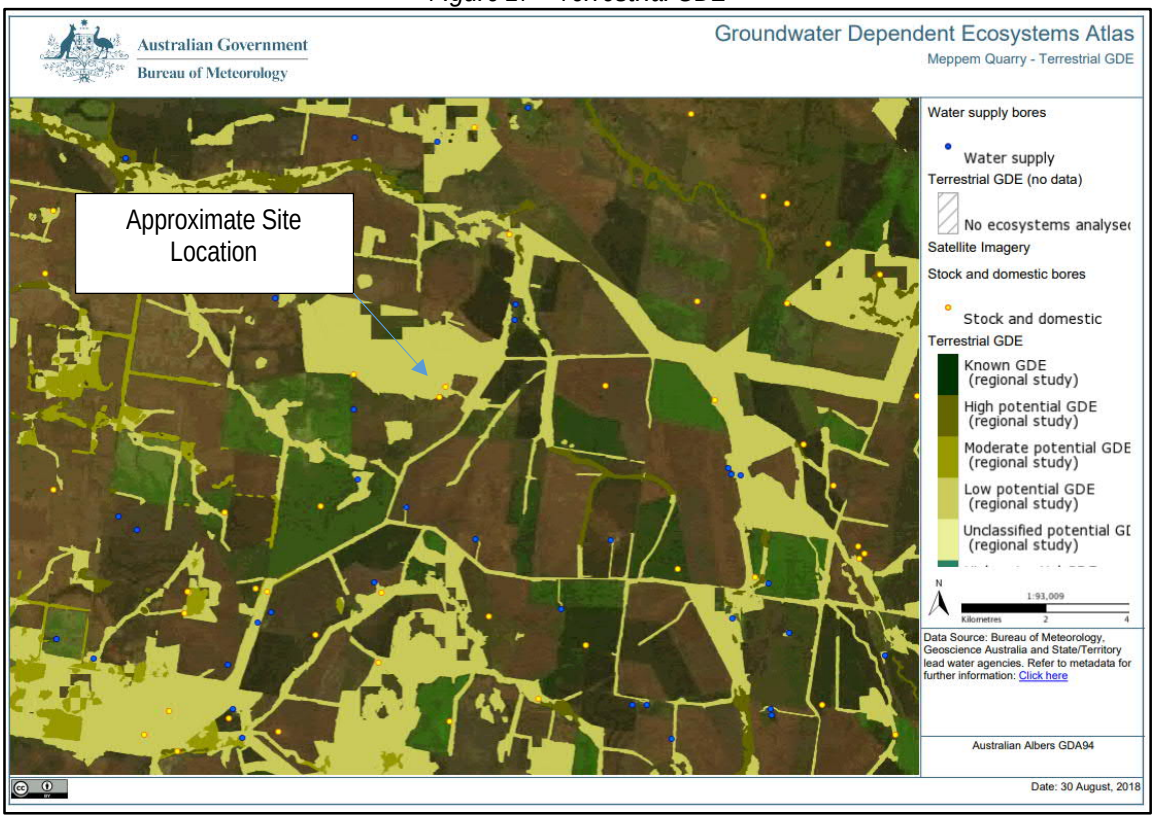


Figure 27 – Terrestrial GDE



5.9.2 Potential Impacts

If groundwater was to be intercepted potential impacts may include the following:

- Drawdown of groundwater from sourced aquifer(s) for operations needs such as dust suppression.
- Drawdown of groundwater in overlying and underlying units of sourced aquifer(s).
- Reduction in piezometric head, within aquifers sourced for operational purposes, which could result in the reduction of landholder bore yields.
- The reduction in baseflow to surface water systems.
- Impacts on groundwater dependant ecosystems in the context of groundwater quality, quantity and flow characteristics.
- Impacts on groundwater quality as a result of surficial impacts in the form of leaks, spills, surface runoff and seepage into shallow aquifers.

5.9.3 Management and Mitigation Measures

The following measures are recommended to ensure potential impacts to groundwater are managed and minimised.

Table 18 – Groundwater Management

Aspect	Control
General	• Avoid groundwater impacts
Groundwater Quality	• Chemicals and fuels in containers of greater than 25 litres must be stored within a secondary containment system. • All hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of: o AS 1692-2006 – Steel tanks for flammable and combustible liquids o AS 3780:2008 – The storage and handling of corrosive substances o AS 1940:2004 – The storage and handling of flammable and combustible liquid o AS 3833:2007 – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers • Ensure any groundwater bore and properly encased to minimise deterioration of water quality
Groundwater Quantity and Use	• Not applicable – groundwater will not be used or accessed by the proposal
Groundwater Intersection	• Maintain quarry floor and extraction areas above the groundwater table. • If groundwater becomes noticeable during the exaction activities, cease work and discuss with DPI Water to identify appropriate mitigation measures
Commitments	• The proposal will not intercept groundwater. • The proposal will not use groundwater for dust suppression water.

5.9.4 Assessment of Impacts

It is noted that groundwater was not intercepted as part of the initial geological drilling program conducted at the site. The resource proposed to be extracted is limited to approximately 30 m below surface, which is above the height of the groundwater levels as identified in Table 19.

It is unlikely that groundwater will be intercepted as part of site activities because the proposal will be contained above the groundwater levels and therefore groundwater impacts from the proposal are unlikely. By implementing the proposed management measures the proposal would have minimal impact to groundwater resources.

5.10 Biodiversity

5.10.1 Introduction

Advitech Pty Limited trading as Advitech undertook a Biodiversity Development Assessment Report (BDAR) for the proposal (refer Attachment 5). This BDAR aims to provide an assessment of the biodiversity of the proposed hard rock quarry in accordance with the Biodiversity Assessment Methodology (BAM). As such, this BDAR supports the Environment Impact Statement (EIS) completed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for the proposal.

5.10.2 Existing Environment

The locality of the proposal site is rural in nature, with farming (cropping) making up the predominant land use in the region.

Black Hill (an extinct volcanic plug) located at the northern end of the proposal site rises approximately 58 metres above the surrounding basalt plains with a maximum elevation of 358 metres. Vegetation in the study area is sparse, usually consisting of scattered trees often associated with road reserves or drainage lines. At the proposal site, vegetation is limited to the mid-slopes and crest of Black Hill. This vegetation extends further north of the proposal site and covers most of Black Hill, including the footslopes. This patch of vegetation is surrounded by cropping lands and is isolated from other large habitat patches. Vegetation within the proposal area is disturbed, regrowth vine thicket forest with existing tracks through the vegetation associated with the historic agriculture use of the property as shown in Figure 28 – Plant Community Type.

One PCT was identified within the site, PCT 147 Mock Olive – Wilga – Peach Bush – Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion. The PCT is identified as Endangered: Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions under the BC Act and the EPBC Act.

This PCT occurs along the midslopes and crest of Black Hill. At the proposal site, the community resembles dry rainforest made up of vines, shrubs and trees. The community occurs in three different condition classes. Zone 1 - Disturbed thicket (low to moderate condition) occurs at the crest of the hill, Zone 2 – Intact thicket (moderate to good condition) occurs at the mid slope of the hill and Zone 3 – Disturbed thicket (low condition) occurs at the base of the hill. Vegetation is primarily regrowth and significantly disturbed through past clearing and ongoing grazing by stock. Low canopy species include Geijera parviflora (Wilga), Ehretia membranifolia (Peach Bush) and Notelaea macrocarpa (Native Olive). Emergent Eucalyptus populnea (Bimblebox) and Casuarina cristata (Belah) occur infrequently along the midslope of the hill. The shrub stratum includes Carissa ovata (Currant Bush) and Capparis mitchellii (Wild Orange) while the ground layer consists of various chenopods and grasses including Enchylaena tomentosa (Ruby Saltbush) and Paspalidium gracile (Slender Panic).

This community is a disturbed isolated remnant that has been subject to previous clearing and ongoing grazing disturbance. Despite these pressures, the site does hold regeneration potential. For example, saplings of trees were recorded in highly disturbed areas. Three condition classes of vegetation are described:

- Zone 1 – Disturbed thicket: Low to moderate condition vegetation occurs on the crest of the hill, a total of 23 native species were recorded in quadrats. Vegetation is regrowth and includes regenerating trees and shrubs and a developed ground layer of forbs, grasses and chenopods.
- Zone 2 – Intact thicket: Moderate - good condition vegetation occurs on the midslope of the hill, a total of 21 native species were recorded in quadrats. Vegetation is structurally complex compared to other condition classes with a presence of large trees, dead wood and leaf litter.
- Zone 3 – Disturbed thicket: Low condition vegetation occurs at the base of the hill, a total of 19 native species were recorded in quadrats. Native shrubs and trees are sparse, Casuarina cristata (Belah) occurs infrequently as a paddock tree.

Minor to major weed occurrence was recorded, the highest levels primarily occurring in Zones 1 and 3.

Vegetation on Black Hill does not connect to large areas of continuous vegetation in the local landscape. Vegetation on the hill is isolated; however, there is some connectivity to the Waterloo Creek riparian corridor through paddock trees. Paddock trees and tree coverage in road corridors provide 'stepping stones' which help support highly mobile species such as birds that move across the landscape.

Figure 28 – Plant Community Type

Fauna habitat resources are present throughout the proposal, including within the construction footprint. Key habitat features recorded within the proposal site include:

- Trees and shrubs may provide foraging and nesting habitat for a range of birds and reptiles;
- Hollow bearing trees, including paddock trees provide nesting and shelter habitat for birds and microchiropteran bats;
- Fallen timber including hollow logs provide habitat for fauna including invertebrate species dependent on decaying wood;
- Ground cover including leaf litter, grassy tufts, and dead wood may provide habitat and cover for a range of small terrestrial species; and
- Rocks including loose boulders provide shelter for reptiles.

No threatened / candidate fauna species were recorded at the proposal site. A list of all fauna species recorded during fieldwork is listed in Appendix III of the BDAR. Targeted searches for all but two potential candidate species, Tytonovaehollandiae (Masked Owl) and the Little Eagle (Hieraaetus morphnoides), was carried out in the specified survey periods generated by the BAM calculator. Breeding habitat was ruled out for both species. The proposal will not impact any hollow bearing trees with the potential to support large tree hollows that provide breeding habitat for T.novaehollandiae. Breeding habitat for H.morphnoides was ruled out due to the absence of stick nests within the proposal area.

It is noted that the unnamed tributary and Waterloo Creek downstream of the site, has been mapped by the Department of Primary Industries and Fisheries, as potential habitat for the Threatened Freshwater Fish, Purple Spotted Gudgeon. See Figure 29 – Purple Spotted Gudgeon Habitat.

Figure 29 – Purple Spotted Gudgeon Habitat (Department of Primary Industries)

5.10.3 Potential Impacts

The proposed extraction activities will result in the removal of native vegetation present within the proposed quarry area. As the clearing proposed as part of the proposed development is over 0.5 Ha on a lot larger than 1 Ha the assessment under the Biodiversity Assessment Method is triggered. Based on this Advitech have carried out an assessment against the BAM to ensure that the proposed clearing is appropriately offset as per the NSW requirements. Based on the proposed clearing the potential impacts to biodiversity may result from the following:

- Removal of vegetation contributing to the loss of ecological values of the site and edging effects with remaining areas of remnant vegetation communities.
- Vegetation removal may also impact the local fauna in the area by detracting from habitat, nesting and foraging areas.
- Increased movement of people, vehicles, machinery, vegetation waste and soil may contribute to the onset of weeds at, and near, the Meppem Quarry which could detract from agricultural productivity and native ecosystems.
- Degradation of water quality within the unnamed tributary and downstream of the site causing impacts to habitat for the Purple Spotted Gudgeon.

5.10.4 Management and Mitigation Measures

The following mitigation measures are proposed to minimise the likelihood of biodiversity impacts from the proposal.

Table 19 – Biodiversity Management

Aspect	Control
Flora	• A vegetation assessment must be undertaken prior to work commencing to determine the presence of weed outbreaks, hollow baring trees, threatened species, communities or their habitat. Any significant areas would be mapped, and areas not approved for clearing would be delineated with exclusion fencing or flagging to prevent over clearing occurring. • All machinery operators would be briefed in a toolbox talk about site specific vegetation clearing to unsure the task and associated risks are well understood. This may include the use of GPS guidance to verify clearing limits. • All machinery to be used during land clearing operations is required to be weed free prior to arriving at site. Weed hygiene practices in the EMP are to be followed to ensure the spread of weeds are minimised. • Significant features of the landscape that could be reused on site during rehabilitation to create habitat structures will be identified and salvaged prior to land clearing operations. • Undertake vegetation clearing in stages. • Survey pegs or bunting flags will establish the full extent of each vegetation clearing stage and the total approved vegetation clearing area to ensure no over clearing or encroachment occurs.
Fauna	• Vegetation clearing must be undertaken in a staged manner to allow ground dwelling and avian fauna to disperse away from areas being cleared on their own accord. • For any approved clearing of areas that include habitat features, a spotter-catcher will be used to assess hollows are relocate any species that are identified to be at risk during clearing operations • Prior to the commencement of clearing operations, the nearest wildlife carer would be identified, and all workers made aware of native wildlife can be taken to in the unlikely event of injury. • Habitat features such as hollows and log piles will be salvaged, where possible, and placed in nearby (retained) habitat areas and used in the rehabilitation of the quarry site. • Work areas are to be checked regularly for fauna that may have entered the work area or become trapped. The sediment dam should remain fenced to exclude native fauna from watering from this area where they could potentially become trapped. • If fauna must be relocated, a qualified spotter catcher who holds a rehabilitation permit must be engaged to handle, capture and or relocate native fauna. • All waste receptacles should remain sealed and covered at all time to prevent attaching native wildlife into the operational areas of the site. • No pet animals will be allowed to be brought to the construction site. • The quarry manager is to be notified immediately of any incident resulting in the harm, injury or death of a fauna species.

Aspect	Control
Pests and Weeds	*Site Awareness* • Site inductions for all staff must include information regarding the local weed and pest species that may be present, and protocols required to be undertaken for control of these species. • Training must be provided to all staff regarding the weed identification and management procedures, protocols and restrictions placed on bringing domestic animals onto the site. *Prior to Construction.* • Prior to construction, a baseline weed survey would be undertaken to identify the extent of the weed populations across the site, weed management of these areas would be planned prior to disturbance to ensure the spread is minimised. All areas of the site would be regularly monitored to identify any new outbreaks occurring that would require treatment. • Vehicles and equipment are to be cleaned before being brought to site and inspected on arrival at the site. All visitors should be advised of the nearest weed wash down facility in the region. • Vehicles and earthmoving equipment imported interstate for project use will be thoroughly cleaned at their point of origin and accompanied by a weed hygiene declaration certificate to ensure that biosecurity laws are maintained. *Infested Areas* • Signage is to be installed at weed hot spots identified through the baseline survey. • Weed control will be undertaken in areas that are very heavily infested or where WONS or Class 1 or 2 weeds present prior to disturbance. • Where weed or other pest and disease infestations are identified the infested area should be assessed and appropriate treatment measures prior to any disturbance in the area. Access to these areas will be restricted with exclusion fencing and signage. • If infestations of weeds continue following treatment advice form a pest plant expert should be sought. *Chemical Control* • In the event that chemical control is required, personnel undertaking chemical weed control measures must be qualified to store, transport and apply chemicals • All chemicals must arrive at site with the corresponding material safety data sheet and be risk assessed and approved by the Quarry Manager or delegate. The storage guidelines should be followed, and all chemicals should be kept in a bunded area with appropriate labelling. *Earthmoving* • All materials including gravel, mulch, packing materials, sand and soil must be inspected and be certified weed and pest free before being accepted at site. Copies of the weed hygiene declaration forms must be kept on site at all times. • Soil stripped and stockpiled from areas containing known weed infestations, particularly of declared weeds, are to be stored separately and are not to be moved to areas free of weeds. • Where applicable and appropriate, disturbed topsoil and vegetative material will be returned as close as possible to the original sites in order to limit the potential spread of weeds and pathogens. • Vegetation and soil waste should not be moved to areas of lower weed infestation. *Pest Animals* • All waste receptacles should remain sealed and covered at all time to prevent attracting pest animals into the operational areas of the site. • Pest animal populations will be monitored during operations. Strategies will be implemented to discourage pest animals to access the site, however if pest animals are noticed in increasing number the relevant abatement programs will be established.
Commitments	• Environmental Management Plan to include a Weed Management Plan. • Environmental Management Plan to include a Fauna and Flora Management Plan

5.10.5 Assessment of Impacts

The BDAR undertaken by Advitech (refer to Attachment 5) concludes that no matters of national environmental significance or threatened species would be affected by the proposal. However, the vegetation required to be cleared for the proposed development will result in the removal of 9.15 Ha of the vegetation type known as PTC 147 – Mock olive – Wilga – Peach Bush – Carissa Semi-evergreen Vine Thicket (dry rainforest).

Three condition classes (vegetation zones) of this PCT were identified at the proposal site. Two vegetation zones (1 and 3) occur inside the proposal area with a combined impact area of 9.15ha. Vegetation in zone 1 (5.33 ha), located on the crest of Black Hill is consistent with the Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions TEC description. This TEC is listed as Endangered under the NSW BC Act (2016) and Federally under the EPBC Act (1999). Low condition vegetation in Zone 3 (which had a VIS score of 9.8) did not meet the EEC description.

The final footprint of the quarry has been designed to limit the ecological impact where possible by avoiding impacts to vegetation zone 2 (good condition vegetation, located on the midslope of Black Hill) and retaining the majority (13/14) of paddock trees located along the haul road or at the base of the extraction area.

The BAM calculator identified a total of seven candidate species (species credit species) and 14 predicted species (ecosystem credit species) required consideration for assessment. No threatened/candidate species were recorded during targeted surveys. Other candidate species were considered unlikely to occur at the proposal site as the site lacked specific habitat requirements or was assessed as substantially degraded such that the species is unlikely to utilise the proposal site.

Key safeguard and management measures identified to minimise and avoid biodiversity impacts include but are not limited to; detail delineation of vegetation clearing limits, relocation of woody debris into remnant habitat and development of protocols/management plans to control invasion and spread of pathogens and weeds.

53 ecosystem credits for the PCT 147 and 1 ecosystem credit for Paddock Trees is required to offset the proposal.

The proposal is a staged proposal and the credit obligation for each stage of vegetation clearing of the proposal is:

- Stage 1 = 1 credit
- Stage 2 = 26 credits
- Stage 3 = 27 credits
- Total = 54 credits

The extent of each stage of vegetation clearing is shown in Figure 2 of the BDAR.

The proponent would retire the credits associated with each vegetation clearing stage of the proposal prior to any works commencing on that vegetation clearing stage area. The offsetting requirement for each vegetation clearing stage will be achieved by retiring the required credits with the Biodiversity Conservation Trust prior to the disturbance of each Stage.

This proposal is unlikely to result in any impacts on wildlife movement given the small amount of regrowth vegetation (5.33 ha) in the proposal footprint and retention of vegetation on the mid-slopes within the proposal site.

5.11 Archaeological Heritage

5.11.1 Introduction

Advitech were engaged to undertake an Aboriginal Due Diligence Heritage Assessment and Historic Heritage Assessment of the proposal (refer Attachment 6 and 7) in accordance with the SEARs requirements for the proposal.

5.11.2 Existing Environment - Non-Indigenous Heritage

NSW has a number of statutory and non-statutory heritage databases. All relevant databases where searched including the NSW State Heritage Register (SHR), NSW State Heritage Inventory (SHI), Narrabri and Moree Plains Local Environmental Plan 2011 (LEP), Relevant Section 170 Registers (S170), Commonwealth Heritage list and National Trust List (NT). These searches revealed that there are no items of heritage at either Local, State or National level within 1 kilometre of the study area. There are previously identified heritage sites within the wider vicinity however the proposed development will not have any impacts on these known locations.

5.11.3 Existing Environment Indigenous Heritage

Many of the local Aboriginal people in the areas surrounding Bellata identify as being part of the Gamilaroi nation. The Moree Gamilaroi Local Aboriginal Land Council members are the Aboriginal custodians of the study area. It must also be considered that Aboriginal Cultures were not static and that clan and tribal boundaries, language groups and dialects most likely changed over many thousands of years. The native title claim is registered under the name of the Gomeroi People with the National Title Tribunal. This claim was registered in 2012.

Potential Archaeological Deposit (PAD)' and area(s)' of archaeological sensitivity' are used to describe areas likely to contain subsurface cultural deposits. An aboriginal archaeological assessment was carried out by Advitech to verify if any culturally sensitive areas were present of the site. The assessment was carried out in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (OEH 2011).

5.11.4 Potential Impacts

Vegetation clearing, and ground disturbance can potentially result in direct impacts to items of heritage value. The contextual setting of artefacts will also be effectively destroyed by ground disturbance. Blasting, drilling and the operation of machinery can also result in indirect impacts on items of heritage value. Similarly, disturbance and erosion of streams and drainage lines may expose artefacts on stream banks and drainage lines, with subsequent loss to downstream environments.

Potential impacts related to inadvertent discovery of non-indigenous cultural heritage items may arise from vegetation clearing and ground disturbance and hence, are similar during both the construction and operation phases.

Clearing and ground disturbances may result in inadvertent finds of items of actual or potential cultural heritage significance.

5.11.5 Management and Mitigation Measures

While no culturally sensitive heritage items were found during the site survey, the following management and mitigation measures are proposed to be implemented to ensure that the proposed has minimal impacts to any potential Indigenous and Non-Indigenous Cultural heritage:

Table 20 – Management and Mitigation Measures – Indigenous and Non-Indigenous Cultural heritage.

Aspect	Control
Aboriginal Cultural heritage	• Only undertake ground disturbing activities in areas of the site that have been assess and approved for ground disturbance. • Ensure that project staff and contractors and their employees are advised of their legal responsibilities under the National Parks and Wildlife Act 1974 and the Heritage Act 1977. • In the event that any Aboriginal artefacts, items or sites of cultural heritage are found during quarry operations, the following management procedures will be carried out: o Work will cease in the immediate area the project archaeologist will be required to attend site and assess the significance of the site/artefact/relic. Once the

Aspect	Control
	significance is known the relevant notifications will be made to the Office of Environment and Heritage (OEH) Heritage Division, Moree Local Aboriginal Land Council and Moree Plains Shire Council to determine the next steps. o In the event that human remains are found during the quarry operations, all works are to be cease, the site secured and the NSW police, the coroner, OEH heritage and the Aboriginal Community will be notified if it is suspected or confirmed that the remains are of aboriginal origin. o Consultation will be carried out as appropriate in accordance with the following documents: ▪ Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010; ▪ The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010. Please refer to the Environmental Management Plan for the full unexpected find protocol.
Non-Indigenous Heritage	• Site inductions for all staff are to include education sessions regarding Non-Indigenous Cultural Heritage. • Undertake Unexpected Finds awareness training sessions with all site personnel as part of site induction. • In the event that an unexpected find of potentially significant heritage relic or human remains is found the works will cease, the site secured, and the quarry manager notified. The project archaeologist will be contacted to attend site to determine the significance of the site/artefact/relic. Once the significance is known the relevant notifications will be made to the Office of Environment and Heritage (OEH) Heritage Division, Moree Plains Shire Council to determine the next steps and if any relevant permits are required. • Advice will be sought from the consulting heritage specialist to determine whether further action is required for archaeological assessment and/or salvage and notification to regulatory bodies prior to the recommencement of works.
Commitments	• Environmental Management Plan to include a Cultural Heritage Management Plan including unexpected find procedures and training material.

5.11.6 Assessment of Impacts

Based on the findings from the field assessment completed by Advitech no items of cultural significance are present on the proposed quarry site. As such the proposal is unlikely to result in the disturbance of any Indigenous and Non-Indigenous Heritage objects. In the event that any Heritage objects or human remains are discovered as a result of construction or operations, all ground-disturbing activities would cease, and the unexpected find procedure implemented. Ground-disturbing works would only recommence following clearance from the relevant authorities. Following the implementation of the mitigation measures proposed in Table 22 the site can be managed to minimise impacts on cultural heritage.

5.12 Natural Hazards

5.12.1 Existing Environment – Flood Hazard Areas

The site is not within the Gwydir Valley Floodplain (Floodplain Management Plan for the Gwydir Valley Floodplain 2016). Similarly, the site is not mapped for "Flood Planning" under the NSW Planning Portal. Based on the quarry location on Black Hill, there is limited risk of the site being inundated by flooding.

5.12.2 Existing Environment – Bushfire Hazard

The proposed quarry is located within the jurisdiction of the Narrabri/Moree Bush Fire Management Committee and is therefore covered by the Narrabri/Moree Bush Fire Risk Management Plan (BFMC). The fire season in the Narrabri/Moree BFMC area generally runs from October through to March, however ongoing drought conditions means that the fire danger period has the potential to extend outside the normal timeframe. The area has on average 230 bush fires per year, of which 10 on average are considered major fires. For larger fires, the main source of ignition in the Narrabri/Moree BFMC area is lightning. Other less frequent causes of large fires are farming machinery, arson and escaped fires from both legal and illegal burning. Bushfire Prone Land as land that has been identified by local Council which can support a bushfire or is subject to bushfire attack. The NSW Rural Fire Service's Online Mapping Tool was accessed in August 2018, to assess whether the site is located in Bushfire Prone Land. Results of the search indicate that the site is located in Bushfire Prone Land meaning the proposed development is required to comply with the Rural Fire Service (RFS) guideline "Planning for Bush Fire Protection 2006" (RFS 2006). Results of the search result is provided below as Figures 30 and 31. Potential ignition sources are present on both the proposed development site and also on the neighbouring rural areas. Potential ignition sources for bush fire risk include the following:

- High Risk Activities such as hot works and welding
- Engine exhaust
- Malfunction of electrical infrastructure
- Portable Machinery (internal combustion engines)
- Combustion of flammable materials
- Discarded cigarettes
- Lightning
- Deliberate acts.

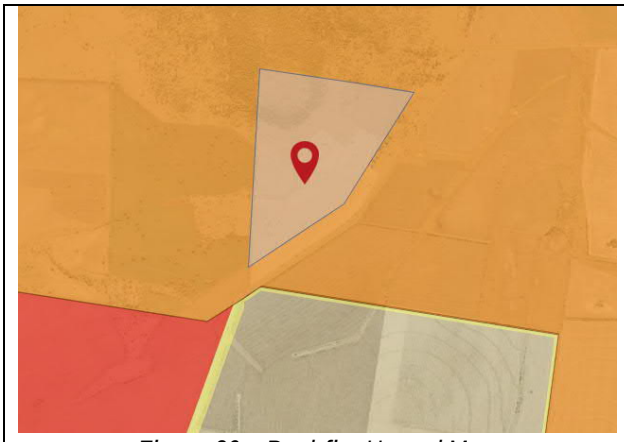


Figure 30 – Bushfire Hazard Map
https://www.planningportal.nsw.gov.au/find-a-property/751753_10

Mapped as - Category 3 Vegetation

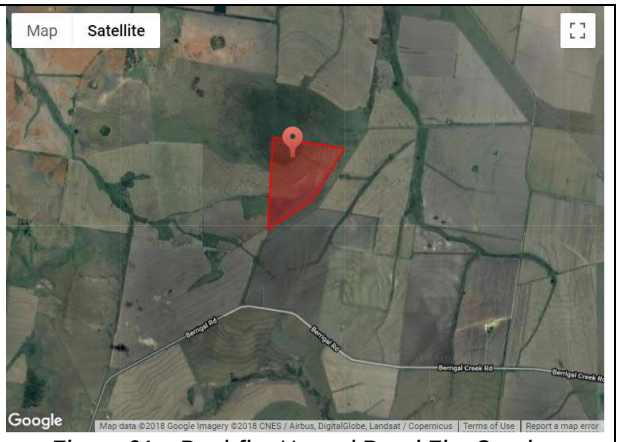


Figure 31 – Bushfire Hazard Rural Fire Service
https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl

Mapped as - Confirmed bushfire hazard.

5.12.3 Potential Impacts

Discounting flooding as a possible threat, Table 20 – Potential Impacts below identifies potential impacts for Bushfires only.

Table 21 – Potential Impacts

Receptor	Specifics
People:	• Staff and contractors • Rural landowners • Rural residential areas including interface areas • Travellers.
Property	• Agricultural/grazing land • Commercial/industrial land • Public infrastructure • Construction equipment • Support infrastructure • Primary infrastructure.
Environment	• Threatened species, populations and ecological communities • Locally important species and ecological communities, such as species and ecological communities especially sensitive to fire • Indigenous significance • Non-indigenous heritage • Other cultural assets.
Community & Reputation	• Reputation • Contractors reputation • Industry reputation.

5.12.4 Management and Mitigation Measures

The following management and mitigation measures should be implemented to ensure that the proposal has minimal potential impacts to bushfire hazards.

Table 22 – Management and Mitigation Measures – Bushfire

Aspect	Control
Objectives	The objectives outlined within the RFS 2006 have been considered. The objectives are as follows: • Afford occupants of any building adequate protection from exposure to a bushfire; • Provide for a defendable space to be located around buildings; • Provide appropriate separation between hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition; • Ensure that safe access and egress for emergency service personnel and residents is available; • Provide ongoing management and maintenance of bushfire protection measures; and • Ensure that utility services are adequate for firefighting needs.
Controls	*Risk Controls* • Management procedures for protection against fire will include: • Consulting with landowners and fire services for implementing fire control management on site in accordance with district/area fire control plans. • Providing fire breaks around the site, and in particular, fuelling areas, workshop areas and other areas where hydrocarbons might be present. • Ensuring all staff on site and other personnel are aware of evacuation procedures and the location and the use of firefighting equipment. • Keeping relevant agencies contact numbers in the event of a fire, namely Rural Fire Service. • Ensuring that extinguishers, fire hoses, fire blankets, sand buckets and other such equipment is regularly inspected and maintained in accordance with Australian Standard AS 1851-2005 (A4), Maintenance of Fire Protection Systems and Equipment. • Providing ready access to water storages on site for use in the fighting of fire.

Aspect	Control
	• Providing fire breaks around operations and in particular workshop and chemical storage areas. • Ensuring welding and other hot works is undertaken in controlled areas. *Ignition Sources* • Appropriate signage is to be erected near flammable and combustible areas e.g. 'No smoking stop engine', hazard symbols (explosive, flammable, combustible). • Any cigarette butts must be free of embers and discarded into site bins. Cigarette butts are not permitted to be thrown out of vehicle or plant windows or onto ground surface. • Vehicles and/or plant must be turned off during refuelling. • Mobile phones must be switched off when refuelling. *Fire Protection* • All vehicles and plant must be provided with fire protection equipment (e.g. fire extinguisher, fire blanket) that meets applicable Australian Standards. • Staff should be trained in the correct use of fire protection equipment. • An adequate water source must be kept on site at all times in the event of a fire e.g. sediment basin, recycled water tanker or the like. • All fire extinguishers must be clearly signed and their purpose clearly visible for the user. *Evacuation Plan* • A site Evacuation Plan must be prepared prior to the commencement of works. It is to be displayed in site offices and all staff trained in the event an evacuation of the site is required. *Site Preparation and Maintenance* • Plan, create and/or maintain strategic fire trails. • Construct and maintain perimeter fencing to prevent unauthorized access where necessary. • Incorporate fire safety management system for chemical fires *Reduce the Hazard* • Assess fire risk each day and evacuate where necessary as per the Evacuation Plan. • Ensure no fuel load is available around work sites. • Preferable burn season is summer to winter and aim for a low to moderate intensity burn. • Create firebreaks around the site and all temporary facilities and infrastructure on site.
Commitments	Prepare a Bush Fire Management Plan prior to commencement of works on site.

5.12.5 Assessment of Impacts

NSW Rural fires have been consulted on 23/08/19 in order to engage in the development of the Meppem Quarry Fire Management Plan. During discussions it was agreed that the quarry itself would form a buffer around quarry assets providing the required 10m of defendable space

The proposed development would increase the number and type of ignition sources in the local area. However, the proposed management and mitigation measures, in conjunction with general clearing activities associated with the proposal development would ensure that an acceptable bushfire hazard is maintained as part of the proposed development.

5.13 Traffic and Access

SMK Consultants were engaged to undertake a Traffic Impact Assessment (TIA) for the proposal (refer Attachment 11) in accordance with the SEARs requirements for the proposal. Moree Plains Shire Council reviewed the TIA and provided comments in January 2021. This EIS has been revised to incorporate a revised scope of road works in response to the comments from More Plains Shire Council.

The development site is approximately 7.85 hectares on Lot 10 in DP751753. The site is located within the Moree Plains Shire Council (Council) local government area. The proposal is to be developed in two (2) phases, a construction phase and a operational phase for supply of a range of quarry products to mainly the IRP and other local projects including reconstruction of sections of the Newell Highway.

The haul route is fully contained with the Moree Plains Shire. Haulage on Narrabri Shire Council roads has been avoided.

The proposal involves haulage of quarry product to link with the Newell Highway at Gurley. The haul route will include:

- Gurley Creek Road between the Newell Highway and Boo Boo Road
- Boo Boo Road between Gurley Creek Road and Manamoi Road
- Manamoi Road between Boo Boo Road and the Meppem Quarry site
- An internal property road between Manamoi Road and the quarry site

The haulage route to the Newell Highway is shown on Figure 32. Photos of the existing road network are included in the TIA and are reproduced for ease of reference in Figure 33 below.

5.13.1 Existing Environment

Access to Manamoi Road
There are a number of farm tracks on the site which provide access to the unconstructed portion of Manamoi Road adjacent to the site.

Manamoi Road to Boo Boo Road
Council has advised that the section of Manamoi Road (SR190) that is constructed, "is a Local B-road servicing one property and is a single lane natural surface road (sparse gravel in places)." At present, the constructed section of Manamoi Road is considered as a black soil road with minimal gravel present. The road in its present form would not support truck traffic for an extended period after rain.

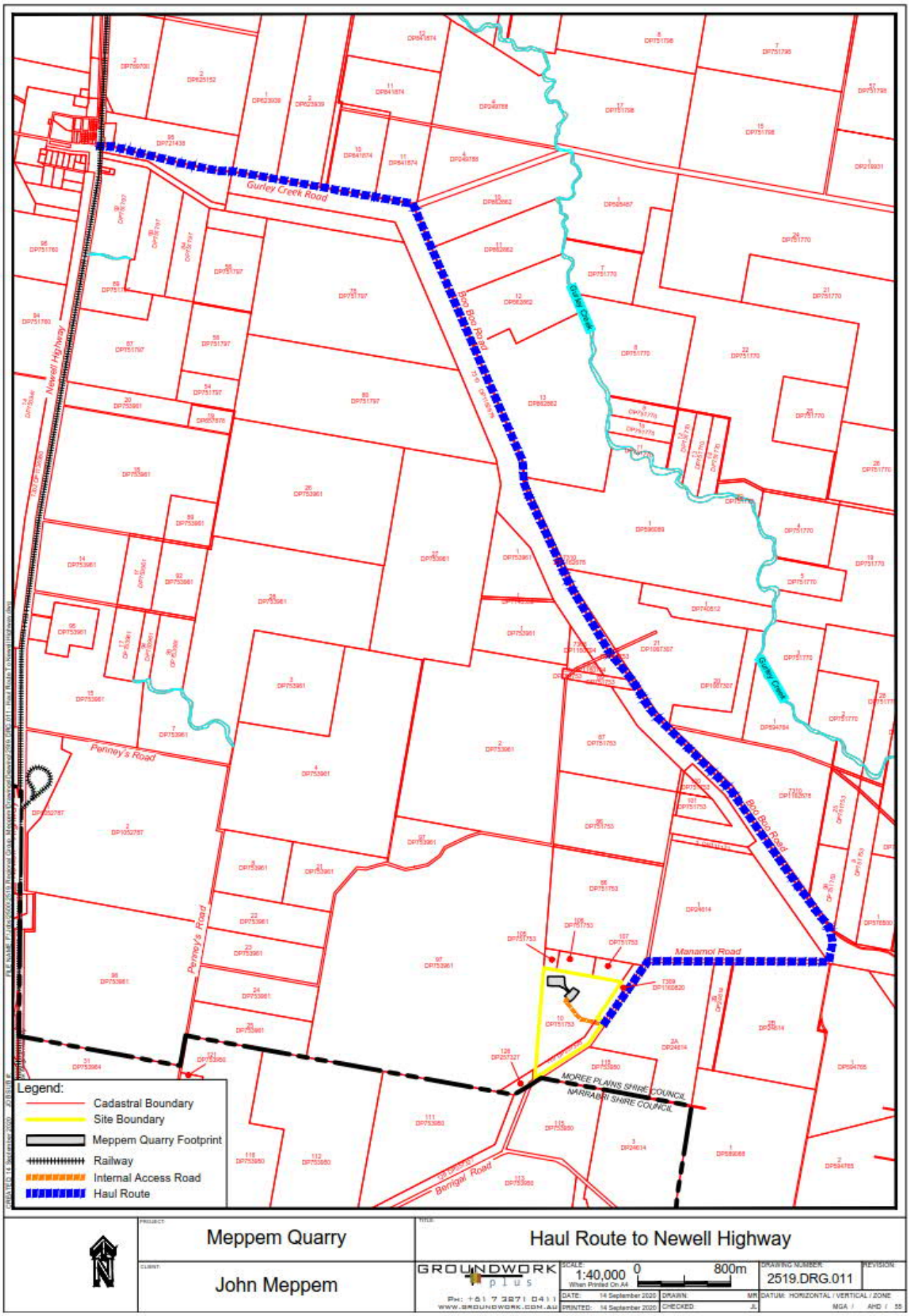
Boo Boo Road
Council has advised that Boo Boo Road (SR139) is classified as a Local A road, meaning that it has through traffic and services several properties. The road has minimal continuous gravel remaining and is therefore deformed is sections as a result of local traffic during and after rainfall events. Gravel depth in some sections is estimated to be in the order of 150mm.

In other sections, there is no gravel. The gravel that is present is a white rock (claystone) material which is suitable for local traffic but wears under heavier harvest traffic and dry conditions as the material powderises and blows away. There is approximately 11.5 km of Boo Boo Road between Manamoi Road and Gurley Creek road which remains as a gravel road.

The road currently supports mainly causeway type crossings for local water as the road does not cross any significant watercourses. Local runoff would occur for a short period after a rain event.

The northern 4.1 km of Boo Boo Road is bitumen sealed. Pavement width along this section at present is between 7m and 7.1m with a shoulder width of approximately 1m. The depth of gravel beneath the pavement is minimal. The gravel sub-grade extends for a width of between 0.5m and 1m on either side of the road but the depth is variable. Some natural soil has mixed with this shoulder area. Council has identified that they will require this bitumen section to be widened to 7m and this will involve an additional 0.5m of bitumen on either side of the road. The geometry of this road is defined by long straight sections with no significant bends. Sight distance along this road is significant.

Figure 32 – Proposed Haulage Routes



Gurley Creek Road

Gurley Creek Road (SR109) is defined as a Collector Road by Council. The road has been bitumen sealed between the Newell Highway and approximately 3.6 km to the east of Gurley Creek. The bitumen seal has been in place for an extended period and in parts has been re-sheeted. Council has indicated an average seal width of 6.7m and requested that for a haul route, the seal width needs to be a minimum of 7.7m. This will require an additional 0.5m seal width on both sides of the road and regrading of the shoulder and table drain area. Total length of Gurley Creek Road to be resealed is approximately 5.49 km between the intersection of Boo Boo Road and the Newell Highway.

Intersection of Gurley Creek Road and the Newell Highway

Gurley Creek Road intersects with the Newell Highway within Gurley. A distance of approximately 50m is available between the rail crossing and the highway edge (give-way sign). A stop sign is present for the rail crossing. This section of road is an approved road train area. A single road train can stop between the rail line and the highway with appropriate separation distance between the rail track and the highway.

All vehicles will need to stop at the rail crossing. In the case of a truck waiting between the rail and the highway, any following vehicle will need to stop before proceeding across the rail line.

The geometry of the intersection onto the Newell Highway is considered sufficient in radius to exceed AustRoads Standards for a road train to turn left or right from Gurley Creek Road onto the highway. The curve width is in excess of 16m which is considered suitable for this standard of intersection.

The highway has not right or left turn lanes onto Gurley Creek Road. This highway is outside of the jurisdiction of Council and subject to Transport for NSW management.

Newell Highway

The Newell Highway is the primary haul route for all regional and interstate traffic. The Highway will service the primary project to utilise the proposal, being the Inland Rail construction work. Various Newell Highway upgrades may also be serviced by quarry material from this site.

The Newell Highway consists of a duel lane bitumen sealed road supporting more than 2,000 vehicle movements per day. Highway upgrades include the development of various passing lane areas and subsequent improvement of intersections onto the Highway.

The haulage route will utilise an existing access road (Gurley Creek Road) onto the highway. This is located within a section through Gurley village with a speed limit of 60 km/h. This is considered ideal for safety in relation to trucks entering or exiting Gurley Creek Road. The 60 km/h section extends for a distance of approximately 400m either side of the centre of Gurley.

Figure 33 – Existing Road Conditions

Figure 12: Boo Boo Road near Manamoi Road showing deformation due to lack of gravel

Figure 13: Boo Boo Road at Gurley Station entrance – new gravel section to south

Figure 14: Boo Boo Road north of Gurley Station entrance -deformation due to lack of gravel and widened road as vehicles avoid centre of road

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Figure 15: Boo Boo Road bitumen section looking north

Figure 16: Intersection of Boo Boo Road and Gurley Creek Road with widened should for left turning vehicles from Boo Boo Road

Figure 17: Minor road deformation over culvert at Boo Boo-Gurley Creek road intersection

5.13.2 Inland Rail Project

Background

The ARTC Inland Rail Project Narrabri to North Star was assessed and approved by the Minister for Planning and Public Spaces as State Significant Infrastructure (SSI 7474) on 13 August 2020. The NSW Government Assessment Report for the project noted the following in the Executive Summary.

> *'The Australian Rail Track Corporation (ARTC) is constructing the Inland Rail project, a 1,700 kilometre freight rail line between Melbourne and Brisbane. The Narrabri to North Star Phase 1 critical State significant infrastructure (CSSI) project is one of eight Inland Rail projects in NSW. This stage proposes to upgrade approximately 173 kilometres of existing rail line and associated facilities between Narrabri and North Star in north west NSW. The project will consist of two non-contiguous sections: Narrabri to Moree and Camurra to North Star. The upgrade from Moree to Camurra will be the subject of a separate CSSI application (Phase 2).*
>
> *Inland Rail will provide economic benefits to NSW and the nation. Inland Rail's business case indicates it will increase gross domestic product by $16 billion over the 10-year construction period and 50 years of operation. Narrabri to North Star Stage 1 has a Capital Investment Value of approximately $700 million and will create an average of 500 jobs during construction.*
>
> *The Narrabri to North Star Phase 1 project will provide economic growth in north-west NSW and development opportunities in the region through the improved reliability, efficiency and capacity of rail freight transport provided by this section of the Inland Rail project.'*

And

> *'The Department is satisfied that the construction and operation of the proposal will not cause significant impacts on the Newell Highway or local roads. Recommended conditions of approval require that the Proponent consult with landowners and reach agreement on level crossing closures and changes to property access.*
>
> *The Department notes Moree Plains Shire Council's position that the proposed Jones Avenue bridge in Moree should be relocated to better support future freight and logistics development to the south of Moree as part of the Moree Special Activation Precinct (Moree SAP). The Proponent has committed to investigating relocating the bridge, and the Department recommends a condition requiring a Transport Network and Connectivity Analysis that provides a framework for this investigation and potential relocation.'*

Construction traffic for the Inland Rail Project

The 'Preferred Infrastructure Project Description' prepared by the ARTC as part of the response to submissions for the SSI, identified that the IRP would be constructed in three (3) stages. The portion of the rail line adjacent to the Newell Highway at Gurley is part of Stage 2. Table 2.3 of the 'Preferred Infrastructure Project Description' of the IRP identifies Gurley Creek Road as a secondary construction access route for Stage 2. Section 2.6.5 and Table 2.4 of the 'Preferred Infrastructure Project Description' identifies that up to 200 'haulage and delivery trucks' are anticipated per day during the construction of the IRP.

The Environmental Impact Statement for the IRP included the Technical Report 1: Traffic, Transport and Access Assessment, dated October 2017, prepared by GHD. That report assessed traffic impact associated with the construction of the IRP, including delivery of construction materials to the alignment, which includes heavy vehicle movements such as those anticipated by this proposal (the Meppem Quarry). Table 5.4 of the GHD report identifies that Gurley Creek Road was assessed as a Secondary Route, and the Newell Highway was assessed as a Primary Route for construction access routes. The GHD report also identifies that up to 200 'haulage and delivery trucks' are anticipated per day during the construction of the IRP. Section 5.4.7 of the GHD report states:

> *'As discussed in Section 5.4.1, there is expected to be minimal increase in traffic on the road network as a result of the proposal. The increased delay at intersections and level crossings is expected to have a localised impact only. In particular, through movements on the Newell Highway are not likely to be affected.'*

NSW Government Assessment of Inland Rail Project traffic impacts

Traffic impacts during the construction of the IRP were identified as a key assessment criteria by the Department. Haulage of construction materials (including quarry materials) via heavy vehicles was noted as a potential impact to local roads. Section 6.4.1 of the NSW Government Assessment Report stated:

> *'The existing road network generally performs at a good level of service (LoS). The Newell Highway has a peak hourly volume of approximately 210 vehicles in both directions near Bellata and 180 vehicles north of Moree, and generally operates at a LoS of A. Local roads operate at a LoS of A or B. The network experiences seasonal variation in activity with increased heavy vehicle traffic (in the form of trucks transporting grain and farming machinery moving between properties) during harvest season.*
>
> *The existing rail corridor in the project study area caters for both passenger and rail freight services. The Northern Tablelands Xplorer is a passenger rail service that connects Narrabri, Bellata and Moree with Sydney. One return passenger train operates per day. There are no regularly scheduled freight trains north of Narrabri, but trains operate within the project area on a seasonal basis to serve grain freight. Up to seven trains operate per day travelling south from Moree at the peak of grain season.*
>
> *The project would have temporary impacts on local road traffic during construction with acceptable changes to level of service (with roads maintaining a LoS B). The Department acknowledges that impacts are unavoidable but can be managed or mitigated through the Proponent's commitments, and the Department's recommended conditions of approval.*
>
> *The operation of the project is expected to generate maintenance and operational traffic; however the total number of additional vehicle movements is expected to be minimal and unlikely to adversely affect the operation of the local road network. Although the project will result in additional delays at level crossings, these delays are predicted to be minor and acceptable.'*

And Section 6.4.3 included the following:

> *'Newell Highway performance will be maintained*
> *During construction, the number of vehicles on the Newell Highway is expected to increase from approximately 130 vehicles per hour to approximately 250 vehicles per hour during peak hour. In addition, there will be an increase in vehicles due to the temporary suspension of rail services due to rail possessions.*
>
> *Despite the increase in vehicles from construction vehicle movements and rail possession, the Newell Highway is expected to comfortably operate within the LoS B threshold of 500 vehicles per hour including seasonal variations in truck movements and displacement of rail freight to road. Similarly, other roads in the local network are not expected to be significantly impacted. All local roads have an existing LoS of A or B and the addition of approximately 120 vehicles per hour in a worst-case scenario will not cause any of these local roads to fall below a LoS of B.*
>
> *To ensure the LoS of the local road network does not deteriorate beyond predicted levels, the Proponent has committed to manage construction traffic movements along local roads and arterial roads in consultation with council and public transport operators including during harvest season and rail possession periods. The Department therefore considers that the additional construction traffic will not adversely affect the LoS of the road network during both peak and non-peak harvesting periods.'*

And

> *'Rail possessions will accommodate peak harvest seasons*
> *The Department recognises that possession of the existing rail corridor and temporary suspension of rail services is a necessary requirement to ensure that track upgrade works are carried out as efficiently as possible and worker safety is maintained.'*

And

> *'Level crossing treatments will be subject to stakeholder consultation and review*

The project rail corridor is intersected by 72 formal level crossings, comprising 38 public crossings (which are located on public roads and include Crown roads that provide access to a single property) and 34 crossings located on private roads or maintenance access tracks. Within Moree, the road network crosses the existing rail corridor at the Alice Street/Moree Bypass intersection to the north and at Bullus Drive to the south of Moree station.

The Proponent has prepared a Level Crossing Treatment Methodology which sets out its evaluation process in dealing with public and private level crossings along the project rail corridor, including:

- *identifying and classifying the level crossings;*
- *evaluating whether such crossings should be retained, consolidated or closed; and*
- *determining whether upgrade works should be undertaken to install active or passive protection and ensure all retained level crossings meet relevant infrastructure standards, guidelines and Inland Rail operational criteria.'*

On this basis, it is understood that:

1. The potential impacts of construction traffic (including heavy vehicles transporting quarry materials) resulting from the IRP has been assessed as part of SSI 7474; and
2. The Department concluded that such impacts were reasonable and could be managed subject to compliance with various conditions of approval; and
3. That during construction of the IRP, level rail crossings are likely to be closed to facilitate the construction of the project.

Conditions of approval of SSI 7474

The SSI 7474 dated 13 August 2020, includes the following relevant conditions of approval:

'A1 The CSSI may only be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the Inland Rail – Narrabri to North Star Environmental Impact Statement, Volumes 1-7 (prepared by GHD and dated November 2017), the Inland Rail – Narrabri to North Star Submissions Preferred Infrastructure Report (ARTC, dated December 2019) and (updated BDAR, RtS on the SPIR and RFI responses).

C1 A Construction Environmental Management Plan (CEMP) must be prepared in accordance with the Department's Environmental Management Plan Guideline for Infrastructure Projects (DPIE, 2020) to detail how the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1 will be implemented and achieved during all stages of construction.

C4 The following CEMP Sub-plans must be prepared in consultation with the relevant government agencies and relevant councils identified for each CEMP Sub-plan and be consistent with the CEMP referred to in the EIS.

	Required CEMP Sub-plan	Relevant government authorities to be consulted for each CEMP Sub-plan
(a)	Traffic, transport and access	TfNSW and relevant councils
(b)	Noise and Vibration	Relevant councils
(c)	Biodiversity	EES, DAWE and relevant councils
(d)	Soil and Water	Relevant councils, Water Group, and EES
(e)	Heritage	DPC Heritage, RAPs and relevant councils
(f)	Flood Emergency Management	SES, EES and relevant councils

E38 Construction traffic must not use local roads or privately-owned roads (other than to avoid direct access from ancillary facilities and construction sites to the Newell Highway) unless no alternative access is available. Use of private access roads must be in accordance with Conditions A19 and A20. Local or privately owned roads used for access to ancillary facilities and construction sites must be identified in the Construction Traffic, Transport and Access Management Sub-plan required by Condition 0.

E39 Before any local or private road is used by a heavy vehicle for the purposes of construction of the CSSI, a Road Dilapidation Report must be prepared for the road. A copy of the Road Dilapidation Report must be provided to the relevant road authority(ies) and landowners within one (1) month of completion of the survey and at least two weeks before the road is used by heavy vehicles associated with the construction of the SSI.

E40 If damage to roads occurs as a result of the construction of the CSSI, the Proponent must, within six months of the completion of construction, either (at the landowner or relevant road authority's discretion):

a) compensate the relevant road authority(ies) and landowner for the damage so caused. The amount of compensation may be agreed with the relevant road authority(ies) and landowners, but compensation must be paid even if no agreement is reached;
b) rectify the damage to restore the road to at least the condition it was in at the time of the dilapidation survey; or
c) where other agreements are in place, leave, maintain or remunerate for damages to these roads in accordance with these agreements.

E43 The Proponent must consult with TfNSW prior to, and at regular intervals during, construction to co-ordinate and implement mitigation measures to reducing any potential concurrent impacts arising from the construction of the CSSI and Newell Highway upgrade works. Procedures for consultation must be outlined in the Traffic, Transport and Access Management Sub-plan required by Condition 0.'

On that basis, it is understood that it is the responsibility of the ARTC under the conditions of the SSI 7474 to:

1. Prepare a Construction Environmental Management Plan (CEMP); and
2. Include traffic, transport and access matters within the CEMP; and
3. Not use a local road for construction traffic without agreement from Council; and
4. Undertake a road dilapidation report prior to construction traffic using a local road; and
5. Rectify any damage to a local road as a result of the construction of the SSI.

SSI 7474 regulates haulage of quarry material from Meppem Quarry to the Inland Rail Project

As previously discussed, the assessment of the SSI 7474, included the heavy vehicle movements associated with delivery of quarry materials to the IRP.

It is assumed that the Meppem Quarry will produce the quarry materials, which will then be collected by the haulage contractor appointed by the ARTC and that the haulage contractor and the ARTC must comply with the conditions of the SSI 7474. Therefore, any heavy vehicle delivering material from the Meppem Quarry to the IRP will fall under the conditions of the SSI, including the requirements of the conditions identified above.

If this is correct, it would be the responsibility of ARTC under SSI 7474 to undertake a dilapidation report of Manamoi Road, Boo Boo Road, Gurley Creek Road and the intersection with the Newell Highway and rectify any road damage at the conclusion of haulage of quarry materials from the Meppem Quarry to the IRP.

However, from an abundance of caution a full traffic impact assessment has been prepared for the proposal.

5.13.3 Potential Impacts

The main impacts associated with increase in traffic from the Meppem Quarry is as follows:

- Increased number of vehicles on the haulage route between the site and Newell Highway.
- Increased deterioration of the road pavement as a result of heavy vehicle usage.
- Tracking of material / sediment onto the road.
- Increase in noise associated with the heavy vehicle movements (see Section 5.7)
- Increase in dust generation from unsealed roads (see Section 5.6)

The proposal involves the development of a hard rock quarry with a maximum production capacity of 490,000 tonnes/year. the lifespan of the quarry at an annual extraction rate of up to 490,000 tonnes per year will depend on whether other major infrastructure projects occur after the IRP is completed. The IRP between Narrabri and Moree may extend over 2-years or more before works move closer to other regionally significant quarries that would supply gravel to the project at a more economic rate due to shorter transport distances.

To establish the impact of the development on the adjacent road network and assess the need for improvements to accommodate traffic generated based on the proposed Meppem Quarry, traffic generation and trip distribution to the proposed development have been estimated. The traffic generated by the development will include heavy-vehicle traffic carrying materials, and light vehicles transporting employees, visitors and service personnel.

The components of traffic generation for the proposed development are:

- Staff trips
- Visitor trips
- Haulage of equipment
- Haulage of quarry materials

It is noted that construction traffic will be minimal consisting of delivery of plant and heavy equipment to site.

Light Vehicle Movements

Light vehicles would be required for staff and service operators attending the quarry site. Due to its remoteness, very few visitors are expected to the site and therefore visitor numbers are assumed to be an average one per week.

The site will have 5-6 full time equivalent (FTE) staff and will therefore utilise 2 light vehicles per day. It is expected that staff would travel from their place of residence or accommodation in either Moree or Narrabri. The staff travel distances will be limited under standard Work Health & Safety policy. A travel distance of less than three quarters of an hour is not considered to present issues of fatigue.

Heavy Vehicle Movements

Road traffic would be considered to travel along internal roads before entering Manamoi Road to the north. Traffic would then travel east onto Boo Boo Road before turning left onto Gurley creek Road toward the Newell Highway. Once on the Newell Highway, traffic would travel north or south to various project sites. The movement of light vehicles would be along the same route.

The Highway runs parallel to the proposed Inland Railway alignment. The quarry expects to provide quarry materials to the section of new rail between Moree and Narrabri.

Truck size and therefore load capacity may vary during the project. The truck size will generally be defined by access at unloading points. The primary configuration to be used to date for supply of gravel to Inland Rail consists of a truck and dog trailer with a standard load capacity of 38-tonnes. Other truck units including side tipping road trains and B-triple units will be considered as they provide greater haulage efficiency, however the manoeuvring ability of such units is limited on the delivery sites. The following calculations are therefore based on a truck and dog trailer as the standard unit. This may over-estimate the total truck movements as the larger truck units can carry up to 63-tonnes of material or approximately 1.66 times the load capacity.

Normal Heavy Vehicle Movements

The following assumptions have been made in regard to traffic calculations:

- 490,000 tonne/year of material will be hauled utilising the road network.
- Haulage vehicles will typically be truck & dog configurations although B-doubles and PBS road trains may also be used where approved routes are available.
- The General Mass Limit (GML) is 55.95 tonnes for truck & dog configurations.
- A 38-tonne haulage capacity per trip has been assumed.
- Hours of operation for haulage of material are 6.00am to 6.00pm Monday to Friday and 6:00am to 1:00pm on Saturdays.
- Daily peak truck traffic would occur between 7am and 10am.
- 300 working days per year (6 working days/week and 50 working weeks/year).
- Movement is one-way (i.e. a truck entering and leaving is considered two movements).
- The movement of trucks to and from the site would be controlled by management through a Driver Code of Conduct and GPS locators and truck monitoring system.
- If external water for dust suppression is required, up to 4-additional truck trips would be generated but these would occur from within the property of Meppem or from the north of the property and therefore not utilise Berrigal Road
- Quarry operations can occur via all-weather roads and therefore provide the potential for continuing operations in wet weather.

This would equate to:

- 47 loaded trucks per day exiting the site (94 truck movements per day)
- 258 loaded trucks per week exiting the site (516 truck movements per week)
- 12,895 loaded trucks per year exiting the site (25,790 truck movements per year)

Assuming demand is evenly spread across each day and week in a year this could equate to an average of 9,800 tonnes of material moved per week by an average of 47 laden trucks per day (94 truck movements per day) exiting the quarry or an average of 4 laden trucks per hour exiting the quarry. However, quarries do not work on an average basis and must meet demand which fluctuates outside of the control of the quarry operator. This is specifically the case where a quarry may supply large infrastructure projects such as the IRP.

The delivery program of the IRP has not been confirmed. It is expected that the demand for construction materials will fluctuate throughout the project. Regional Quarries Australia has advised that demand for construction materials might reach up to 5,000 tonnes per day. Therefore, during peak demand periods it is possible that up to 132 laden trucks (264 truck movements) per day or an average of 12 laden trucks (24 truck movements) per hour may exit the quarry. This is equivalent to approximately 5 minutes between trucks at the peak times. The frequency of trucks leaving the quarry would be dependent on the time taken to load a truck. The time to load a truck would range between 5 and 20-minutes.

Regional Quarries Australia have advised that the peak demand periods are unlikely to occur on a prolonged basis, but flexibility is required in operating conditions so that the requirements of the IRP during peak demand periods can be met. The peak periods will be offset by wet weather days and lower demand periods which would generate less deliveries.

Regional Quarries Australia has identified that a 5-minute gap between trucks leaving the site will be a minimum gap for loaded trucks. At this spacing, the expectation of potential queuing at the Newell Highway intersection, is predicted to be minimal. The existing traffic frequency along the haul route is relatively minimal other than during grain harvest periods.

Gravel trucks will irregularly be required to stop at the Newell Highway intersection unless a stop sign is installed. Trucks will stop on either side of the rail line. For the Newell Highway, some traffic peaks will occur as a result of local issues and highway issues. A gap of 5-minutes between trucks should decrease potential queuing at this intersection quite significantly.

A Traffic Management Plan would be implemented. This is to include radio contact between drivers and GPS tracking of vehicles.

5.13.4 Management and Mitigation Measures

The proponent has consulted with Council regarding the potential impacts of the proposal on the local road network and based on discussions with Council in January 2021, the following upgrades to the local road network are proposed:

<u>Manamoi Road</u>
A new section of road is to be constructed by the developer to link the quarry to the southern end of the existing road to link with Boo Boo Road. The following scope of works is proposed for this road and replaces the works described in the TIA:

- Construction of a two (2) lane gravel rural road with a minimum 8m formation and a 7m wide wearing gravel surface exclusive of the creek crossing which will be controlled with Give Way signs benefiting the outgoing laden vehicles.

<u>Boo Boo Road (currently unsealed section)</u>
The following scope of works is proposed for this road and replaces the works described in the TIA:
A minimum of 100mm of compacted gravel to be constructed as a road surface

- Gravel is to be a selected material and Council approved
- Minimum width of formation to be 7m
- The southern 8.5 km to be widened to an 8m formation
- Table drains to be regraded as part of the formation

Boo Boo Road (currently sealed section)
The following scope of works is proposed for this road and replaces the works described in the TIA:

- Widen the sealed section to a minimum of 7m width
- Install a concrete causeway to replace the bitumen sealed floodway at approximately 3.8 km south of Gurley Creel Road

Gurley Creek Road

The following scope of works is proposed for this road and replaces the works described in the TIA:

- Widen the sealed section of approximately 5.49km between the intersection of Boo Boo Road and the Newell Highway to a minimum of 7.7m.
- Regrading of the shoulder and table drains will be required.

Gurley Creek Road intersection with the Newell Highway

The geometry of the intersection onto the Newell Highway is considered sufficient in radius to exceed AustRoads Standards for a road train to turn left or right from Gurley Creek Road onto the highway. The curve width is in excess of 16m which is considered suitable for this standard of intersection. The highway has not right or left turn lanes onto Gurley Creek Road. This highway is outside of the jurisdiction of MPSC and subject to Transport NSW management. TfNSW has recommended works occur at the intersection of Gurley Creek Road and the Newell Highway including:

- A Rural Basic Left-turn (BAL) treatment
- A Basic Right-turn (BAR) treatment.

The proposal commits to undertaking those works recommended by TfNSW.

General Management and Mitigation Measures

The following management and mitigation measures should be implemented to ensure that the proposal has minimal potential impacts on traffic.

Table 23 – Management and Mitigation Measures – Traffic

Aspect	Control
Other Users	Liaise with ARTC and the appointed contractor for the IRP regarding the conditions of SSI 7474.
Fleet Management System	The haulage fleet would be managed through an advanced GPS tracking system which includes: • GPS monitoring of each truck for full duration of shift • Live monitoring of truck speed against road speed limits • Notifications to quarry management of erratic driving or speed limit violations • Proximity detector to advise driver separation distance to school bus • Driver fatigue / behaviour monitoring • Electronic load sheets for material tracking • Load count reporting to help maintain compliance with consent conditions
Drivers	• Implement driver monitoring program including use of monitoring software and GPS tracking to ensure all vehicles used as part of the project are obeying road rules and driver code. • Prepare and enforce a driver code of conduct, ensuring the code provides for the following minimum requirements: o All loads to be covered prior to leaving the quarry o All loads to be weighed prior to exit o Minimise exhaust fumes and compression breaking o Education on school bus routes and pick up / drop off times o Obeying all road rules. o Speed limits and communication requirements o Operational hours
Noise	• See Section 5.7.3.
Air Quality	• See Section 5.6.3
Surface Water	• See Section 5.8.3
Wet Weather	• Minimise truck movements on the haulage route immediately following rainfall events.
Maintenance	The haul route will be maintained by ARTC or the principal contractor for the IRP in accordance with the conditions of the SSI 7474. In the event that SSI 7474 does not regulate the haulage of quarry materials from the Meppem Quarry to the construction of the IRP, maintenance and works will be via road user development contributions and agreements with Council.
Internal Haul Road	The internal haul roads will constructed to achieve all weather access.
Commitment	• Prepare a Traffic Management Plan and Driver Code of Conduct. • Consult with the school bus provider during preparation of the Traffic Management Plan.

5.13.5 Assessment of Impact

The primary purpose of this Quarry is to supply material to the IRP, which is scheduled to commence in early 2020 and continue for approximately 3 years. The designated haulage route from the development site is described in the above sections. This will be the only haul route utilised for trucks to move quarry product from this site. Alternative routes for haulage of product are not available.

As previously discussed, the assessment of the SSI 7474, included the heavy vehicle movements associated with delivery of quarry materials to the IRP. Having considered the content of the assessment of the SSI and the subsequent conditions of approval, it is apparent that the use of Manamoi Road, Boo Boo Road and Gurley Creek Road to haul quarry materials to the IRP will be covered by the conditions of the SSI 7474.As such, it would be the responsibility of ARTC under SSI 7474 to undertake a dilapidation report of Manamoi Road, Boo Boo Road, Gurley Creek Road and the intersection with the Newell Highway and rectify any road damage at the conclusion of haulage of quarry materials from the Meppem Quarry to the IRP. Accordingly, the Meppem Quarry would not need to be responsible for those works and no further assessment of traffic impacts from the proposal is required. However, from an abundance of caution a full traffic impact assessment has been prepared for the proposal.

Manamoi Road

Manamoi Road is a Council maintained road but services one farm residence. No new gravel has been placed on this road for an extended period. Council grade the road on an as-needed basis, mainly in preparation for grain harvest periods or when significant damage occurs following a wet weather period. The road in its current condition is not suitable as a heavy haulage route. This has been recognized by the developer and Council. Use of this road will therefore require an upgrade.

Boo Boo Road

Boo Boo Road has been subject to Council current policy of gravel maintenance only and no new gravel. The road is mostly raised above the surrounding natural surface level. It was once a gravel road but due to cost, Council has reduced work on this road to maintenance only.

As a result of limited traffic flow, a large part of the southern end of this road is utilised as a single lane road and therefore road shoulders have subsided. Sections of potholes have created wider sections where local traffic drives around the potholes. The potholes have resulted from minor water ponding on the road due to a lack of slope from the road centre to the shoulders. Road width is therefore an average of 6m.

The central section of this road on either side of the Gurley Station entrance, extends in width to approximately 7m but is variable. Some depth of gravel has been maintained in parts. This central section is not suited to a heavy haulage road at present. The northern end of this road is bitumen sealed. Council has indicated that the average seal width is 5.9m. The road needs to be a minim of 7.1m for road train use. The road at present is not considered suitable for a heavy haulage route as a higher frequency of trucks would potentially impact road shoulders and therefore deformation of both sides of the road. The proposal will be required to upgrade the road to the necessary standard.

Gurley Creek Road

Gurley Creek Road is a relatively straight section of road which services an extended region to the east of Gurley. Gurley village has a large grain storage facility which generates extensive truck movements during harvest periods. To date, the road has supported the current traffic load with regular maintenance works being undertaken. This includes pothole repairs and scheduled resealing works. A large proportion of the grain stored in Gurley is moved by rail and therefore existing truck movements are concentrated during October through to December. Council has indicated that this road will require widening of the sealed surface before it is suitable for a heavy vehicle haulage route for quarry operations.

Gurley Creek Road and the Newell Highway Intersection

This intersection has been identified as a key issue that will require a design investigation to determine whether it meets the requirements of the proposal or whether a redesign and upgrade is required. However, as previously discussed, it is understood that the construction traffic impacts of the IRP on Gurley Creek Road and the Newell Highway were assessed under the SSI 7474 and that necessary works and upgrades will be addressed through the conditions of that approval through negotiation with ARTC and TfNSW and Council.

For trucks moving west onto the Newell Highway, only one truck can queue between the rail and the edge of the highway. If other vehicles arrive, they would be required to form a queue on the eastern side of the rail line at the stop sign. This would

avoid the issue of queuing across the rail line as the distance between the rail line and the highway is limited to approximately 50m. This would be suitable for one truck to queue.

The presence of the Gurley-Millie road on the western side of the highway complicates this intersection. This western road is also utilised by local truck traffic and the entrance cannot be impacted by traffic conflict for trucks turning into Gurley Creek Road. The issue is exacerbated by the traffic volume on the Newell Highway being >2,000 vehicles per day.

Key Local Intersections

There are two key intersection involved along the proposed haul route between the quarry and Gurley. These are the Manamoi-Boo Boo and Boo Boo-Gurley Creek intersection. Neither intersection has sign posting for either a give-way or stop requirements. This is assumed to be based on the low level of traffic volume and extensive sight distances. Key intersections along the proposed haulage route are deemed satisfactory in terms of Safe Intersection Sight Distance.

Safety and Efficiency of Access

The local roads do not have a sign posted speed limit. All road users would be expected to drive to the road conditions. Based on the condition of the road at the time of inspection it is expected that travel speeds would be restricted to 80 km/h. The proposal to improve the road conditions with additional gravel sections and widening of the bitumen sealed sections may change this slightly, however, the presence of wildlife such as Kangaroos tends to limit the speed of vehicles. The available SISD exceeds this minimum requirement at all intersections. The only limitation may relate to an extended height of grass and shrubs at the Boo Boo-Gurley Creek Road intersection.

Traffic Impacts

Current traffic from the proposed development site along Manamoi Road is considered as highly infrequent as the road is only used by the landowner on occasions for access to the property. The road consists of a single lane road. Use by one landowner may involve one or two trips per day with an increase in truck traffic during harvest periods. The potential impact of between 94 and 264 two-way truck movements along this road is significant and reflected in the proposal to upgrade this road. As a minimum, the daily operations of quarry vehicles would result in a significant increase in traffic on Boo Boo Road. The ensure road safety, it will be essential to adopt the upgrades discussed with Council to ensure that road width is suitable and road condition is maintained with good quality gravel. The addition of between 94 and 264 trucks trips on the Newell Highway will result in between 4-percent and 12-percent increase in heavy vehicle movements per day. The quarry trucks will operate on the highway between 6am and 6pm during the week and reduced hours on the weekend. This conforms to the busiest periods of vehicle movements. The potential peak delivery period that may generate a 12-percent increase in heavy vehicle traffic would be considered as noticeable. However, the quarry operator has identified this potential peak to potentially occur over a short period of possibly a few days only and therefore this is considered as a short period of impact on the Highway. The potential impact on the highway maintenance requirements is considered minor for such short campaigns.

Public Transport

There is no school in Gurley. The closest schools are in Moree and Bellata. At present, the school bus collects and drops off school children at Gurley Station on Boo Boo Road and then turns around. The bus would generally operate between 7am and 8am in the morning and between 3.45pm and 4.30 pm of an afternoon. It is noted that there are fewer children utilising public school buses in the local area. The truck drivers will need to identify the presence of the school bus and undertake appropriate precautions when it is present. The bus and trucks will travel at similar speeds. As there appears to be only one bus stop along the haul route, the risk of conflict between the bus and haulage trucks is considered manageable.

Cumulative impacts

Potential cumulative impacts are those which are generated by the combined impacts on the local environment as a consequence of the project, together with other developments of a similar nature (both existing and proposed). For the purposes of this report, the assessment of cumulative impacts considers the impacts of existing and proposed extractive industry development in the local area. However, there is no other extractive industry known that would utilise the same haul route and therefore there are not anticipated to be any cumulative traffic impacts that require assessment.

Conclusion

Based on the findings of the traffic impact assessment it has been concluded that the proposed development would result in a net increase in traffic generation from the site, but that this traffic increase has already been considered and assessed as part of the SSI 7474 and will be regulated under the conditions of approval of the SSI 7474. However, in the event that is not the case, a range of upgrades to the local road network are proposed.

5.14 Waste, Chemicals and Hazardous Materials

5.14.1 Existing Environment

The site is currently cultivated for cotton production. As such there are no significant waste generating activities associated with the current use of the site.

5.14.2 Potential Impacts

The proposal is expected to produce more waste than the existing land use. The wastes that may be generated by the proposal are identified as follows:

- Paper and general wastes from the offices, workshops and amenities facilities
- Packaging wastes
- Scrap metals
- Rubber tyres from Heavy Machinery and Equipment
- Waste oil, lubricants and coolants
- Chemical or herbicide drums
- Contaminated soils from any clean-up of any hydrocarbon spills
- Food scraps and liquid wastes
- Vegetation wastes
- Used Batteries
- Building wastes for the erection of site offices and crib sheds
- Wastewater and sewerage (portable toilets)

Potential impacts from waste generation, incorrect storage and disposal can include the following:

- Visual impacts
- Production of odour
- Fire hazards
- Attraction vermin and pest animals
- Contamination to land
- Contamination of surface waters
- Contamination of groundwater
- Human exposure to contaminants and hazardous substances causing harm.

5.14.3 Management and Mitigation Measures

Table 23 – Management and Mitigation Measures – Waste and Table 224 – Management and Mitigation Measures – Hazardous Waste outline the mitigation measures proposed to manage impacts from waste on the environment.

Table 24 – Management and Mitigation Measures – Waste

Aspect	Control
General	• All waste generated by the development will be managed in accordance with the waste management hierarchy as shown in Figure 34 below. • Appropriate waste receptacles must be provided for the segregation and storage for waste. This includes recycle bin for bottles/cans vs general bin for food scraps/wrappers. • All wastes will be segregated onsite and disposed of with specific waste services providers • Waste storage areas should be free from bush fire risk. Waste tyres will be stored in accordance with the NSW Fire and Rescue *Guideline for bulk storage of rubber tyres 2014.* • Bins and storage areas must be maintained so they are free of vermin (mice, rats, cockroaches, flies). • Littering is not permitted. All worksites must be free of litter, including cigarette butts. • No waste is to be burnt on site or removed from site and burnt at another place. • All waste streams are to be removed off site by a licensed waste contractor to a lawful point of disposal.

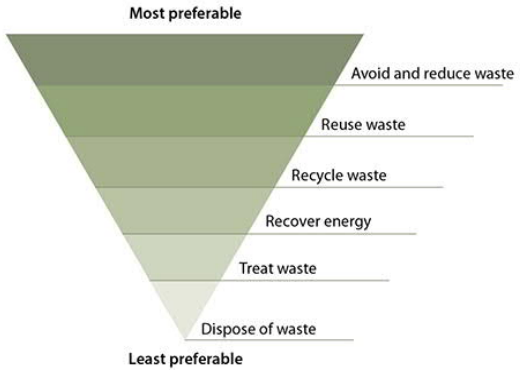
Aspect	Control
	 *Figure 34 – Waste Management Hierarchy*
Waste Storage of Chemicals	• Bins and/or drums will be designated for the storage of used chemicals, empty chemical/paint/solvent containers, used filters, oily rags, batteries • Bins and/or drums will be sealed, labelled and stored within appropriately bunded areas and where required in accordance with AS1940 – 2004 and located within waste management areas. • Spill kits will be strategically located throughout the project area and maintained as necessary. • Wherever possible recycle waste chemicals, liquid waste, drums, used filters, oily rags, batteries and dispose at a licensed waste facility.
Waste Avoidance	• Waste avoidance strategies to be embedded in the procurement process for the site. Including supply chain management, consideration of packaging by-products and the ability to buy in bulk to minimise waste. • Increased efficiency in the use of raw materials, energy, water such as fitting out the temporary site facilities with energy efficient fittings and fixtures. • Aim to accurately estimate and order quantities of materials required to avoid over supply.
Waste Reuse	• Consider the reuse of operational by products elsewhere in the operation i.e. regrading of solvents and hydrocarbons to degrease equipment when servicing, reuse of waste water for dust suppression, reuse habitat features logs bush rock in the rehabilitation of the site, reuse of IBC pod for the mixing of flocculants for sediment dam treatment. • All topsoil that has been stripped will be stockpiled separately and reused to rehabilitate the site. • Any surplus overburden materials are reused onsite for constructing safety bunds and ERSED controls, internal roads. • Reusing silt/sediment on site to the maximum practicable extent.
Waste Recycling	• Segregate recyclable wastes from non-recyclable. • Recovering oils, greases and lubricants for collection by a licensed oil recycling contractor, recovering, separating and recycling packaging (including paper, cardboard, steel and recyclable plastics) • Recycling used plant and equipment to the maximum practicable extent.
Waste Disposal	• Where waste cannot be reused on site and is required to be disposed, recycled or treated offsite all waste will be transferred to a location that can lawfully except the waste product. • The waste generator (The Quarry) will undertake due diligence on waste disposal sites to ensure the waste receiver can lawfully except the waste based on its classification.
Waste Storage	• Waste storage containers or areas are to be provided and located at safe and convenient locations. Each container will be identified with the type of wastes which may be disposed of in each container. Each container or area will be designed to prevent waste materials from being lost.

Table 25 – Management and Mitigation Measures – Hazardous Waste

Aspect	Control
General	• Hydrocarbon spills are to be cleaned up immediately by controlling the source of the leak, containing the spill, and using spill kit materials to absorb all materials. Following a spill, the hydrocarbon contaminated material will be placed in the regulated waste and the spill kit material restocked. • Ensure employees are familiar with, and trained in the use of, proper spill clean-up procedures. • Refuelling, equipment maintenance and cleaning of vehicles is to be undertaken within a designated area such as a hardstand, capable of capturing and containing contaminants to prevent release to land. • Maintain the chemical storage areas in a neat and tidy condition. • Bunds / spill trays are to be used during refuelling and equipment maintenance. • Safety Data Sheets (SDS) of chemicals used on site shall be kept in a register at the site office. • An Emergency Response Procedure has been prepared for spill events. • If applicable, hazardous materials signage must be erected at the entrance to the site and display the quantity, type and location of hazardous material stored and handled at the site. • Maintain appropriate spill kits and Personal Protective Equipment (PPE) at designated locations on site (e.g. refuelling locations, chemical storage facilities, mobile equipment).
Bunding and Storage	• Chemicals and fuels in containers must be stored within a bunded area at all times. • When jerry can are being used in the field consider temporary bunding equipment. • All hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of: o AS 1692-2006 - Steel tanks for flammable and combustible liquids o AS 3780:2008 – The storage and handling of corrosive substances o AS 1940:2004 – The storage and handling of flammable and combustible liquid o AS 3833:2007 - Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers • Bunding will be constructed of material which is impervious to the material that is to be stored in the bunded area. • Bunds will be kept in good condition (e.g. no cracks, gaps or leaks). • Roofed storage facilities are to be provided where possible. • Stormwater captured within bunding is to be removed as soon as practicable and appropriately disposed of as contaminated water. This will be checked prior to and following rainfall events. All bunder areas exposed to the weather will be covered in plastic to prevent the ingress of clean water into the bunds. • A collection sump or valve must be provided in the floor of the bunding to facilitate the removal of liquids. • Develop site-specific procedures for storing hazardous materials including details on: o Quantities of hazardous materials will be kept to a minimum, commensurate with their usage and shelf life. o SDS's of stored hazardous materials will be readily accessible at the place of storage. o Permanent and temporary containers that hold hazardous materials will be labelled with the relevant safety and risk phrases. o The volume and types of hazardous materials stored will be known, current and documented and will not exceed the design capacity of the storage area. o Hazardous materials that may degrade in storage and thus become more dangerous will be identified and managed. o Storage and containment areas (including secondary containment) will be inspected for signs of loss or damage and any deficiencies will be addressed. o Hazardous materials no longer in use will be identified and assessed to determine if they should be removed. o Dangerous goods will not be held in transport storage areas for longer than five consecutive working days. Where they are required to be stored for longer periods, they will be moved to permanent hazardous materials storage areas.

Aspect	Control
	o Hazardous materials storage areas will be kept clear of combustible material, vegetation and refuse by a minimum of three metres.
Refuelling	• Temporary bunding, drip trays or impermeable matting must be used to prevent spillage from any in field refuelling or maintenance of plant and equipment, or any other activity that could result in spillage of a chemical, fuel or lubricant to soil. • Refuelling of plant and vehicles must be conducted in designated areas away from sensitive receptors and at least 100 m away from watercourses, water holes, lakes or wetlands. All in field refuelling must include the use of a temporary bund to contain any spills. • Refuelling will utilise auto shut off valves. • Refuelling trucks and designated refuelling areas will include ample spill kit material in the event of an emergency spill. • One dedicated smoking area will be established away from the refuelling and hydrocarbon storages areas. Signage will be implemented to remind workers not to smoke around area where hydrocarbons are being used.
Plant / equipment / vehicle maintenance	• All vehicles, plant and equipment must be maintained in accordance with manufacturer's specifications and kept in good working order. • Routine maintenance and inspections of earthmoving equipment must be conducted including daily prestart and regular maintenance. • All scheduled maintenance activities must be undertaken at designated workshop areas. • For major plant and equipment maintenance activities works will be undertaken off site.
Disposal	• Hydrocarbon and chemical contaminated materials are to be appropriately disposed of at a licensed facility. • If the material is a trackable waste, it will be transported and disposed of by a licensed contractor. • A waste register for the disposal of waste will be maintained and the corresponding weighbridge dockets verifying the volumes of waste and truck rego will be maintained.

Contaminated Land	• A hydrocarbon management procedure detailing the management of spills is to be developed and the workforce train on this procedure. The procedure will refer to the Pollution Incident Response Plan which will verify the process to follow in the event of a spill resulting in a pollution event.
	• If widespread contamination occurs as a result of the construction activities, then management will be carried out in accordance with the contaminated land provisions of the EP Act, National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM, 1999). Broadly, the management measures will include the following:
	  • A site contamination assessment (SCA) will be undertaken in accordance with the NEPM.
	  • Management and remediation will adhere to any Site Management Plan or Remediation Action Plan that has been approved by the administering authority.
	  • Validation sampling will be conducted to verify that remediation is successful, and any further remedial actions implemented as required.

Commitments	Environmental Management Plan to include a Waste Management Plan Environmental Management Plan to include a Pollution Incident Response Plan (PIRMP).

5.14.4 Assessment of Impact

Waste generated by the quarry operations is generally moderate and can be managed appropriately and assuming adherence to the management measures nominated above. Based on the adoption of these mitigation measures the site can minimise waste management impacts to an acceptable level.

5.15 Biosecurity

5.15.1 Existing Environment

The Moree Plains Shire Council has a number of declared weeds identified within the LGA. Based on the biodiversity assessment undertaken by Advitech it has confirmed that three significant weeds where identified on site as follows;

- *Lycium ferocissimum* (African boxthorn) – Weed of national significance
- *Opuntia Stricta* (Prickly Pear) – Weed of national significance
- *Xanthium spinosum* (Bathurst Burr) – High threat exotic

The presence of these weeds is expected to be associated with the existing agricultural land use of the site.

5.15.2 Potential Impacts

The potential impact of the proposal could include;

- Spread of weeds along access and haulage routes of the site through the movement of vehicles, machinery, and waste.
- Increasing the prevalence of weeds on the site which may contribute to the reduction in quality of habitats for some flora and fauna species, particularly by replacing native plants. This can apply to both the areas of vegetation being retain and also the quality of the rehabilitation of the site.
- Site management practises that could result in an increase in the population of pest animals.

To reduce the risk of these potential impacts occurring, the proposed mitigation measures are detailed in Table 28 below.

5.15.3 Management and Mitigation Measures

Table 25 – Management and Mitigation Measures – Biosecurity outline the mitigation measures proposed to manage impacts from biosecurity matters.

Table 26 – Management and Mitigation Measures – Biosecurity

Aspect	Control
Awareness	• Site inductions for all staff must include information regarding the local weed and pest species that may be present, and protocols required to be undertaken for control of these species. • Training must be provided to all staff regarding the weed management procedures, protocols and restrictions placed on bringing domestic animals onto the site. • All personnel entering the site must be advised of their responsibilities for declared weed management, cleaning procedures for vehicles and equipment, weed identification and weed reporting. • Make all personnel aware of The General Biosecurity Duty (section 22 of the Biosecurity Act 2015) which states that: "*any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised*."
General	• In times of drought or in dry conditions, wildlife and pest animals traveling looking for food and water sources. The following needs to be considered during construction: • Fence or secure general waste areas (food scrap bins). • Reduce access to water sources such as sediment basins and areas of quality fresh feed such as newly rehabilitated areas. This may involve erecting exclusion fencing around the permitter of these areas.
Prior to Construction.	• Prior to construction, baseline field surveys to identify initial weed populations and ongoing monitoring of these populations and for any new occurrences are to be undertaken • Signage is to be installed at weed hot spots identified through the survey • Vehicles and equipment are to be cleaned before being brought to site and inspected on entry to site.

Aspect	Control
	• Vehicles and earthmoving equipment imported interstate for project use will be thoroughly cleaned at their point of origin to mitigate introduction of foreign seed and soil potentially harmful to Australia's flora and fauna.
Infested Areas	• Signage is to be installed at weed hot spots identified through the survey • Weed control will be undertaken in areas that are very heavily infested or where Class 1 or 2 weeds present prior to disturbance. • Where weed or other pest and disease infestations are identified the infested area should be assessed and appropriate treatment measures initiated before any earth moving machinery or vehicles enter the area. • Restricted access to infested areas must be in place until all control measures are implemented. For any substantial outbreak of a declared plant detected in the approved construction area or access tracks the area must be isolated with no access permitted until the area is declared to be controlled for weeds. • All materials including gravel, mulch, packing materials, sand and soil must be inspected and be certified as pest free before being accepted at site. Copies of the weed hygiene declaration forms must be kept on site at all times. • Plant, equipment or other items that may be moved from one property to another must be visually inspected prior to movement. • A weed hygiene certificate may be required to accompany plant, equipment or other items if requested by the landholder.
Chemical Control	• In the event that chemical control is required, personnel undertaking chemical weed control measures must be trained and qualified to store and handle chemicals • All chemicals must be approved by the Site Manager or representative prior to use.
Soil Material Importation	• All soil and materials of plant origin that are to be imported to site are to be certified as weed free by the supplier • Waste management measures should include containment of food scraps in securely sealed containers.
Earthmoving	• Soil stripped and stockpiled from areas containing known weed infestations, particularly of declared weeds, are to be stored separately and are not to be moved to areas free of weeds. • Where applicable and appropriate - Disturbed topsoil and vegetative material will be returned as close as possible to the original sites in order to limit the potential spread of weeds and pathogens. • Vegetation and soil waste should not be moved to areas of lower weed infestation.
New Infestations	• New weed infestations, breach of vehicle hygiene, feral animal sightings and any suspected plant or animal diseases will be photographed and reported to the Quarry Manager immediately. • All declared pest plants detected will be fenced out with exclusion fences so treatment can take place.
Pest Animals	• Pest animal occurrence will be monitored during construction. If increased densities of pest animals are observed, or new pest animals are identified, pest abatement program will be established and implemented.
Commitments	• Environmental Management Plan to include a Weed Management Plan

5.15.4 Assessment of Impact

Implementation of the above mitigation measures will minimise potential biosecurity impacts to an acceptable level.

5.16 Land Contamination

5.16.1 Existing Environment

The subject site has historically been used for agricultural purposes. As activities have been limited to grazing, cultivation and other agricultural related activities contamination is also limited to contamination related to mainly fertiliser and herbicide use. Whilst some chemical, including herbicides are typically utilised as part of normal farming practices, these chemicals are general stable, volatile products which biodegrade over time. If these chemicals are present, current concentrations of chemical residue would be negligible and would not impact the quarry site. The contaminated land register has been checked to verify no contamination is present on the subject site in the form of old sheep dips, dump sites or tanneries. It is therefore considered that no further investigation into land contamination is required.

5.16.2 Potential Impacts

Potential land contamination risks from the proposal would include fuel and chemical spills.

5.16.3 Management and Mitigation Measures

The following measures will be implemented to reduce the likelihood of land contamination occurring, and in the event, contamination does occur, how the land will be restored.

Table 27 – Management and Mitigation Measures – Land Contamination

Aspect	Control
Hazardous Substances Management	• See Section 5.14.
Spill Response	*Initial Response* • The spill will be assessed to identify the type of oil (lube oil, diesel or chemical), location of the spill source, the quantity of oil spilled and its environment, community, health and safety impact. The Incident Controller will undertake immediate steps to spill containment/control, recovery of spill material and waste management. • Implement Spill Response Plan. • Cease the spill where reasonable, safe and practical to do so. • Where reasonable, safe and practical to do so prevent spill from entering drainage features or water courses and absorbent material will be placed on spillages which will be collected for disposal and any contaminated soil removed for treatment and disposal. • Contain spill and remove by licensed contractor. *Clean Up* • Clean up spills immediately and dispose of contaminated soil and clean-up materials off site at an appropriate facility. • Undertake water or soil sampling as required. • Undertake an investigation: • In relation to environmental incidents, reports to the administering authority of the EP Act must include “the event, its nature and the circumstances in which it happened”. Environmental incident investigations and reports will cover: • A description of the incident, including witness accounts. • A description of any releases to land, air or water or other environmental harm that may have occurred, including loss of native plants or habitat for native animals. • A description of the environmental values affected or potentially affected. • Whether releases or other harm caused by the incident was in excess of prescribed standards or requirements (for example, whether particulate emissions exceeded compliance levels, or whether vegetation was cleared outside areas where clearing was authorised). • Whether a formal non-compliance with legislative requirements or approval conditions occurred. • Whether the incident constituted serious or material environmental harm • Whether internal procedures or requirements were breached. • Formal and informal reports and notifications made internally and externally.

Aspect	Control
	• A review of the causes of the incident or near miss. • Recommendations in relation to actions required to rectify any environmental harm or damage that may have occurred. • Recommendations in relation to preventing a recurrence of the incident or near miss. These may include: o Disciplinary action against individual employees o Revisions to procedures and work methods o Maintenance, repairs or re-design of infrastructure, facilities or equipment. o All recommendations from incident investigations will be included in the corrective action register.
Remediation	• Ideally contaminated land is to be managed at the time of the incident by removing and remediating the impacted area in accordance with the appropriate guidelines and standards. • Prior to decommissioning of temporary disturbance areas, a contaminated land assessment by a suitably qualified person may be required to be completed if spills or potential contamination has occurred. Should it be identified that areas of the temporary disturbance areas have been contaminated, these areas are to be remediated and then validated as contaminant free. • Assessment of site contamination, if required, is to be undertaken and managed in accordance with the following: • National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013) • Australian Standard (AS4482.1-2005) Guide to the sampling and investigation of potentially contaminated soil. Par 1 – Non-volatile and Semi-volatile compounds. • Australian Standard (AS4482.2-2005) Guide to the sampling and investigation of potentially contaminated soil. Part 2 – Volatile Compounds.
Commitments	Environmental Management Plan to include an Incident and Spill Response Plan. Environmental Management Plan to include a Waste Management Plan. Environmental Management Plan to include a Pollution Incident Response Plan (PIRMP).

5.16.4 Assessment of Impacts

Land contamination impacts from the proposal may occur from spills of hazardous substances / contaminants. By adopting the mitigation measures outlined above minimise potential impacts from land contamination.

5.17 Social Impacts

5.17.1 Existing Environment

Quarries are a use permitted with consent within RU1 Primary Production zoned land under the *Moree Plains Local Environmental Plan 2011.* The proposed site and surrounding land are zoned RU1 Primary Production and is therefore consistent with the zoning of the locality. The subject site will continue to be used for agricultural purposes concurrently with the operation of the quarry activities. The proposed location is considered suitable for the purpose of developing and operating a quarry with respect to land use zoning and the intended purpose of the land. A description of the surrounding land use and sensitive receptors is detailed in Section 5.4.

5.17.2 Potential Impacts

An assessment of potential social impacts 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 proposed development has the potential result in adverse social impacts (e.g. adverse amenity or sense of community) in the absence of the implementation of any mitigation measures. Table 30 – Checklist of Matters Assessment below provides an assessment of the proposed development against the identified social impact assessment checklist matters.

5.17.1 Management and Mitigation Measures

Management and mitigation measures for each of the elements comprising a social impact have been addressed in their relevant sections of the EIS. Based on the implementation of these management measures the net result will relate to social impact being minimised.

Table 28 – Checklist of Matters Assessment

Matters		Key Links to Social Impacts	Risk of Impact Without Mitigation	Nature of Impact	Explanation
Amenity	Acoustic	Way of life;	Likely	Negative	Noise generated from machinery, vehicles and processing equipment may impact on neighbouring properties.
	Visual	Surroundings	Likely	Negative	The quarry might be visible from some areas on public and private land; however, mitigation measures are in place to manage this.
	Odour	Surroundings	Unlikely	Negative	Quarry operations will not produce a strong odour.
	Microclimate	Surroundings	N/A	Nil	Quarry operations will not significantly impact microclimate.
Access	Access to property	Way of life;	N/A	Nil	Development will not impact on access to neighbouring properties
	Utilities and public transport	Access to infrastructure, services and facilities;	Unlikely	Negative	The proposed development will utilise public roads for transportation. This will not result in the reduction of access to public transport services.
	Road and rail	Personal and property rights.	Unlikely	Negative	The proposed development will utilise public roads and rail sidings for transportation. However, this will not preclude the public from access roads and rail facilities as a result of the project.
Built Environment	Public domain	Community;	N/A	Nil	The development will not impact the public domain as it will be located on private land
	Public infrastructure	Access to infrastructure, services and facilities;	N/A	Nil	As per above the proposal will not preclude public access to public infrastructure.
	Other built assets	Surroundings; Personal and property rights.	N/A	Nil	As above.
Heritage	Natural	Way of life;	N/A	Nil	Natural heritage of the site is not compromised by the proposed development.
	Cultural	Community;	Likely	Negative	The subject site does not contain any cultural heritage values. Unexpected finds procedure will be implemented.
	Aboriginal culture	Culture;	Likely	Negative	An assessment of the site reveals that no Aboriginal cultural heritage values have been identified. Regardless the unexpected finds procedure will be implemented.
	Built	Surroundings.	Unlikely	Negative	The subject site does not contain any built heritage values.
Community	Health	Health and wellbeing;	Likely	Negative	Dust and noise emissions are expected to be below NSW guidelines at the nearby receivers therefore minimising the possibility of health impact to the community.
	Safety	Surroundings;	Likely	Negative	Increased traffic on haul route presents potential for traffic impacts however these aspects are mitigated through a traffic management plan, identified upgrade works and driver behavioural measures.

Matters		Key Links to Social Impacts	Risk of Impact Without Mitigation	Nature of Impact	Explanation
	Services and facilities	Way of life; Access to infrastructure, services and facilities;	N/A	Nil	The proposed development does not impact on public services or facilities.
	Cohesion, capital and resilience	Way of life; Community; Culture;	Likely	Positive	The proposed development will provide employment opportunities for the region. However, the scale of the quarry operation is not large enough to impact and artificially inflate the cost of housing in nearby townships. Thus, the region will benefit from employment yet remain resilient to change.
	Housing	Way of life; Personal and property rights.	N/A	Nil	As per above.
Economic	Natural resource area	Way of life;	Likely	Positive	The quarry will utilise available natural resources in a sustainable manner. The natural resources consumed will be supplied to support the construction of the IRP and associated road projects which has significant benefit to the region.
	Livelihood	Surroundings;	Likely	Positive	The proposed development will provide employment and training opportunities for the area. The economic activity generated by the proposed development will also relate to the longer-term benefit to the region through the construction of the IRP and associated road projects.
	Opportunity cost	Personal and property rights	N/A	Nil	The net benefit to the community far outweighs the loss of natural resources in term of vegetation (being offset) and the consumption of geological resources.
Air	Air emissions.	Surroundings	Likely	Negative	The proposed quarry will not exceed the NSW EPA air quality criteria. Air quality mitigation measures will be implemented.
Biodiversity	Native vegetation and fauna	Surroundings	Likely	Negative	Vegetation clearing is proposed on site however the net loss of biodiversity impacts is offset by the provision of biodiversity credits under the biodiversity assessment method and trading scheme.
Land	Stability/structure, land capability, topography	Surroundings	Likely	Negative	While the quarry operation will disturb the land controls will be in place and at the cessation of quarry activities the site will be rehabilitated.
Water	Quality, availability, hydrological flows	Surroundings	Unlikely	Negative	Soil and water management measures should be implemented to ensure the proposed development causes minimal impact to surrounding water bodies and hydrological flows.

5.18 Rehabilitation

5.18.1 Rehabilitation measures

As the quarry reaches the end of its lifecycle, areas of the site that are surplus to operational needs will be identified for rehabilitation. The key outcomes sought for the rehabilitation of the site are as follows;

- Produce a stable landform capable of supporting grazing purposes
- Establish groundcover across all disturbed areas to ensure that erosion is minimised
- Ensure that all areas drain adequately to prevent water logging and also prevent concentrated flows that may result in scour
- Maximise biomass of groundcover to provide a resilient and functional landform

5.18.2 Strategy

The strategy that will guide the approach taken to rehabilitation will consider the following and be incorporated into a site-specific environmental management plan. The broad features of the rehabilitation strategy will include the following;

- Design the final landform design to consider land capability, drainage, and stability
- Select a productive pasture seed mixture which is suitable the climate and soils type. The pasture mix needs to incorporate a balance of fast establishing ground cover as well as perennial species which can help promote binding of the soil and contribute toward a stable landform
- The landform will be prepared by minor shaping to achieve the desired profile while considering the drainage to provide a water shedding surface.
- Soils will be prepared by spreading out over the land form surface. Samples will be taken to understand the structural and chemical condition of the soil to determine if amelioration is required to achieve successful groundcover.
- Soils will be deep ripped across the contour prior to seeding to help establish surface roughness to reduce runoff velocity, simulate aeration and provide a suitable planting seed bed.
- Timing of the seeding will coincide with warmer months to ensure that new pasture growth is not subject to adverse environmental conditions during early establishment.
  Once seeding has taken place all machinery will be excluded from the rehabilitation areas and pasture will be monitored for weed growth and development. Water will be applied by water cart if required.
  Pasture and soil conditions will be monitored over time to determine when the site is suitable for the introduction of grazing activities.

5.18.3 Resources

To ensure that sufficient financial resources are available to implement the above rehabilitation strategy the proponent has committed to $20,000 to be set aside over the course of the operation for this purpose. As the site approaches the end of its lifecycle, topsoil resources, earth moving equipment and labour will already be available on the site and can be utilised for rehabilitation. Therefore, the costs will be mainly in seed and fertiliser purchases. Based on this it is considered that the proposed funds are adequate to satisfy the rehabilitation objectives.

6. Economic Impacts

The proposal is expected to require a capital investment of $26,320. This investment includes the works to establish the site such as the earthworks associated with the construction of the sediment pond system, road upgrades and rehabilitation costs. All plant and equipment associated with the quarry have a lifecycle beyond the operational life of the quarry and will be redeployed from the site once the construction activity in the area is complete.

The proposal will stimulate economic activity within the local area. This will include the creation of employment opportunities which are targeted at sourcing applicants from within the local area. As the proposal has limited staff, local support services are relied upon for secondary functions of the site. These services may include but are not limited to waste service providers, mechanical services, cleaning services, fencing contractors, fuel supply services, weed and pest control services, water supply services and plumbing and building services.

Majority of the workforce will be locally sourced, however infrequent site visits from specialist contractors and quarry management staff will also generate indirect employment in the local area in the provision of hospitality services, fuel supply and other miscellaneous items required for short term visits to the area.

Overall through the supply of suitably priced quarry products to the regional market place, major infrastructure projects can be constructed efficiently. Major infrastructure projects proposed in the area have significant economic benefit at a regional level by introducing increased demand for labour, resources and services beyond the traditional economic base. The proposal would positively contribute towards this increased economic activity in the region.

7. Cumulative Impacts

The potential environmental impacts resulting from establishment, operation and rehabilitation phases of the proposal have been detailed in the relevant sections above.

Potential cumulative impacts are those which are generated by the combined impacts on the local environment as a consequence of the project, together with other developments of similar nature (both existing and proposed). For the purposes of the EIS, the assessment of cumulative impacts considers the impacts of the proposed extractive industry development in the local area.

It is understood that there is a proposed quarry to the south east of the site. The cumulative impacts of both proposals operating concurrently have been considered as part of the noise, dust and traffic assessments supporting this EIS noting that the Meppem Quarry no longer proposes to rely on Berrigal Road to access the Newell Highway.

As described in earlier sections of this report the surrounding land uses in the immediate vicinity are predominantly comprised by agricultural land uses. The cumulative impacts from the proposal have been assessed and are considered compatible with the rural setting surrounding the site.

The cumulative impacts on biodiversity have been considered as part of this assessment and have concluded that there is no concentration of clearing of one particular vegetation community, species or habitat type. The development impacts on biodiversity values have been assessed under the provisions of the *Biodiversity Conservation Act 2016*. Accordingly, long term impacts as a result from the proposed clearing are proposed to be addressed under the biodiversity offset scheme through retiring credits through a stewardship site or payment into the biodiversity conservation trust fund.

Other aspects such as visual, heritage and water resources have also been assessed and have been deemed to not require further assessment as each proposal is adequately separated such that these aspects do not interact or that the proposal has minimal impact on these aspects.

Overall, the cumulative impacts of the proposed development will not significantly impact the surrounding area.

8. Ecologically Sustainable Development

Ecologically sustainable development (ESD) is defined as:

"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased" (DMP 1990).

(4) The principles of ecologically sustainable development are as follows:

a) the precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

ii) an assessment of the risk-weighted consequences of various options

The proposal would be in accordance with the relevant guidelines. As the proposal will be operated as per the measures highlighted in this EIS it is expected to be a sustainable operation for the duration of its lifecycle without irreversible environmental harm to the environment.

b) inter-generational equity, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

The proposal is not expected to have any long-term environmental impacts that would impact future generations. The areas subject to ground disturbance will be returned to a functional landscape through high quality land rehabilitation treatments. This is expected to maintain the environment of future generations.

c) Conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

The proposal has been planned to avoid areas of high-value remnant vegetation. Conservation of biological diversity has been a key component of consideration of the quarry layout. Management measures are in place to ensure that areas of existing ecological integrity are maintained as part of the proposed development.

d) improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:

i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The proposal includes several development costs associated with environmental factors. These costs are directly proportionate to the scale of the development and costs will not be passed on through the supply chain or market mechanisms.

In conclusion, the proposal can be supported based on achieving the objectives of ecologically sustainable development.

9. Conclusion and Justification

The proposal by John Meppem to establish a hard rock quarry at Manamoi Road, Bellata requires consent under the *Environmental Planning and Assessment Act 1979*.

The project would extract a maximum of 490,000 tonnes per annum, to supply the IRP and associated road projects and thereby support and enhance the economic viability of the region. Consent is being sought for a period of up to ten (10) years, subject to the progress of the construction activity in the area and would not include necessary time for the completion of any rehabilitation works once the resource is exhausted.

The Australian Rail Track Corporation (ARTC) identified the need for structural fill, track capping and ballast material requirements for the Narrabri to North Star section of the IRP. In the EIS prepared for this project (ARTC, 2017) it is stated that the procurement of these materials would be sourced locally from suitable quarries along the Inland Rail alignment. Similarly, Roads and Maritime Services (RMS) require similar materials for the Newell Highway upgrade works and note in approval documents that there are limited local supplies of gravel and aggregate that conform to suitable standards, requiring such resources to be imported from further afield.

While alternative sites were considered to provide the required construction materials for the Inland Rail and associated road upgrade works, other sites that were assessed included constraints in ecological characteristics, potential heritage items, resource accessibility and amenity issues. The site was selected based on its limited constraints and proximity to the Inland Rail and the anticipated Newel Highway road upgrade works.

The consequences of not carrying out the proposal were also considered, resulting in the ARTC and RMS having to source materials from other existing or new greenfield sites which may be at a higher cost based and similar level of disturbance.

The proposal has been designed to avoid impacts to the areas of environmental significance on the site and minimise any remaining potential impacts through appropriate design and management measures. A thorough and comprehensive assessment of existing environmental values and potential environmental impacts have been undertaken. Environmental aspects considered by this EIS include the following:

- Aboriginal and historic heritage
- Traffic impacts
- Biodiversity impacts
- Noise, dust and blasting impacts
- Surface water management
- Resource characteristics.

These matters were subject to detailed specialist assessments which identified project specific mitigation measures to avoid and minimise potential environmental impacts.

Extractive industries are a significant contributor to the material needs of local and regional communities and to economic activity and development. Extractive resources are site specific, limited in occurrence by geological conditions and are finite. Because they are high-volume, low-cost materials, they need to be located close to the communities that use them as the cost of transport to the end user contributes greatly to the overall cost of the delivered product. Extractive resources underpin all urban and infrastructure development and make a major contribution to the ongoing economic growth of the community through direct and indirect employment opportunities.

The potential environmental impacts of the proposal have been identified and measures proposed to manage and mitigate those impacts. Therefore, it is considered unlikely that the proposal would have a significant detrimental impact on the environmental values of the site. The proposal would provide economic benefits to the local community through additional employment whilst also providing improved material delivery efficiencies to the IRP which will benefit the wider region. Accordingly, it is considered that the proposal is justified and its impacts acceptable subject to the implementation of the management and mitigation measures identified by this EIS and supporting specialist assessments.

10. Declaration

This Environmental Impact Statement provides a true and fair assessment of the proposed Meppem Quarry in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal. This statement has been prepared in accordance with clause 6 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

Environmental Impact Statement prepared by
Name: James John Lawler
Qualifications: Bachelor of Built Environment – Urban & Regional Planning
Address: 6 Mayneview Street, Milton, QLD 4064

In respect of the proposed Meppem Quarry.

Proposal
Applicant name: John Meppem
Applicant address: C/O Groundwork Plus Pty Ltd, 6 Mayneview Street Milton, QLD 4064.
Land to be developed: As shown in the Environmental Impact Statement.

Environmental Impact Statement
An Environmental Impact Statement is attached.

Certificate
I certify that I have prepared the contents of this Environmental Impact Statement and to the best of my knowledge:

i. the statement has been prepared in accordance with Schedule 2 of the NSW Environmental Planning and Assessment Regulation 2000;
ii. the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates; and
iii. that the information contained in the statement is neither false nor misleading.

Name: James John Lawler
Date: 17 February 2021

Drawings

Attachment 1 – Secretary's Environmental Assessment Requirements (SEARs)

Attachment 2 – Site Office Plan

Attachment 3 – Site Amenities Plan

Attachment 4 - Environmental Management Plan

Attachment 5 – Biodiversity Impact Assessment

Attachment 6 – Aboriginal Cultural Heritage Impact Assessment

Attachment 7 – European Heritage Impact Assessment

Attachment 8 – Surface Water Management Assessment

Attachment 9 – Air Quality Impact Assessment

Attachment 10 – Noise impact Assessment

Attachment 11 – Traffic impact Assessment

Attachment 12 – Resource Assessment Report

Attachment 13 – Council Water Supply

Attachment 14 – Polo Citrus Information