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Wandoona Sand Quarry

ENVIRONMENTAL IMPACT STATEMENT

Johnstone Concrete and Quarries Pty Ltd
Lot 5 in Deposited Plan 236547

October 2020

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Wandoona Sand Quarry

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Johnstone Concrete and Quarries Pty Ltd
Lot 5 in Deposited Plan 236547

Prepared by: **SMK Consultants**
39 Frome Street, Moree, NSW 2400

October 2020

DOCUMENT CONTROL

Project Name	Wandoona Sand Quarry
Proponent	Johnstone Concrete and Quarries Pty Ltd
Project Reference	15-229
Report Number	15-229 – Environmental Impact Statement
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Revision History			
Version Number	Date	Authority	Details
0	June 2016	Peter Taylor (SMK Consultants)	Initial Issue
1	October 2020	Peter Taylor (SMK Consultants)	Amendments as per Council Request

CERTIFICATE

Environmental Planning and Assessment Act, 1979

Submission of an Environmental Impact Statement (EIS)

Prepared under the Environmental Planning and Assessment Act 1979 and meeting the requirements for clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

This Environmental Impact Statement has been prepared by SMK CONSULTANTS PTY LTD to accompany a Development Application made in respect of the development described as follows:

Development: Expansion of Wandoona Quarry, Moree
Applicant: Johnstone Concrete and Quarries Pty Ltd
Address: P.O. Box 941, Moree NSW 2400

Land to be developed: Lot 5 in Deposited Plan 236547

Environmental Impact Statement:

The contents of this Statement, as required by Schedule 2 of the Environmental Planning and Assessment Regulation 2000, are set out on the following pages.

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

- ☐ It has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*;
- ☐ It contains all available information that is relevant to the environmental assessment of the development to which the statement relates; and
- ☐ The information contained in this Statement is neither false nor misleading.

Signature: *Peter Taylor*

Date: October 2020

Peter Taylor B.Sc. MEIANZ CIAg LAA.
Director
SMK Consultants

EXECUTIVE SUMMARY

This development proposal has been prepared by SMK Consultants on behalf of Johnstone Concrete and Landscape Supplies Pty Ltd (“the Applicant”) to support the expansion of the existing “Wandoona” quarry footprint. The current footprint extends over approximately 2 Ha and it is proposed to increase the footprint size to a total area of 12.6 Ha, including roads and associated temporary infrastructure.

Applicant:	Johnstone Concrete and Quarries Pty Ltd 35 Drive In Road Moree, NSW 2400
Owner:	Wandoona Pty Ltd 35 Drive In Road Moree, NSW 2400
Land involved:	Lot 5 in Deposited Plan 236547
Local Government Authority:	Moree Plains Shire Council
Zoning:	‘RU1’ – Primary Production under the Moree Plains LEP 2011
Development Type:	Designated and Integrated Development
Development Description:	Expansion of Existing Quarry Footprint
Capital Investment Value:	\$80,000

Approvals and Licences

The following approvals are required to amend operations at the existing quarry at Wave Hill:

- 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 Licence from the NSW Environment Protection Authority issued under the *Protection of the Environment Operations Act (1997)*.

Background

Johnstone Concrete & Quarries (JCQ) currently operate a sand and gravel quarry on the property of “Wandoona” near Moree. The current consent conditions for the site enable a

maximum extraction limit of 29,000 cubic metres of material per annum over a limited footprint of approximately 2 Ha with a 40 metre minimum buffer distance between operational areas and the adjoining Mehi River. The current operations are confined to the south-eastern section of the property. The average annual extracted quantity is in the order of 15,000 tonnes at present.

The resource material available on the site extends outside of the approved footprint of the development. In order to ensure that the site operation can continue to expand to meet regional sand and gravel resource demands, the Proponent proposes to extend the current footprint to secure a reliable long-term supply of materials. The annual extraction limit would remain the same.

The Proposed Development

The proposed development involves extending the footprint of the existing sand pit extraction area and extracting the ridge gravel resource which is available on Wandoona. The annual tonnage or method of extraction will not be altered. The access road will utilise the existing gravelled road around the eastern and northern perimeter of the property in replace of the current central access road. The proposal will also include reusing the wash water generated from the sieving plant for irrigation of various crops.

Other operational activities would also need to be changed. The intended hours of operation would remain the same. The limit on the number of truck trips per day would need to be increased to enable materials to be moved from the site in bulk amount rather than smaller constant amounts on a daily basis.

Extension of the gravel quarry footprint triggers several parameters relating to Schedule 3 of the *Environmental Planning and Assessment Act 1979* (The Act). Primarily, the proposed development would extend beyond the limit of 2 hectares in total area. The haul road is located within 40 metres of the Mehi River bank over a short distance. Both of these dimensions trigger the provisions of the Act to classify the development proposal as Designated development.

The land included in this proposal comprises Lot 5 DP 236547. The subject land is owned by the Directors of the Proponent (Wandoona Pty Ltd).

The quarry has been utilised by Moree Plains Shire Council (MPSC) and private developers for several decades, until regular extraction ceased approximately ten years ago. The historical extraction of gravel from this site occurred without a consent from the local Council as this was not needed when the original extractive works commenced.

The Proponent purchased the property in about 2013-14 for the purpose of obtaining sand for their ready mixed concrete and aggregate business. The Proponent lodged a development

application for a non-designated sand and gravel extraction enterprise. Moree Plains Council issued development consent 2014-58 for the extraction and sieving of aggregate from the site. The project involved establishing a portable sand sieve plant on a raised pad, installation of a river pump under a DPI Water works approval and extraction of gravel and sand material from within the initial extraction area. The extraction operation commenced once an occupation certificate was issued.

JCQ wishes to extend the Quarry footprint to the west and north of the current extraction area. Additionally, an area of “ridge gravel” has been uncovered at an old pit on the southwest corner of the property. The extraction of this material is included in this current proposal. A plan showing the potential long-term extension of the gravel extraction area is presented as Plan 1.

The extended area has been previously cultivated and cropped. The trees within the footprint of the extended areas will be preserved with appropriate buffers. The proposal intends to reuse water from the sieving operation through a centre pivot for production of various crops including lucerne hay. The approximate location of this centre pivot area is indicated on Plan 1. The pivot will be mobile to provide flexibility in cropping arrangements.

Under the existing approval, JCQ’s extraction limit is set at 29,000m³ of sand and gravel from this site in any one year. The annual average is predicted to be in the order of 15,000 tonnes. In exceptional circumstances including flood damage repairs etc., additional extraction may occur, but this would be limited to less than 29,000m³ per annum. The resource available on the site indicates a life span of 30-years or more.

The proposal is Designated development under the provisions of the NSW *Environmental Planning and Assessment Act 1979* and requires development consent from the Moree Plains Shire Council based on the area to be affected by the extension and the proximity of an internal access road to the Mehi River.

The outcomes of the Environmental Impact Statement have shown that the proposal is unlikely to interfere with surrounding land uses and as the proposed extraction area has been cleared and extensively modified by cultivation and grazing along with the existing quarry operations over several decades, the proposal is considered to have minimal additional impact on native flora and fauna.

TABLE OF CONTENTS

CERTIFICATE	v
EXECUTIVE SUMMARY	vi
Approvals and Licences	vi
Background	vi
The Proposed Development.....	vii
1 Introduction.....	14
1.1 Proponent and ownership	14
1.2 Background Information	14
1.3 Authors	14
2 The Development Proposal	15
2.1 Objectives	15
2.2 Existing Development	15
2.3 Proposed development.....	16
2.3.1 Quarry Operations	20
2.3.2 Total Footprint	26
2.3.3 Site Management.....	26
3 Description of the Existing Environment	27
3.1 Location	27
3.2 Surrounding Land Uses	27
3.2.1 Land Use Conflict	27
3.2.2 Surrounding Land Uses	28
3.3 Existing Infrastructure	29
3.3.1 Quarry Access off Gwydirfield Road	29
3.3.2 Transport Route	31
3.4 Topography and Geology	32
3.5 Soils	32
3.5.1 Land and Soil Capability	32
3.6 Meteorological and Climatic Data	33
3.6.1 Rainfall	33
3.6.2 Temperature and Evaporation.....	34
3.6.3 Wind Direction and Frequency	34
3.6.4 Humidity.....	35

3.6.5	Frosts.....	36
3.7	Surface Water.....	36
3.7.1	Watercourses.....	36
3.7.2	Riparian Vegetation	37
3.7.3	Surface Water Sharing Plans.....	37
3.8	Groundwater.....	38
3.8.1	Groundwater Assessment.....	38
3.8.2	Groundwater Data	39
3.8.3	Groundwater Dependent Ecosystems	40
3.8.4	Groundwater Sharing Plans	43
3.9	Natural Hazards.....	44
3.9.1	Bushfire Risk.....	44
3.9.2	Flood Liability	45
3.10	Flora and Fauna	46
3.10.1	Desktop Assessment	46
3.10.2	Site Assessment	49
3.11	Cultural Heritage	51
3.11.1	Aboriginal Cultural Heritage	51
3.11.2	European Heritage	52
3.12	Socio-Economic Conditions	52
3.12.1	Population.....	52
3.13	Employment.....	54
3.14	Road network and traffic volumes	54
4	Justification for the Proposal	56
4.1.1	Biophysical	56
4.1.2	Economic.....	56
4.1.3	Social	57
4.1.4	Ecologically Sustainable Development	57
4.2	Analysis of Alternatives	59
4.2.1	Alternatives.....	59
4.2.2	Consequences of not carrying out the development	59
5	Statutory Matters	60
5.1	Commonwealth Legislation.....	60
5.1.1	Environment Protection and Biodiversity Conservation Act 1999	60
5.2	State Legislation and Planning Matters	60
5.2.1	Environmental Planning and Assessment Act 1979	60
5.1.1	60	

5.2.2	Environmental Planning and Assessment Regulation 2000	61
5.2.3	Biodiversity Conservation Act 2016	62
5.2.4	National Parks and Wildlife Act 1974	63
5.2.5	Protection of the Environment Operations Act 1997	63
5.2.6	Water Management Act 2000	63
5.2.7	Heritage Act 1977	64
5.2.8	Contaminated Land Management Act 1997	64
5.3	State Environmental Planning Policies and Development Codes	64
5.3.1	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	65
5.3.2	State Environmental Planning Policy (Koala Habitat Protection) 2019	66
5.3.3	State Environmental Planning Policy No. 55 – Remediation of Land	72
5.3.4	State Environmental Planning Policy (Primary Production and Rural Development) 2019	72
5.4	Regional Plan.....	73
5.5	Local Planning Instruments	73
5.5.1	Moree Plains Local Environmental Plain 2011	73
5.5.2	Land Use Definition	74
5.5.3	Zone RU1 - Primary Production	74
5.5.4	Bushfire Hazard Reduction	76
5.5.5	Development Control Plan.....	76
5.5.6	Development Contributions Plan	76
5.6	Consultation and Liaison with Government Authorities.....	76
5.7	Identification and Prioritisation of Issues	78
6	Environmental Impact Assessment and Proposed Mitigation Measures.....	79
6.1	Environmental Risk Analysis of Proposal	79
6.2	Transport	83
6.3	Noise and Vibration	84
6.3.1	Environmental Noise Impact Assessment	84
6.3.2	Noise Attended Monitoring	86
6.4	Air	89
6.4.1	Diesel exhaust	89
6.4.2	Dust	90
6.4.3	Dust Mitigation Measures	90
6.5	Visual	90
6.6	Water	91
6.6.1	Surface Water	91

6.6.2	Groundwater.....	92
6.7	Soils	93
6.7.1	Soil Erosion.....	93
6.8	Flora and Fauna	93
6.9	Heritage	95
6.9.1	Aboriginal heritage.....	95
6.9.2	European heritage	95
6.10	Technological hazards.....	96
6.10.1	Blasting.....	96
6.11	Natural hazards	96
6.11.1	Flooding.....	96
6.11.2	Geological instability.....	97
6.11.3	Bushfire	97
6.12	Waste.....	100
6.13	Social & Economic	101
6.14	Public Safety, security & crime prevention	101
6.15	Energy	101
6.16	Site design	101
6.17	Cumulative impacts	102
7	Environmental Management Plan	103
8	Site Rehabilitation.....	103
8.1.1	Rehabilitation and Final Land Use Objectives	103
8.1.2	Rehabilitation Method.....	103
8.1.3	Final Land Form.....	104
8.1.4	Rehabilitation Funding.....	104
9	Conclusion	105
10	References	106
Appendix 1 – Site Plan		
Appendix 2 – Secretary’s Environmental Assessment Requirements		
Appendix 3 – Authority Correspondence.....		
Appendix 4 – Environmental Noise Impact Assessment.....		
Appendix 5 – Contamination Assessment (SEPP 55)		

Appendix 6 – AHIMs Search Results	
Appendix 7 – Soil and Water Management Plan.....	
Appendix 8 – Test of Significance	
Appendix 9 – Matters of National Environmental Significance.....	
Appendix 10 – Operational Environmental Management Plan.....	
Appendix 11 – Submissions Recieved in Response to the Proposed Development	
Appendix 12 – Applicant’s Response to Received Submisssions.....	
Appendix 13 – Resource Assessment	
Appendix 14 – Traffic Impact Assessment	
Appendix 15 – Wandoona Quarry Weighbridge Records	

1 Introduction

This Environmental Impact Statement (EIS) has been prepared by SMK Consultants on behalf of Johnstone Concrete and Quarries (JCQ) to accompany a Development Application for an extended area for an existing sand and gravel Quarry operation on the property 'Wandoona'.

1.1 Proponent and ownership

The proponent is JCQ. The proponent's details are summarised in Table 1. The owner of the property is Wandoona Pty Ltd.

Table 1: Proponent Details

Organisation	Johnstone Concrete Quarries Pty Ltd
ABN	93 151 466 554
Postal Address	35 Drive In Road Moree NSW 2400
Phone Number	02 6752 6902
Contact Name	Mitch Johnstone
Email	Mitch@jcq.com.au

1.2 Background Information

SMK Consultants were engaged by JCQ to prepare an Environmental Impact Statement (EIS) to assess the proposed expansion of Wandoona Quarry. The EIS was prepared to accompany a development application. This document constitutes the resultant work of that request.

The following primary assessment components form the EIS:

- Submission and Response to Request for Director-General's Requirements for the preparation of an Environmental Impact Statement
- Aboriginal and Cultural Heritage Assessment
- Flora/ Fauna Assessment
- Noise Assessment
- Traffic Impact Assessment
- Water Balance
- Contamination Assessment

1.3 Authors

The persons involved in the preparation of this Environmental Impact Statement and its appendices are:

- **James Maxwell** MEnvMgt. BSc.
- **Hayley Greenham** B.Sc. B.Bus.
- **Peter Taylor** B.Sc. MEIANZ CIAg
- **Marie Duffy** B.Sc. (Hons) M.Sc.

2 The Development Proposal

2.1 Objectives

The objective of expanding the Quarry is to secure a reliable, long term supply of materials to ensure the economic viability of the existing Quarry operation and the Proponent's ready mixed concrete business.

2.2 Existing Development

JCQ's existing Wandoona Quarry is located within Lot 5 DP 236547, which covers an area of approximately 2 Ha. Johnstone Concrete and Quarries operate the Wandoona Quarry as a source of sand and gravel material for use in their ready mixed concrete batching, landscaping materials and the construction of the local civil projects undertaken within the Moree Plains Shire.

The property has been historically used as a cultivation and grazing property on the eastern edge of the Gwydirfield area. Up until the late 70's, the Gwydirfield area had been used as a general source for several separate gravel pits of varying quality in material. Extraction of gravel from Wandoona had continued for private use up until approximately 2005. Extractions in 2005 consisted of several hundred tonnes only. The original active pits were located along the lower floodplain area and not the higher open floodplain which had been used for grazing and cultivation. The original extraction sites remain open and are gradually being backfilled with sand and silt during floods and rainfall events.

The proponent received development consent from Moree Plains Shire Council (MPSC) to reactivate the Quarry in November 2014 (DA 2014-58). The existing development consists of two components mainly, below ground extraction areas to obtain natural sand and gravel material and a portable sieving and washing plant. The gravel and sand is extracted by an excavator, loaded onto a dump truck, hauled to the sieving plant and stockpiled for washing and separation. The sieving plant separates fine sands and gravel material. Wastewater from this process is recycled through a sediment pond which is used to settle the dirty water as well as runoff from the plant and stockpile area. The treated sand and gravel is stockpiled onsite until transport is available to the JCQ Ready Mixed Concrete facility on Drive In road in Moree.

At present, the facility operates for 2 or 3 days per week to provide sufficient sand and other materials for the Proponent's operations and market demand. During operations, the material is stockpiled adjacent to the sieving plant. Once the stockpile is sufficient to supply 1 or 2 weeks of demand, site operations cease. The Proponent generally deploys one or more trucks per day to replenish the stockpiles of material at their Drive In road facility. Once this is completed, site operations cease.

The property is also used for cropping and on occasion grazing of cattle and horses.

There are no residences on the property. The original cattle infrastructure remains in place for managing the cattle.

2.3 Proposed development

Figure 1 presents a locality plan of the area showing the lot location in relation to Moree and local roads. Figure 2 presents a detailed plan of the property showing the preliminary layout of the development site. The area currently utilised for below ground extraction is contained within the south-eastern section of the property. Two primary areas for sand extraction expansion have been identified on the plan. The southern area extends west from the existing pit across the cultivation paddock. The northern area extends onto the slightly higher ground to the northeast of the sand sieve area. Both areas have been investigated for gravel material to a depth of 6m or more to ensure the extent of the resource.

The extraction and processing of material would be undertaken on an irregular basis, subject to demand and use of concrete and aggregates in the Moree region. JCQ generally undertake the extraction and processing work when men are available with the intention of extracting and processing for 5-10 days every 2-3 months. The sieve plant would be operated on a daily basis to accumulate sufficient processed material to supply their operations. The processed materials would then be hauled from the site in a similar timetable to accumulate stockpiles at their Drive In road facility. This work would include short periods of 1-2 days where additional product would be processed for special orders. The sieve plant available on the site is currently restricted to processing approximately 150 cubic metres of material per day. Under this development proposal, the plant is to be used to its full capacity which is in the order of 1,000 cubic metres per day.

Annual demand for sand and river gravel for JCQ is estimated to be in the order of 15,000 tonnes per year to supply normal projects in the Moree region. This includes the housing and industrial markets. On occasions, larger projects such as the Moree Bypass or industrial facility development occur in Moree and if JCQ is able to win the contract to supply these new projects with gravel and concrete, a short period of larger extraction and processing may occur. If this occurs, the Proponent has indicated that no more than 29,000 m³ of material would be extracted from the site. If the specific project required more material, other sources would be utilised.

The sand and gravel resource to be extracted is located at a depth of approximately 0.5 m below ground level and extends to depths of 6 m to 8 m or more. Figure 2 presents an aerial image of the site showing the areas that have this gravel source and would provide potential gravel pits. The proposal would involve removal of the over-burden material and stockpiling

of this material around the edge of the pit area. Direct access to the gravel would then be possible. The floor of the open pit would gradually be lowered until shallow groundwater associated with the adjacent Mehi River system was encountered. No further excavation depth would be possible. The water table would rise and fall under varying conditions in the adjacent river. Such conditions include the summer period with large volumes of irrigation water being supplied to irrigators via the Mehi River which would elevate the groundwater level in the pit area. This can be compared to extended dry periods from March through until September when minimal irrigation water is delivered and the natural stream flow is reduced to a bare minimum or no flow at all.

The sand and sieve operation would generally be undertaken by one employee under normal conditions. This employee would operate the excavator to extract the gravel and sand, drive the articulated dump truck to stockpile the raw gravel at the sieve plant and operate the sieving and screening plant.

A secondary area of ridge gravel has been identified in an old pit in the southwest corner of the property. The ridge gravel is suitable for road foundations and building pads. The resource is considered a secondary product from the site. The gravel deposit may provide up to 50,000 tonne of material. The material is utilised in its raw state. The ridge gravel material would be hauled directly from the site to projects with only a minor demand for stockpiling this material at the Drive In road base. The operation would involve a front end loader being parked on the site and each truck driver loading their own truck.

Access points to the property will remain via the existing property access from Gwydirfield Road. This access point is considered suitable for semi-trailer and road train access, as the main gate to the property is approximately 50 m or more off Gwydirfield road. A stock grid has been installed to avoid issues of stock access to the site during operations. All vehicles to be used on the site would access the area via the northern end of Gwydirfield road and not traverse through the main Gwydirfield subdivision area.

Internal access will involve use of an existing gravelled road which was originally developed for access to the farm and access to the original gravel resources prior to the Proponent's purchase of the property. This road is a graded and gravelled road around the northern and eastern boundaries of the property. The road traverses within 40m of the top of the bank of the Mehi River along part of the eastern boundary. The use of this road was discussed during a site meeting with DPI Water representatives.

The sieving plant consists of portable equipment powered by a generator. The equipment is established within a circle of stockpiled materials in order to suppress noise emissions. The attached plan presents the current layout of the sieve and stockpiles.

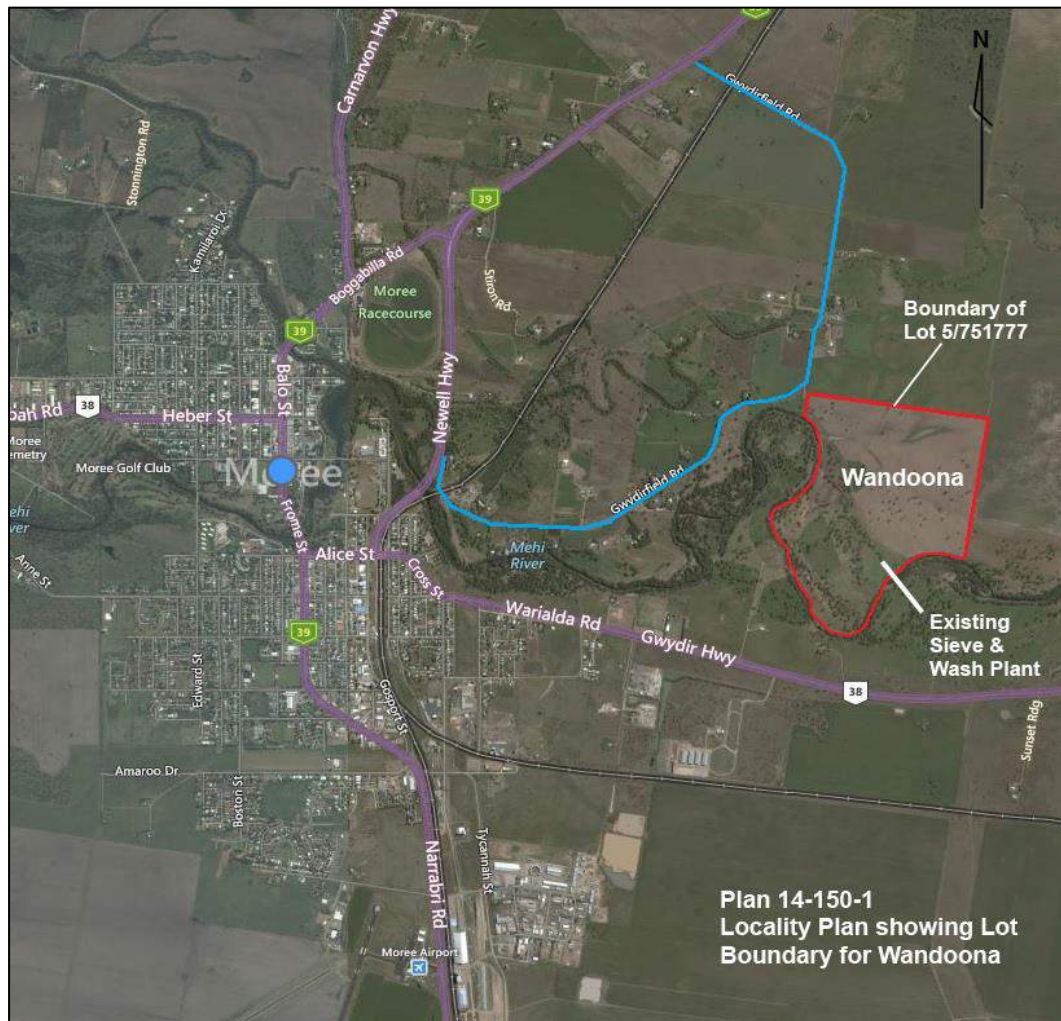


Figure 1: Locality Plan Showing Boundary of "Wandoona" and the Sieve Location

Other facilities developed on the site include a portable handicap accessible toilet, supplied on an as-required basis. No fuel or other workshop supplies would be kept on the site for security reasons. Fuel would continue to be delivered to the site on an as needed basis.

Topsoil material containing grasses and other seeds is stacked around the edge of the site to form a small levee which prevents local drainage from entering the pit area. The initial excavation of the pit is also stockpiled on the southern side of the main south pit. This material forms a noise barrier between the works and the closest residence located on the southern side of the Mehi River.

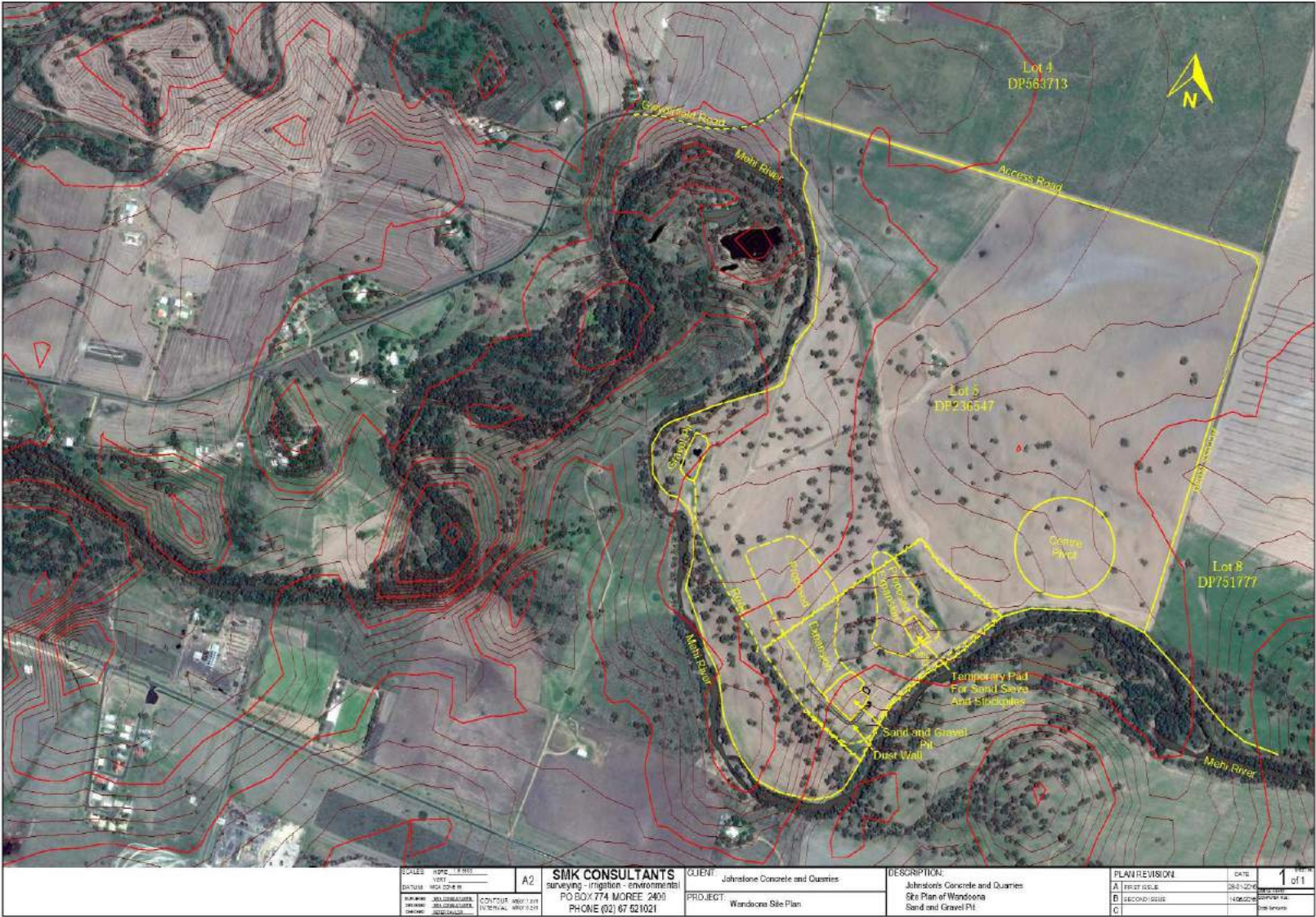


Figure 2: Wandoona Quarry – Site Plan

2.3.1 Quarry Operations

2.3.1.1 Volumes

Under the existing approval, the annual extraction limit is set at 29,000 m³. This is equivalent to approximately 43.5 tonnes. Typically, the tonnage of raw material extracted annually has been much lower than this threshold. Weighbridge records for the period of 01/03/2019 – 01/03/2020, included in Appendix 15, show that in the last 12 months, less than 6,000 tonnes of raw material were extracted in total. The breakdown of material types and quantity are set out in Table 2 below.

Table 2: Breakdown of Materials Extracted from Wandoona Quarry
(March 2019-March 2020)

Type of Material	Volume (Tonnes)
Coarse Sand	4,560.0
Ridge Gravel	622.9
5mm Aggregate	463.4
Loam	281.8
Total	5,928.0

In terms of the proposed development, the annual estimated volume to be extracted at the Wandoona Quarry is 15,000 tonnes. This is expected to vary considerably throughout the year, based on market demand. The Proponent does not plan to exceed an annual extraction of 29,000m³.

The material extracted from the site is to be utilised for sale as raw aggregate or processed aggregate (concrete). The proponent will maintain a record of materials removed from the site via weighing of trucks. This will occur at the Drive In road facility which includes a registered weighbridge facility.

2.3.1.2 Onsite Processing

Onsite aggregate based operation consists of processing the sand and gravel through the portable sieving plant. The sieving process involves separating the raw river gravel material into sand and various sizes of river rock. The sand is washed in the plant so that it is suitable for concrete batching. The various sizes of rock are sold for a range of uses including gravel filter material for bores, rock for bitumen roads, landscape product and general aggregate. The sieving process is a wet process. The water is pumped from the river into the sieving equipment and then captured in adjacent settling ponds. The Proponent does not plan to exceed the annual processing limit of 29,000 m³.

The addition of irrigated cropping to utilise the water required for washing the gravel is considered ancillary to the works as it is agriculture.

2.3.1.3 Stockpiles

The treated sand and gravel is stockpiled onsite until transport is available to the JCQ Ready Mixed Concrete facility on Drive In road in Moree. Stockpiles would range from 500 to 2000 tonne of various products.

2.3.1.4 Loading and Transport

The processed material is loaded into trucks and transported over a period of 2-3 days to the Drive In Road facility. During the loading and hauling, the Proponent will utilise a front end loader, various trucks and if necessary, a water truck to suppress traffic dust on the site and along the haul route where houses are located adjacent to the road. The number of trucks used to haul the gravel would vary according to the project size and location in relation to haul distances and work schedules.

Under average demand conditions, the facility is expected to supply an average of 60 tonnes per day based on a 5-day week. This would require two semi-trailers and one smaller truck. During maximum demand conditions, one semi-trailer would be utilised to haul material from the site. Based on a 1-hour turn-around between facilities, the semi-trailer would be capable of undertaking between 7 and 8 two-way trips per day to the site or approximately 1-trip per hour on average. This may vary when stocks are low. The Proponent has the potential to use 3-4 trucks to haul the material in any one day. The range of movements from the site would therefore consist of a minimum of 7 two way trips and a maximum of 32 two way trips.

The extraction of the ridge gravel from the site would involve excavation from the pit area and temporary stockpiling above ground or within the floor of the pit to enable road train access and loading. The trucks would be loaded directly from the stockpiles and would subsequently haul the material to project sites or the Proponent's Drive In road facility. The required truck movements associated with this gravel would be similar to the removal of sand. The potential exists to engage 6-8 trucks on any day to move this gravel from the site. This would result in 40-50 two-way truck movements from the site. However, this would be subject to operation schedules and potential noise implications and management in accordance with the OEMP for this site.

Trucks used to remove product out of the site to the JCQ main plant operations, will utilise the same route both leaving the site and returning to the site. This route has been determined as the least likely to impact on the residential aspect of Gwydirfield Road whilst also being the safest route. The chosen transport route follows the northern section of Gwydirfield road to the intersection on the Newell Highway. Trucks will then utilise the Moree Bypass to travel between the quarry and the JCQ ready mixed concrete site.

This route would ensure that trucks do not travel through the rural residential sector of Gwydirfield. A proposed traffic speed limit of 60 km/h will be enforced on all drivers along Gwydirfield Road. Induction for operators on the site includes limiting engine breaking, general noise and dust emissions along this corridor. Figure 3 shows the proposed traffic route between Wandoona Sand Quarry and JCQ concrete facility.

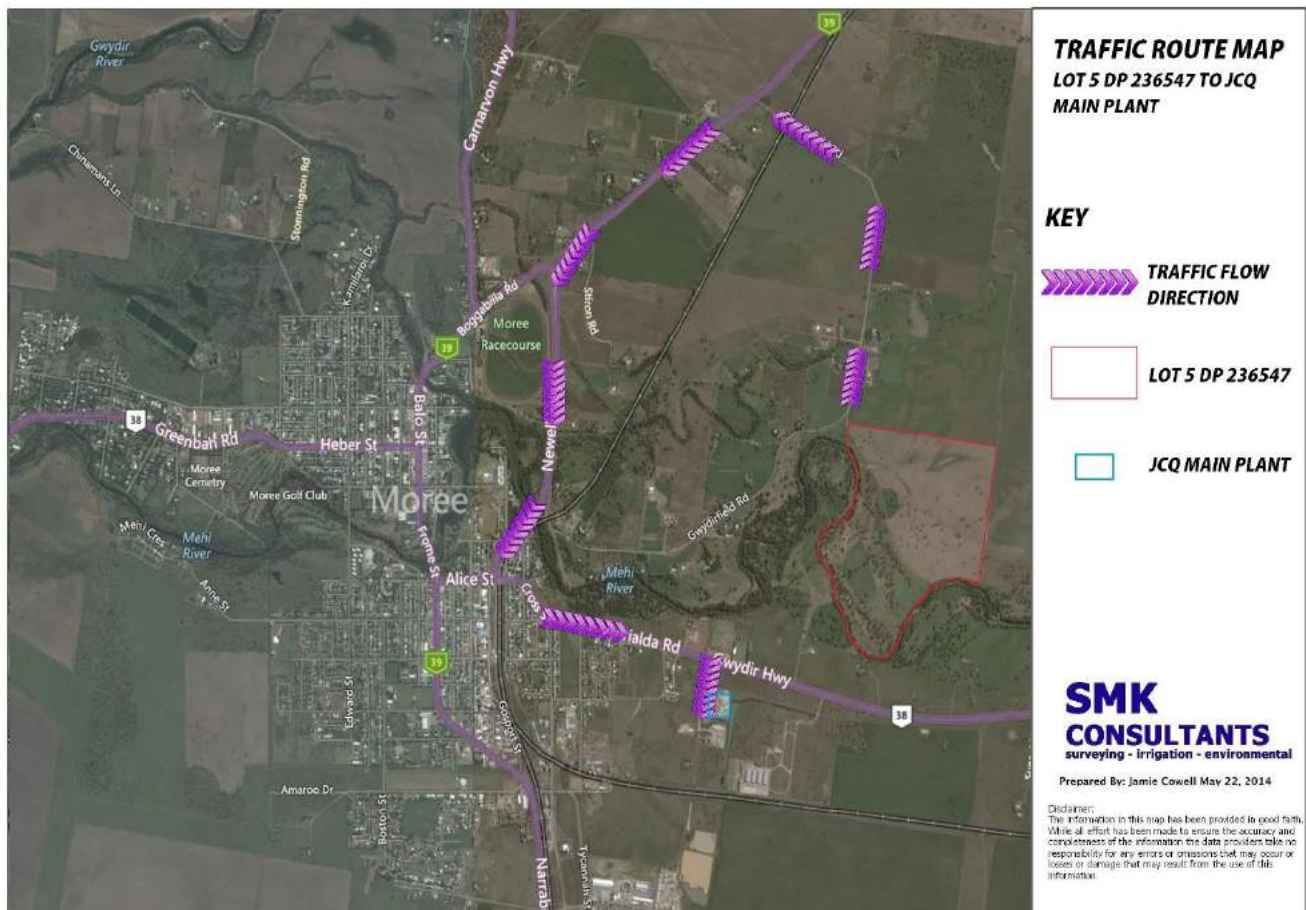


Figure 2: Existing and Proposed Truck haul route between Wandoona and JCQ concrete facility

The development would not require the use of oversized trucks.

Traffic movements to and from the site would remain subject to current planning agreements. To date, this has included a bench marking report on the section of Gwydirfield road to be utilised to move material from the quarry onto the Newell highway. The report did not extend to assessment of the Newell highway as the truck numbers generated by the existing and proposed development is considered to be less than 1% of daily truck traffic volumes on the highway.

All existing intersections and traffic signs will remain in place as these have been approved by Council for the current development. This includes current road network signage and geometry which was based on Austroad Standards.

2.3.1.5 Water Requirements

An allowance of up to 17 ML of water per annum for the washing of sand, dust suppression (roads) and employee facilities has been included in the proposal. The following presents a preliminary water balance for the site:

Table 3: Preliminary Water Balance for Operation of Wandoona

Water Use	Estimated Daily Volume (L)
Road watering	50,000 Litres (two loads)
Dry sand	48,000 litres (2 litres per second)
Absorption by sand	3,000 litres removed from property
Seepage through sand pit holding pond at 50 mm/day	11,250 litres seepage loss
Daily water use during operations	98,000 litres
Available for irrigation and recycling	33,750 litres

If the facility operates for 3 days per week, the water requirements would be in the order of 156,000 litres. The use of water would vary as a result of many factors including plant operation and road water requirements.

This water is obtained through a high security allocation from the Gwydir Regulated River system, which can be utilised for industrial purposes. The licence number is WAL13284, issued on 28/5/2015 and includes 18 ML of water that can be used for Industrial purposes. This water was transferred to the site under the application to DPI Water. The water is pumped from the Mehi River through an electrically driven pump. The electricity is supplied by a diesel generator. Water is ordered on a regular basis through NSW Water. The water is obtained from a water hole in the river which means that the pump does not rely upon a requirement to have a flowing river.

2.3.1.6 Security

The subject land is fenced from the Gwydirfield Road boundary. The machinery at the site is set back from the road and is secured when not in use. There are few land holders in the area and these few are considered by the applicant to be vigilant and report unusual activities to one another as a form of neighbourhood watch. This generally results in a lower level of rural crime in this locality in comparison with other areas which do not have this level of public cooperation.

The front gate of the property is shut and locked when the site is not in operation. This is a deterrent to crime. The property also supports grazing and cultivation. This results in regular visits by the lessee to check stock and, on occasion, plant and harvest crops.

2.3.1.7 Bunding

Topsoil material is stacked around the edge of the site to form a small levee which prevents local drainage from entering the pit area.

No fuel or other chemical is stored on the property. Fuel is brought to the site on an as needed basis and used to fuel equipment on an as needed basis. No bunded fuel storage or chemical storage area is required for this development.

2.3.1.8 Waste Disposal

No refuse or waste will be disposed onsite. Waste will be removed from the site as it is generated. This may be in the form of tyres and oil for equipment as well as very minor amounts of domestic waste from the employees.

2.3.1.9 Sediment System

The existing facility utilises a sediment pit to collect runoff from the sieving operation. This pit is designed to capture the runoff from the sieving operation, allow the sediment to settle and then allow the settled wastewater to drain away from the plant.

The sediment system is to be expanded to allow storage of water prior to irrigation using the centre pivot system. The preliminary water balance indicates a daily production of water from the sieving operation of 33.75 kL. The current sedimentation pond holds approximately 3-days of water generated from the sieving plant.

The proposed development includes a centre pivot which is ancillary to the development as it would involve a separate business entity of growing crops when water is available from the sieving plant. It would potentially require additional water to support a crop and therefore be the subject of a separate application to DPI Water to obtain additional allocation to be pumped from the river.

The proposed centre pivot would be designed to apply an average of 12 mm across the area of approximately 7-10 Ha pivot. This would require a total of approximately 0.85 to 1.2 ML per pass of the pivot. The balancing storage at the sieving plant would therefore be extended to provide one irrigation of the field. The balance storage would therefore be in the order of 20 m x 20 m x 3 m deep to hold 1.2 ML of the waste water. The pond would consist of an extension of the existing pond, placement of a suitable pump or portable pump on the pond and a mainline servicing one or more hydrant points for the centre pivot.

2.3.1.10 Employment

The proposal would not result in additional employment as the capacity or annual throughput of the site would not be altered. The proposal development would secure the employment of current staff at the Proponent's facilities by providing a long term supply of sand and aggregate for concrete production.

2.3.1.11 Hours of Operation

Operating hours will be between the hours of 7:00am and 5:00pm on weekdays and 7:00am to 3:00pm on Saturdays. Operation events or projects will be variable as JCQ will only be present onsite to supplement their demand. However, these operations would be expected to occur approximately two days a week, with only 1-2 staff on-site. In between projects, the site would remain closed and no activity would occur other than occasional site inspections for assessment of gravel reserves or minor maintenance such as fence repairs.

Truck movements to and from the site would be restricted to the hours indicated in the following table.

The normal hours of operation including extraction, processing, transport and maintenance for the proposed development are indicated in the following table.

Table 4: Proposed Operation Hours

Activity	Monday to Friday	Saturday	Sunday	Public Holiday
Arrival and loading of trucks to haul product	7.00am to 5.00pm	7.00am to 3.00pm	Nil	Nil
Light vehicle traffic associated with employees, or light service vehicles entering or leaving the site	24 hours a day			
Maintenance of plant and equipment including repairs/alterations to processing equipment and unloaded test runs	6.00am to 10.00pm	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 5.00pm
Operation of associated equipment within the confines of the excavated quarry area	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 2.00pm	7.00am to 2.00pm
Operation of loaders, excavators, trucks, screening & washing equipment within the property	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 2.00pm	7.00am to 2.00pm
Exceptional circumstances – all crushing, screening, loading and product haulage activities within and from the site to enable manufacture and delivery to high priority RTA or Shire Projects. Haulage outside normal operating hours is to be limited to four (4) trucks only.	24 hours in emergencies, only with written notification to Moree Plains Shire Council.			Nil

2.3.2 Total Footprint

The existing quarry covers an area of 1.3 Ha. The existing roads from the access point to the main operations and abandoned gravel pit cover an area of approximately 3 Ha. The extension involves an increase to the quarry site of 8.3 Ha. The proposed development's combined total footprint is therefore 12.6 Ha.

2.3.3 Site Management

The operation of the gravel extraction area would involve removal of part of the land that is currently cultivated. The cultivation and farming process at present includes weed management by spray applications. The disturbed areas around the quarry site and stockpiles of material to be retained on the site for extended periods would also be subjected to weed growth from a range of weeds that are currently onsite. This would be exacerbated after flood events.

Localised weed infestation was noted during a site inspection in March 2020. It is recommended to develop and implement a Weed Management Plan prior to the earthworks which form part of the proposed development, and to continue the implementation of the plan throughout the project life cycle, through to completion.

A weed management program is particularly important to ensure appropriate management of weeds within the work areas that remain undisturbed for extended periods. This would include stockpiles of topsoil and table drains along roads.

3 Description of the Existing Environment

3.1 Location

The proposed expansion is within the property known as 'Wandoona', located to the east of Moree, within the Gwydirfield area. The real property description is Lot 5 of Deposited Plan 236547 in the Parish of Mia Mia, County of Courallie. "Wandoona" is located approximately 5km north-east of the Moree township in the Moree Plains Shire. Figure 2 presents an aerial photograph of the property and surrounds showing the landscape features and current development. Figure 2 also highlights the cadastral boundary of the property and nearby residences.

3.2 Surrounding Land Uses

Wandoona is located in the rural edge Moree and is predominantly surrounded by livestock grazing and dryland agriculture. The land to the west has been subdivided into rural residential lots. The area to the north consists of larger farms (>20 Ha).

Adjoining land to the west and east has historically been utilised for extraction of river gravel materials. The existing sand pit and ridge gravel pit will continue to be used for aggregate product as part of this development proposal. The northern section of the property will continue to be utilised for cultivation.

3.2.1 Land Use Conflict

The existing Quarry and proposed expansion is consistent with the historical land use and current zoning for the lot. Potential land use conflicts may arise from the noise and dust generated from the increased extraction occurring on site. Appropriate management options are available to minimise the potential conflict with neighbouring properties, including the adjoining rural residential properties.

The lot will continue to be used for agricultural purposes in conjunction with the sand quarry activities. The proposal is considered compliant within the zoning under the LEP. The following minimum buffers are recommended for the existing land use:

Table 5: Recommended Minimum Buffers for Various Landuses

Extractive industries minimum buffer (m)	
Residential areas & urban development	500
Rural dwellings	500

Source: Department of Primary Industries (2007) Living and Working in Rural Areas Handbook

Existing residential dwellings located within the vicinity of the proposed development have been included in the site plan in Figure 2. The closest residence is located southwest of the

current extraction area. This residence is located as a distance of 645m from the sieving plant and approximately 485 m from the point where the road down into the excavation pit reaches ground level. The proposed development area will involve moving further away from this residence. The second closest residence is approximately 1.4 km from the sieving plant.

The existing excavation pit was constructed with a 2-3 m high earth bank along the southern and western edges. The earth bank was constructed as such to shield the southern receptor from noise and visual disturbance from the pit. The Proponent intends to maintain the current earth bank and continue this along the southern side of the pit area as it extends to the west.

In order to quantify the potential noise impacts of the existing operation and compare this to ongoing operations, an acoustic impact study was undertaken. This study is presented in Appendix 3. The results of this assessment are discussed in Section 6.3 of this EIS. Furthermore, at Council request, attended noise monitoring was carried out during site operations to corroborate operational findings with the acoustic assessment. The results of this additional noise monitoring, carried out by SMK Consultants, are also presented in Section 6.3.

3.2.2 Surrounding Land Uses

The subject site is located on the northern bank of the Mehi River. It is located approximately 16km south east of Midkin Nature Reserve and 37km west of the Bullala National Park. A small number of quarries currently exist within the region, the closest of which is Seven Mile Pit, located approximately 6km to the east. Seven Mile Pit has a current EPL for 30,000 tonnes/year.

The locality to the north, east and south of the subject site is rural zoned land and is typically heavily cleared and utilised for agricultural production, including grazing and cropping enterprises. No new developments have been identified in this area. The area to the south of the Drive In road is utilised for industrial purposes.

West of the subject site, the area of Gwydirfield consists of rural residential development. Some of the lots remain subject to further subdivision opportunities but most lots are not entitled to any closer subdivision within the current LEP. It is expected that a minor number of additional residences may be constructed in this area. These residences would be more than 1 km from the proposed development.

The subject site is approximately 5 kilometres east of Moree, a rural town with a population of 7,383 as of the 2016 census. The wider Moree Plains LGA recorded a total population of 13,159 as of the 2016 census.

Towns and villages within Moree LGA largely rely upon the surrounding rural community for the bulk of their income. The main industry in the Moree LGA is Agriculture (Grain Growing, Grain Sheep/Cattle Farming), which accounts for approximately 11% of the workforce. Additional key industries include Local Government Administration (3%), Primary Education (2.9%) and Cotton Growing (2.8%).

Correspondence with the Moree Plains Shire Council indicated that there were no nearby development applications.

3.3 Existing Infrastructure

The Moree Plains Shire provided development consent for extraction of sand and gravel from the subject land in November 2014. There is no permanent machinery on the site. All machinery used in the gravel removal process is portable and therefore only on site when required. Current infrastructure includes a portable plant for sand sieving, machinery, and a pumping station.

The existing development utilises an access road through the centre of the property to access the sieve plant. This road will be left as an internal farm road and the main boundary fence access road which existed prior to the 2014 approval, will be utilised as the primary access between the front gate and the sieve plant. This road follows the northern and eastern boundary of the property. The road is gravelled and will be maintained to provide access in most conditions. The site would not be utilised during or immediately after rain.

The existing infrastructure also includes the river pump which delivers water to the sieve plant.

3.3.1 Quarry Access off Gwydirfield Road

Traffic enters / exits “Wandoona” from Gwydirfield Road. Gwydirfield Road is a bitumen sealed road. Vehicles exiting ‘Wandoona’ experience the following:

- Sight distance from the exit onto Gwydirfield Road is 400 m to the north; and 350 m to the west.
- Figures 4-7 below show the sight distance from the Wandoona exit onto Gwydirfield Road and into the Quarry.

This intersection was approved under the 2014 development consent after minor upgrades were undertaken to Council requirements. The new bitumen can be noted in Figure 4.



Figure 4: Gwydirfield Road (Northerly Aspect)



Figure 5: Gwydirfield Road (Westerly Aspect)



Figure 6: Gwydirfield Road (access to Wandoona Sand Quarry)



Figure 7: Gwydirfield Road (access to Wandoona Sand Quarry)

The intersection was constructed under the existing development consent for the Quarry. The design and completion of the intersection was approved through the Moree Plains Shire Council.

3.3.2 Transport Route

The traffic from the Quarry will be directed to the northern intersection of Gwydirfield Road and the Newell Highway. Trucks would then travel along the Newell Highway and Inverell

Road to the Proponents main premises, located on Drive In Road. Alternatively, trucks would deliver the product from the site, directly to construction projects.

3.4 Topography and Geology

Geology of the area generally consists of tertiary basalts and overlying quaternary alluvial fans and stream terraces (Morgan & Terry 1992). Landforms in the area are characteristic of sloping plains with coarse alluvial fans deposited over time (Morgan & Terry 1992). The local area is relatively flat with extensive alluvial flood plains. Based on 1:50,000 topographic maps, 'Wandoona' is sited at approximately 210 m above sea level. The natural land slope on the property is 0.5 % to 1%. There is a ridge line that runs through the middle of the property before falling off to the southern side leading into the Mehi River. The river forms the southern border of the project site. There are no other significant artificial or natural topographical features on the project site.

3.5 Soils

The area consists of landscapes derived from both extensive basalt faults and quartz sandstones and consequently has very variable soils and vegetation depending on the local rock type or sediment source (NSW NPWS 2003). The heavy black soils and clays typical of the region are derived from the weathering of tertiary basalts. The surface soil on the Quarry Site varies from a sandy loam in the lower floodplain area to a loamy clay in the upper area. Current operations have revealed up to 8m of sand and gravel material underlies approximately 1m of soil.

The remainder of the property will continue to be cultivated for mainly wheat or barley crops under a minimum till program. There was no evidence of soil contamination present on the site, and a preliminary assessment has been included as Appendix 5.

3.5.1 Land and Soil Capability

The subject site and surrounding land is classified as Class 2 land on the statewide Land and Soil Capability (LSC) map (eSPADE V2.0, Department of Planning, Industry and Environment). This mapping is based on the land and soil capability assessment scheme developed by OEH (2012), and provides a broad-scale, regional view of the dominant LSC present in an area. The definition of Class 2 land under this classification system is described below:

Class 2 – “Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.”

The subject site will be rehabilitated to a land condition of Class 2 or above.

3.6 Meteorological and Climatic Data

The following information is based on Bureau of Meteorology (BOM) information for Moree Aero (Site: 053115), which is the closest recording station to 'Wandoona' that could provide comprehensive datasets. The climate is typical of a semi-arid environment with typically long hot summers and a winter of cool clear days.

3.6.1 Rainfall

The average annual rainfall in Moree is approximately 590 mm. Rain is generally summer dominant with the heaviest falls occurring from October to March (Figure 8). January typically receives the most rain with an average of 89 mm. Summer storms may cause severe flooding and erosion, and winter flooding may also occur if soils remain saturated after summer rains. Autumn and winter rainfall generally varies between 25-45 mm per month.

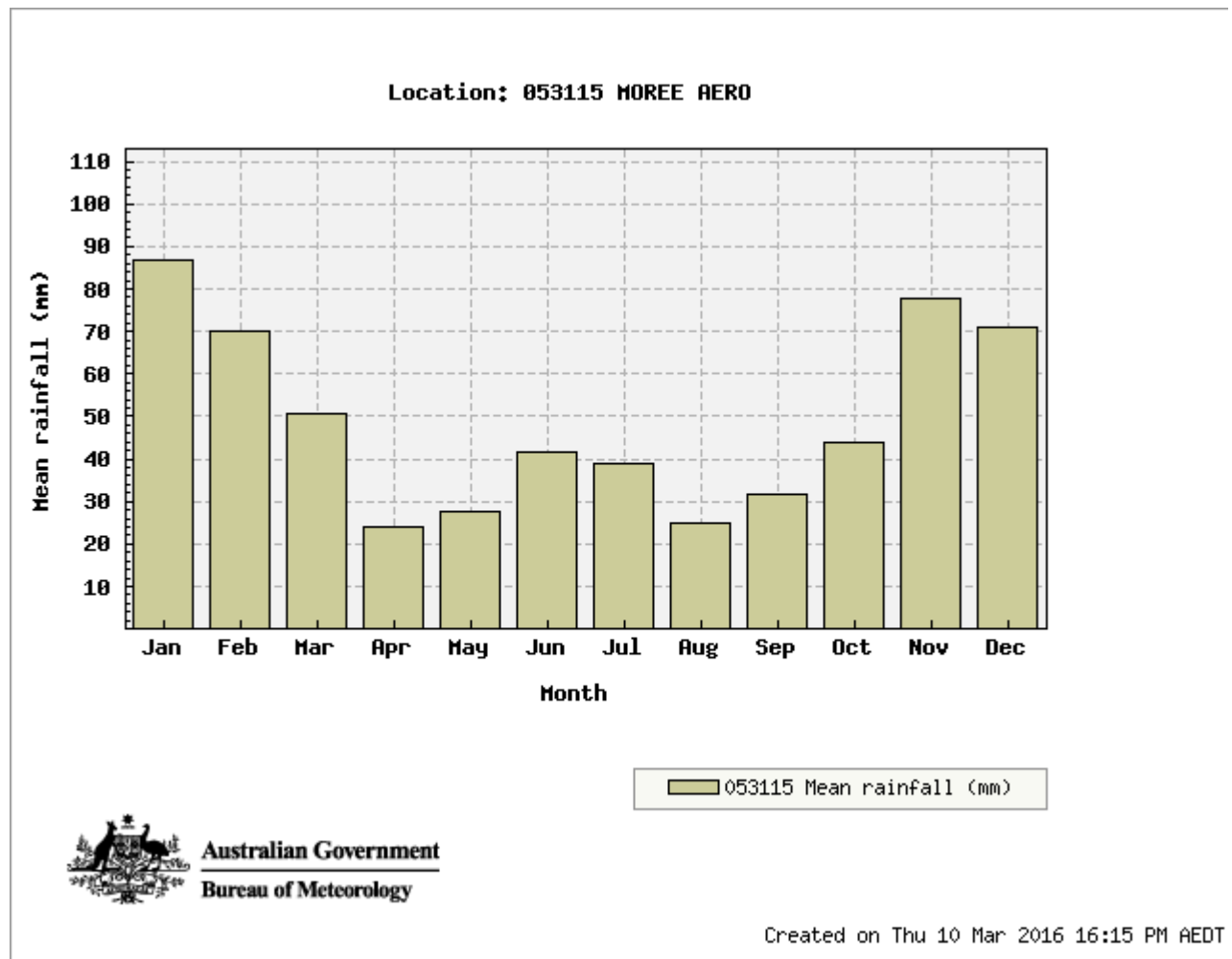


Figure 8: Average monthly rainfall in Moree 1995 - 2016

3.6.1.1 Historical Records

The historical records were obtained from the Moree Post Office (Site: 053027), which has since ceased recording climate statistics. The highest daily rainfall recorded in Moree was 161.8 mm on the 9th of February 1888 and the highest monthly rainfall recorded was 229.0 mm in January 1891. The highest annual rainfall recorded in Moree was 1107.5 mm in 1894 and the lowest annual rainfall was 202.7 mm in 1902.

3.6.1.2 Design Storm IFD Data

The Bureau of Meteorology website provided Rainfall Intensity-Frequency-Duration (IFD) data for storm events at the proposed development site. A 1 in 20-year storm event with a 24-hour duration produces 129.8 mm of rainfall in total. A 1 in 100-year storm event with a 1-hour storm duration produces 67.9 mm of rainfall.

3.6.2 Temperature and Evaporation

Average maximum temperatures ranges from 18-20°C in the winter months to 32-33°C in the summer months. Average minimum temperatures range from between 4-5°C in the winter to between 18-20°C in the summer. In winter the minimum is below zero on an average of 9.2 days. In summer, on average, more than 36.8 days' reach 35°C or higher. Records show a slight increase in the minimum temperature with time.

Annual evaporation exceeds average rainfall, with evaporation levels over 2,000 mm in Moree. Potential evaporation appears strongly seasonal, varying from 2-3 mm/day during June and July, to 10mm/day in December and January.

Table 6: Temperature and Evaporation Data from Moree Aero 1995-2015

Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Av. Max Temp (°C)	33.7	32.7	30.9	27.0	22.4	18.9	18.0	20.4	24.6	28.1	30.6	32.4	26.6
Av. Min Temp (°C)	20.0	19.5	17.0	12.5	8.1	5.8	4.4	5.2	8.9	12.7	16.4	18.3	12.4
Av. Evap. (mm)	313.1	252	238.7	168	114	78	83.7	120.9	171	238.7	273	303.8	2372.5

3.6.3 Wind Direction and Frequency

The closest recording station that could provide accurate long term wind data was Moree, located approximately 5km west of 'Wandoona'. The following table shows prevailing wind observations from the Moree aerodrome based on observations recorded at 9am and 3pm.

Table 7: Wind Data from Moree Aero 1995-2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Wind Direction (9am)	NE	NE	NE	E	E	E	E	NE	NE	N	NE	N	NE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
% of Total Observations	40%	38%	35%	30%	35%	35%	35%	25%	30%	35%	32%	40%	28%
Wind Direction (3pm)	N	N	N	SW	SW	SW	SW	SW	W/ SW	SW	N	N	SW
% of Total Observations	28%	22%	18%	25%	32%	25%	32%	28%	25%	22%	25%	28%	22%

The prevailing wind as recorded at 9 am blows is dominated by winds from the north-east and east. The prevailing wind as recorded at 3 pm blows is dominated by winds from the south-west and north.

Figure 9 presents annual wind roses for Moree as recorded by the BOM.

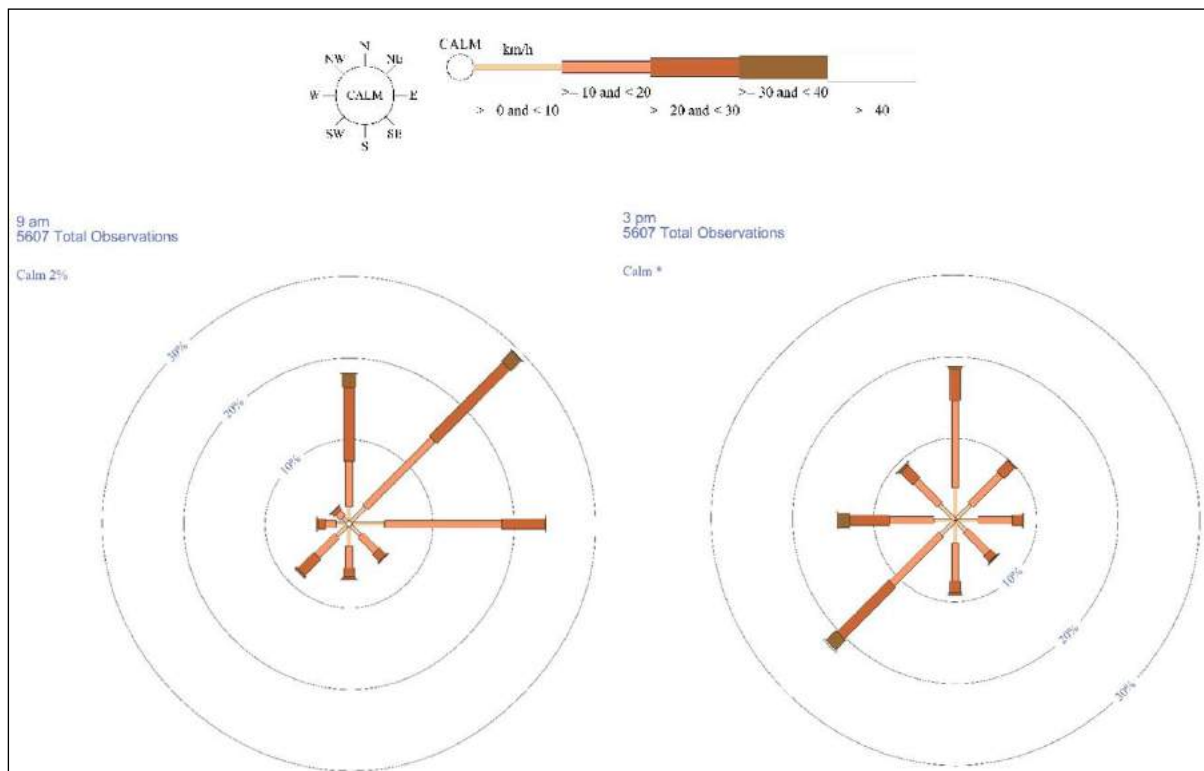


Figure 9: Wind rose, Moree Aero Site No. 053115, 9am and 3pm Observations.

3.6.4 Humidity

Humidity in Moree is generally quite low. Relative humidity is generally higher during winter than summer. The 9 am mean relative humidity varies from 75% in June to 50% in October. The 3 pm mean relative humidity varies from 46% in June to 30% in October.

3.6.5 Frosts

Winter frosts occur Frosts occur when the ground temperature is less than 0°C. In Moree this happens an average of 26.6 days a year, with winter frosts occurring on average 7.5 days a month.

3.7 Surface Water

The proposed development is located adjacent to the Mehi River. The expansion of the Quarry will not involve any extraction from within the river or along the river bank. There are no farm dams located on the site. No wetland is present on or adjacent to the site. The area surrounding “Wandoona” is within the floodplain and sections of the property are subject to inundation in significant flood events. No other surface water features are located within the vicinity of the proposed project.

The sieve plant has been raised on a pad to a height of approximately 1m above natural surface level. The purpose of this pad is firstly to provide drainage around the plant but secondly to raise the plant above small flood levels. The pad would have an extremely minor impact on flood flows as it is approximately 40 m wide including stockpiles.

The stockpiles of topsoil/overburden from the southern existing pit has been stacked in an east-west direction to minimise the impact of the materials during a flood event. No other significant banks or raised areas are required for the development that may interfere with or impact on flood flows.

The proposed extraction areas to the north of the sieve plant are located on land that is only subject to major flood events.

The existing quarry accumulates some internal runoff which is contained within a controlled drainage area (CDA) and diverted into a sediment pond. The water quality is typical of a disturbed area, being turbid for a short period after rain and then settling to clear rainwater after several days. The proposed expansion will involve an extended CDA, sediment pond and installation of additional diversion banks to divert clean water away from the site. As the pit does not drain externally, no external water quality investigations were deemed necessary.

3.7.1 Watercourses

The Mehi River forms the southern boundary of Wandoona. The river is a flood channel derived from the Gwydir River which is used to transfer allocated water for various farming purposes from Copeton dam. Wandoona relies upon water from this river for its current activities of washing gravel and watering roads.

Natural surface runoff from Wandoona drains into the Mehi River.

The Mehi River is within the Water Sharing Plan for the Gwydir Regulated River Water Source 2016. There are no other surface water sources in the area.

3.7.2 Riparian Vegetation

The section of the riparian vegetation through Wandoona has been subjected to grazing, cultivation and infestation of woody weeds such as box thorn. It is considered to be in a degraded condition with few trees and thin vegetation strips. Acacia species dominate the instream and bank vegetation, with an open river red gum woodland scattered through mainly the southern part of Wandoona. Isolated river gums are spread across the upper northern section of the farm. There is minimal understorey as a result of long term cultivation on the property. A combination of native and exotic grass species dominates the groundcover between cultivations or spraying of herbicide. The majority of the farm is cultivated for cereal crop production as well as various fodder crops.

The proposed expansion of the Quarry will not involve any removal of riparian vegetation. Additionally, no extraction is proposed within 40m of the high bank, or within areas of existing riparian vegetation.

3.7.3 Surface Water Sharing Plans

3.7.3.1 Gwydir Regulated River Water Source

The Water Sharing Plan for the Gwydir Regulated River Water Source is in effect since 1 July 2016 and will remain in effect until July 2026. The plan applies to the regulated rivers in the Gwydir catchment including the Gwydir River from Copeton Dam to the Gwydir Raft, the Mehi River, Moomin Creek, Carole Creek, and the regulated sections of Gil Gil Creek. The vision for this Plan is to have a sustainable, healthy river system that provides reliable water through flow management for the community, environment, agriculture and industry.

The objectives of the plan are to:

- a. *protect, maintain and enhance the environmental values of the Gwydir Regulated River Water Source,*
- b. *manage the Gwydir Regulated River Water Source to ensure equitable sharing of water between all uses,*
- c. *protect the Gwydir Regulated River Water Source by ensuring that extraction minimises any adverse impacts,*
- d. *improve water quality in the Gwydir Regulated River Water Source,*
- e. *provide opportunities for ecologically sustainable market based trading of surface water entitlements in the Gwydir Regulated River Water Source,*
- f. *manage the Gwydir Regulated River Water Source to preserve and enhance basic water rights,*
- g. *ensure extraction from the Gwydir Regulated River Water Source is managed properly within the Murray-Darling Basin Ministerial Council Cap, and*

- h. manage the Gwydir Regulated River Water Source to preserve and enhance cultural and heritage values.*
- i. Note. Although there are no specific strategies directly related objective (h) in this Plan, the environmental water provisions in the Plan make a contribution towards the preservation of cultural and heritage values.*

The proposed development is consistent with the relevant rules of the Water Sharing Plan and aims to protect the quality of water in the Mehi River by detaining silt laden water and ensuring all excavation and ground disturbance is managed and remediated with groundcover to minimise the potential for sediment laden runoff to enter the river area.

The allowable extraction from the river under WAL13284 is 18 units (equivalent to 18 ML) per year. The proposal includes the use of a portable sieving plant for washing and processing the sand. The water requirements of the plant average 1 ML/ month, for a total of 12 – 17 ML/ year. The allowable extraction limit exceeds the average water requirements and is considered a reliable water source for the proposed Quarry expansion.

3.8 Groundwater

3.8.1 Groundwater Assessment

The major groundwater aquifers in the surrounding area are found in extensive unconsolidated alluvial sediments, associated with prior streams. The sub-artesian aquifer beneath the site is in the order of 25-30 m below ground.

The material to be extracted on the site includes river gravel. This has been deposited in extensive layers beneath the site. The gravel is directly connected to the river and therefore water flows from the river into the shallow aquifer beneath the site. The depth of this aquifer has been determined at approximately 6 – 8 m below ground level. The depth is seasonally variable. The depth of this shallow connection to the river will determine the potential excavation depth within the pit area.

The area is located above the Great Artesian Basin (GAB), which is concealed approximately 600 - 800 metres below ground. At this depth, there is no risk of contamination of this deep aquifer.

The site is identified as being within the Water Sharing Plan for the Lower Gwydir Groundwater Source 2006. There are no other groundwater sources in the area. A stock and domestic bore is located at the cattle yard in the centre of the property. If this bore is used, its purpose will be restricted to supplying water for grazing cattle.

3.8.2 Groundwater Data

3.8.2.1 Bore Locations

Publicly available bore logs were examined within the locality surrounding the proposed quarry site. There are 7 registered groundwater bores within a 1 km radius of the Quarry site. The closest offsite bore is located across the Mehi River, south of the current operations. The bore was drilled to a depth of 21.3 m with the last recorded standing water level unknown. The buffer distance between the Quarry site and the closest operating groundwater bore is 300m.

The data showed 7 bores recorded within 1km of “Wandoona”. Table 8 shows the drilled depth, depth to water bearing aquifer and the standing water level (SWL) for some of the bores shown in Figure 10.

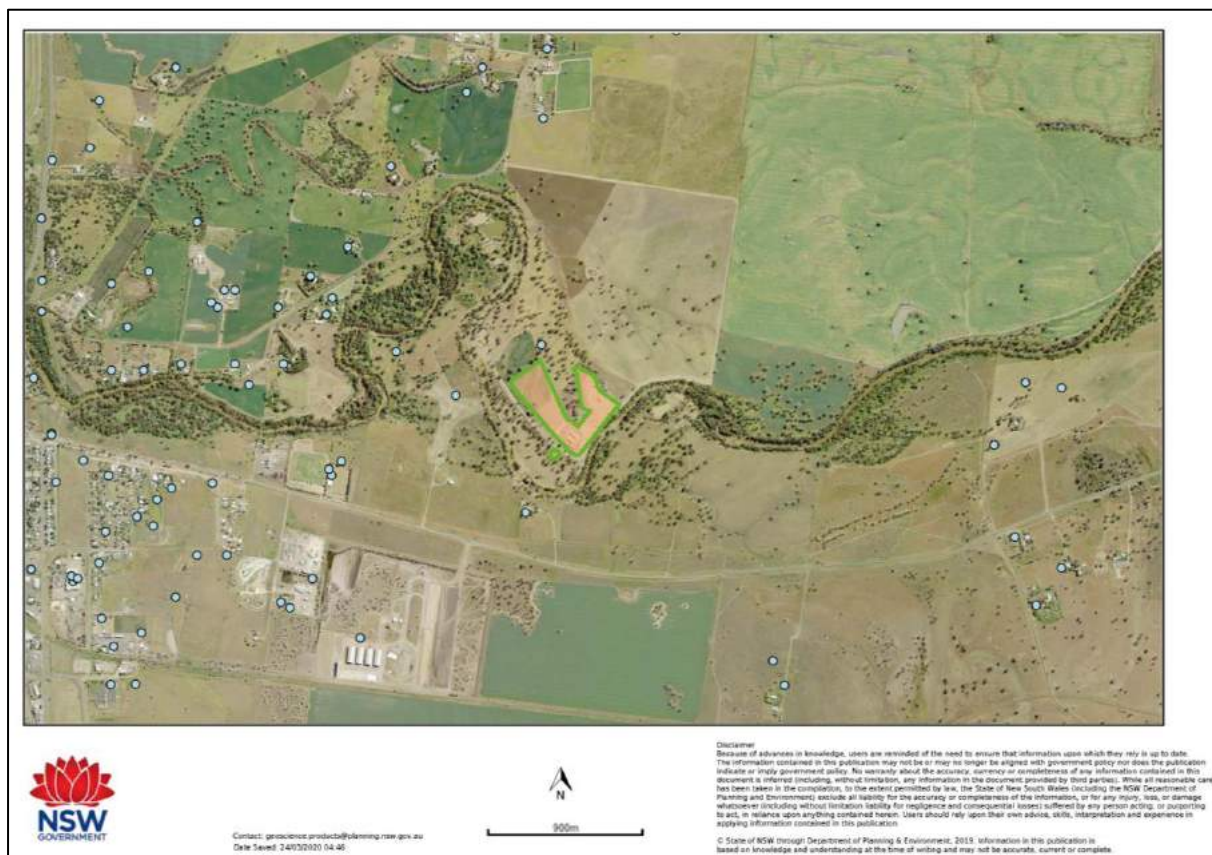


Figure 10: Groundwater Bores (MinView Mapping, Department of Planning, Industry and Environment)

The summary shows bores near the Quarry development were drilled to depths between 24-51 m with water bearing aquifers not being encountered until 8.5 m below surface level (refer to Bore GW045033).

Table 8: Summary of Groundwater Bore Log Data

Bore Licence No.	Distance from Quarry Site (m)	Drilled Depth (m)	Depth to Water Bearing Aquifer (m)	SWL (m)
GW965845	On site*	Unknown	Unknown	Unknown
GW970270	300	45	12	9.2
GW045405	620	29.3	16.8	Unknown
GW026080	370	21.3	13.7	Unknown
GW103431	908	51.0	Unknown	Unknown
GW045033	972	21.34	8.5	8.5
GW068649	980	24.4	9.1	9.1

* Existing onsite bore will not be utilised as part of the proposed development. It is solely utilised for stock and domestic purposes.

3.8.3 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDE's) are defined as ecosystems which have their species composition and their natural ecological processes determined by groundwater (ARMCANZ & ANZECC, 1996). A search of the Atlas of Groundwater Dependent Ecosystems (GDE) (Australian Government Bureau of Meteorology) identified aquatic and terrestrial GDE's predicted to occur within the vicinity of the proposed development. The results of this search are outlined in Figure 11 and Figure 12.

Two aquatic GDE's are located adjacent to the proposed development site:

- The Mehi River (Watercourse) with moderate GDE potential;
- Wetland (Floodplain water body) with high GDE potential, based on national assessment results.

Parts of the property adjacent to the proposal footprint are mapped as having a high potential of supporting a Terrestrial GDE, based on the results of regional studies. The terrestrial GDE identified is 'Coolibah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion', based on regional assessments.

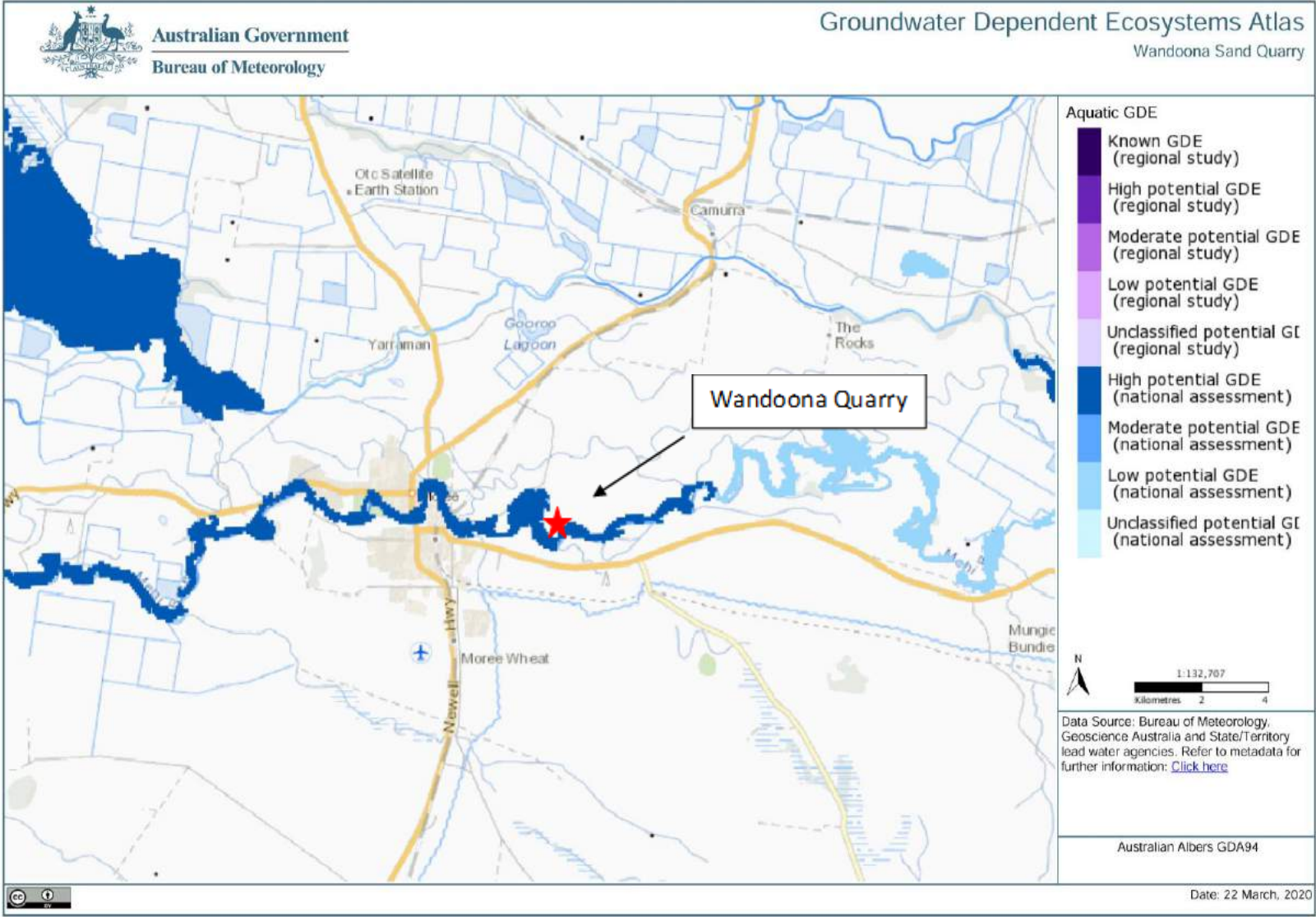


Figure 11: Groundwater Dependent Ecosystems Near Wandoona Quarry

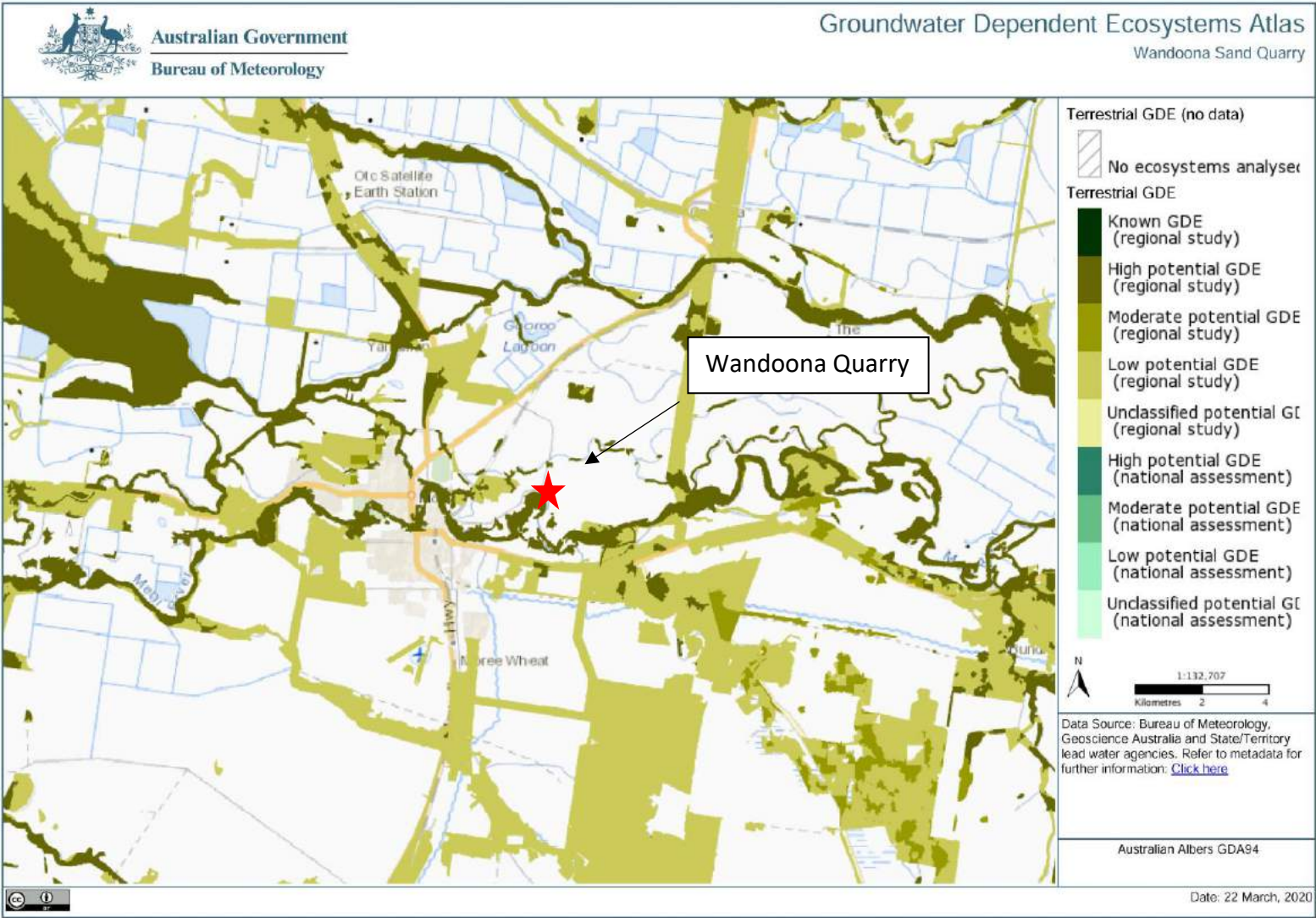


Figure 12: Terrestrial Groundwater Dependent Ecosystems Near Wandoona Quarry

The proposed Quarry is unlikely to have any adverse impacts on the potential GDE's based on the following:

- The proposed site is not located within the vicinity of any identified high priority GDE's.
- The proposed development does not involve any additional water extraction.
- The proposal involves adequate measures to protect the quality of water in the Mehi River and potential water quality utilised by the surface GDE. The proposed measures reduce the potential for sediment discharge into the watercourse.

Given the existing characteristics of the site it is unlikely that the proposed development will have any potential impacts on the surrounding habitat, groundwater levels or connectivity between groundwater sources. Accordingly, there is no potentially significant threat to GDE's within the vicinity of the site.

3.8.4 Groundwater Sharing Plans

3.8.4.1 Lower Gwydir Groundwater Source

The Water Sharing Plan for the Lower Gwydir Groundwater Source 2019 sets the framework for managing groundwater in the Lower Gwydir.

The objectives of this Plan are to:

- protect and maintain groundwater dependent ecosystems by minimising the impacts of extraction,*
- manage and share the groundwater resources of the Gwydir Valley in a sustainable and equitable manner, while minimising negative local and regional impacts,*
- protect the structural integrity of the aquifer by ensuring extraction does not cause any aquifer compaction, aquitard compaction or land subsidence,*
- protect and maintain groundwater quality by ensuring extraction does not result in a change in the beneficial use of the aquifer,*
- provide opportunities for market based trading of groundwater rights within the extraction limit and interference constraints,*
- preserve basic landholder rights to this groundwater source,*
- ensure there are no long term declines in water levels by managing allocations and extractions within the extraction limit, and*
- protect and maintain cultural and heritage values through the management of this groundwater source.*

The bore located on site (Licence No. 90BL153464) is solely utilised for stock and domestic purposes and is not involved with the existing Quarry operations or proposed expansion. The proposed development does not involve any additional extraction or changes to the aquifer and is therefore consistent with the relevant rules of the Water Sharing Plan.

3.9 Natural Hazards

The land is not subject to geological hazard such as volcanism, earthquake, or soil instability such as subsidence slip or mass movement.

3.9.1 Bushfire Risk

Wandoona Sand Quarry is situated on agricultural land which was previously partially cleared. The Lot presently supports a mixture of agricultural cultivated land, as well as remnant vegetation consisting of isolated paddock trees and open woodland. The proposed expansion area consists of cleared cultivated land, and the boundary of the proposed expansion area will be bordered by remnant vegetation in places. At a larger scale, the property is surrounded by cleared cultivation country with minimal fire risk.

The NSW Planning Portal was accessed in March 2020 to assess whether Wandoona is located in Bushfire Prone Land. Results of the search indicate that the subject site and the property are located within Category 3 Bushfire Prone Land (see Figure 13). This is considered to be medium bushfire risk vegetation.



Figure 13: Distribution of Bushfire Prone Land on the Property (NSW Planning Portal)

The development does not involve the erection of any buildings or dwellings. It is noted that the NSW Rural Fire Service were consulted regarding this application and have advised that they have no concerns or issues in relation to bushfire risks.

3.9.2 Flood Liability

The existing Quarry is located on flood liable land. In the event of a flood, a considerable portion of the land will be submerged, from the Mehi River banks up to the ridge of the property. Figure 14 shows the satellite imagery of the property in the February 2012 floods. The image outlines the ridge that runs through the property where the water inundation stopped in this specific flood event. This appears to relate to an existing internal property access road which is elevated by approximately 100 – 200 mm above ground level.

The current development does not include any equipment that is considered of concern in a flood event, nor does the proposed development include construction of such equipment or habitable building or residence. All components of the plant are portable and this will remain the same. The stockpiles of material on the site would have minimal impact on flood flow. No levee banks are proposed.

The extraction operation would cease in flood conditions and therefore no employee would be present under such circumstances.



Figure 14: Wandoona Property and Locality during the 2012 Floods (Source: SIX Maps)

3.10 Flora and Fauna

3.10.1 Desktop Assessment

3.10.1.1 IBRA Bioregions and Subregions

The current version of IBRA (Version 7, 2012) classifies Australia's landscapes into 89 large geographically distinct bioregions and 419 subregions based on common climate, geology, landform, native vegetation and species information. The proposal area is located within the Brigalow Belt South bioregion and Northern Basalts subregion.

The Brigalow Belt South Bioregion extends over an area equivalent to 19.61% of NSW. The bioregion is located within the eastern sub humid region of Australia. It forms the southern extremity of the Qld Brigalow Belt but is not dominated by Brigalow (*Acacia harpophylla*). This bioregion consists of landscapes derived from both extensive basalt flows and quartz sandstones and, consequently, it has very variable soils and vegetation depending on the local rock type or sediment source.

The Northern Outwash subregion occurs on tertiary and quaternary alluvial fans and stream terraces. Sloping plains with alluvial fans, that are coarser and steeper than the Gwydir fans downstream, are landform characteristics of the region. The soils are typically red loams and heavy brown clays. Vegetation consists of Poplar Box with White Cypress Pine, Wilga and Budda on red soils, and Brigalow and Belah on brown clays.

3.10.1.2 Plant Community Type (PCT) Classification

The PCT classification, which was created in 2011 and comprises approximately 1500 Plant Community Types, is the master community-level typology used in NSW's planning and assessment tools and vegetation mapping programs. The database shows 'PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion' occurring in the riparian corridor to the south of the proposed development. 'PCT 39 - Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion' occurs east of the proposal as a narrow strip on the western bank of the Mehi River, as well as to the north-east of the proposal.

No PCTs are identified within the proposed development footprint and this vegetation is classified as non-native.

PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion occurs on Quaternary alluvial grey cracking clay, loamy clays in the riparian zone and floodplains of major rivers and creeks of central-northern western NSW. The floristic composition of this community type varies

greatly depending on flooding regimes. The overstorey usually reaches 30m in height and is dominated by River Red Gum (*Eucalyptus camaldulensis* subsp. *camaldulensis*) sometimes with Black Box (*Eucalyptus largiflorens*) or Coolabah (*Eucalyptus coolabah*) with southern areas containing Yellow Box (*Eucalyptus melliodora*). Shrubs may be absent or if present are sparse. The ground cover may be dense after rain or flooding and is dominated by native grass species such as Warrego Summer Grass (*Paspalidium jubiflorum*), Umbrella Cane Grass (*Leptochloa digitata*) and Couch (*Cynodon dactylon*). A range of forbs can also be present.

PCT 39 - Coolabah - River Coobah - Lignum woodland wetland of frequently flooded floodplains mainly in the Darling Riverine Plains Bioregion occurs on alluvial silty soils on floodplains of major rivers of the Darling Riverine Plains. The community has been extensively cleared in certain parts of NSW and it is endangered due to the rate of its decline and long term impacts from changed flooding regimes affecting its condition. The community consists of open forest and woodland dominated by Coolabah (*Eucalyptus coolabah* subsp. *coolabah*) often with River Red Gum (*Eucalyptus camaldulensis* subsp. *camaldulensis*) with understorey thickets of Lignum (*Muehlenbeckia florulenta*), River Cooba (*Acacia stenophylla*) or Cooba (*Acacia salicina*). Ground cover contains tall tussock grasses, sedges and rushes.

Figure 15 shows the distribution of both PCTs relative to the proposed development.

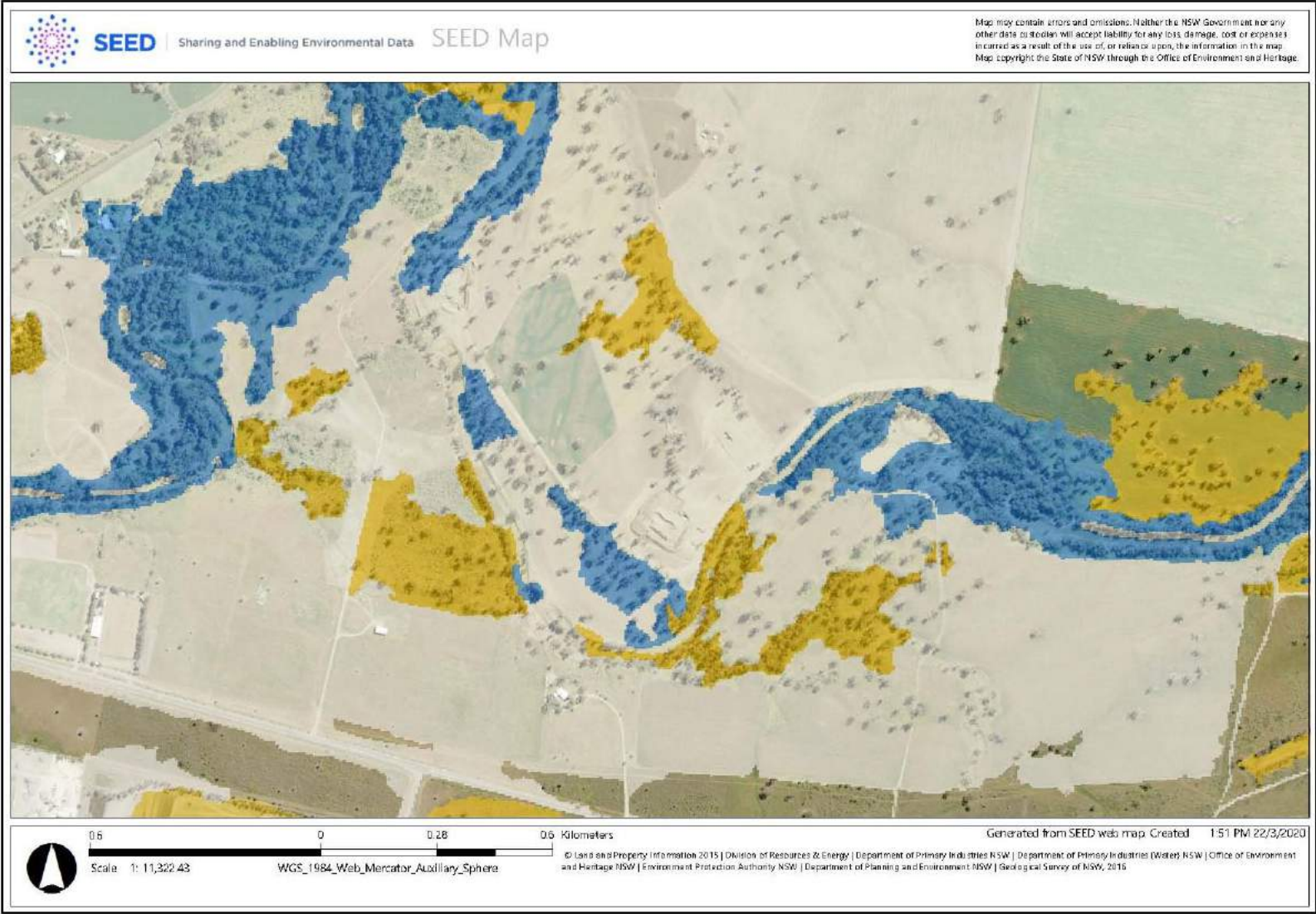


Figure 15: Plant Community Types (PCTs) in the Wandoona Quarry Area

3.10.2 Site Assessment

The development site is considered to be highly disturbed by previous agricultural and extractive operations, including the existing Quarry operation.

The site has been extensively cleared and farmed for several decades. The area has also been utilised for gravel extraction. The property at present is therefore considered to be in a highly disturbed state from the original native vegetation habitat that may have been present historically. The property's southern boundary adjoins the Mehi River corridor which consists of a relatively narrow strip of riparian habitat. The middle level area to be disturbed by the sand pits contains a dispersed remnant of mature river gums which have been retained within the cultivation area. The upper level in the northern two thirds of the property has been fully cultivated and no substantial natural vegetation remnants.

The available habitat on the property consists of the isolated mature river gums in the lower floodplain area and the riverine corridor area. The River Red Gums provide important habitat as a result of hollows and as a food source during flowering. No regeneration is occurring within the immediate cultivation area surrounding these trees. The riverine corridor supports a mix of mainly River Sheoak (*Casuarina cunninghamiana*), river gum regrowth and variations in ground cover in addition to invasive species such as mimosa. Given that the floristic composition of 'PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion' varies widely with flooding regime, the vegetation community on the property is considered broadly consistent with this PCT – It is dominated by River Red Gum and occurs on alluvial clays lining watercourses.

As a result of the impact of an extended history of grazing and cultivation, the property does not support any significant habitat areas, however the riparian corridor is considered significant in relation to local fauna movements and refuge. This will remain undisturbed. The natural habitat that is present on the property will be retained, except for one River Red Gum tree within the proposed extension area, and therefore minimal disturbance or additional impact is predicted for the remaining flora and fauna that is present on the property.

Figures 16-18 show the habitats present within the proposed expansion areas. The proposed extension area north-west of the existing sand and gravel pit consists of a cultivation paddock, with a single mature tree within the proposed expansion footprint. The proposed extension area around the sieve plant has been disturbed by the existing development and there is no natural habitat available. To the north of the sieve plant, there is a localised dominance of weed species within and around an area of gravel.



Figure 16: Cultivation Paddock in Proposed Expansion Area North-west of Existing Sand Pit



Figure 17: Proposed Expansion Area, North-west of Sieve Plant and Stockpiles. This contains extensive weed cover.



Figure 18: Proposed Expansion Area, West of Sieve Plant and Stockpiles

3.11 Cultural Heritage

3.11.1 Aboriginal Cultural Heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) register at the Office of Environmental Heritage revealed zero results on the property or closely located around the property spanning a buffer of 200 metres. A copy of this report is attached as Appendix 5.

The proposed site has been historically cleared for cultivation, grazing and extraction activities. The historical landuse and current operations have therefore resulted in a highly disturbed site. Detailed traverses were made of the surrounds of the site and within the area to be targeted for the extension of the quarry. Each mature tree was examined during this process. There were no items of Aboriginal Heritage located during this site assessment.

The higher areas of the property consist of hard clay which has a relatively low probability of being utilised for burial sites. There are no scarred trees on the property or other potential signs of historical aboriginal presence other than for hunting and collecting along the river system, noting that the Mehi River was a dry flood channel only up until the Tareelaroi weir was constructed between 1975-76. The probability of Aboriginal Archaeological artefacts being present on the expanded site is minimal due to the historic practices.

On this basis, it was considered unlikely that Aboriginal archaeological sites or artefacts would be present on the site. It is noted that riparian corridors are significant in relation to archaeological sites such as sacred trees and camps. Although no sites have been identified within the existing or proposed development area, appropriate actions need to be undertaken if a site is identified. These would include notification of police if a burial site is located (bones) and notification of OEH/NPWS if other sites are identified during excavation works.

3.11.2 European Heritage

A search of the NSW and Commonwealth heritage registers and *Moree Local Environmental Plan 2011* revealed there are no items of European heritage located on or within close proximity to the site. The area has been traditionally used for grazing and was never part of the original Moree settlement.

3.12 Socio-Economic Conditions

3.12.1 Population

Time series profiles for the Moree Local Government Area (LGA) and New South Wales between 2006 and 2016 have been used to develop a picture of the socio-economic characteristics of the Moree LGA in comparison with that of the state. The graphs in Figure 19 compare Moree population levels with that of the state of NSW.

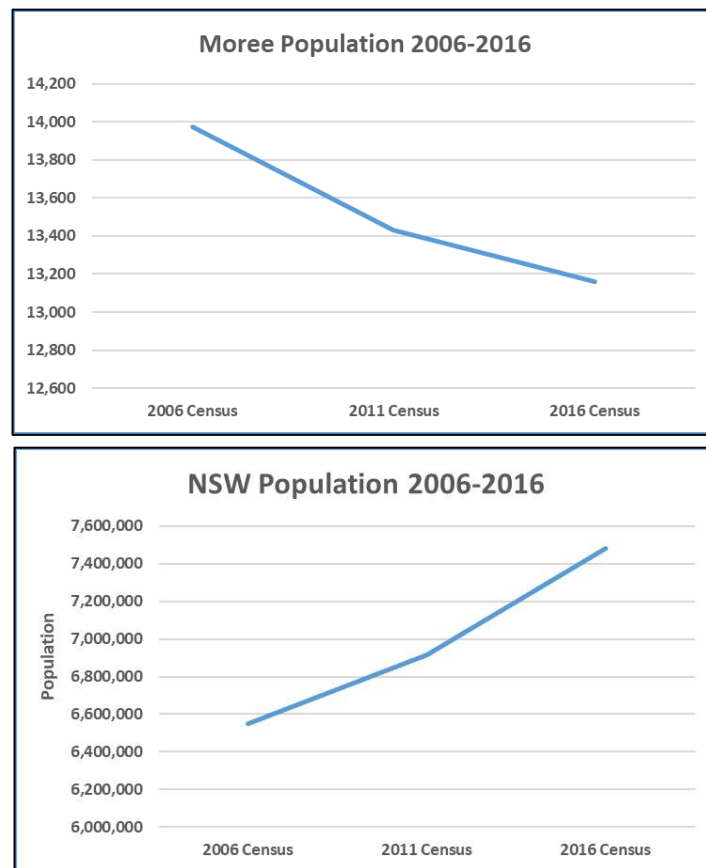


Figure 19: Moree and NSW population levels from 2006 -2016.

Over this period, the population in NSW grew by approximately 14%, while that of Moree LGA declined by around 6%.

The graphs in Figure 20 below show that the population decline in Moree is due, in part, to a disproportionate number of young people moving away from the area, particularly in 2016 census data. A number of factors are likely to have caused the population decline. These include factors such as drought conditions, comparatively low-wages, increasing house prices, and the attractiveness of larger towns and cities that offer greater opportunities.

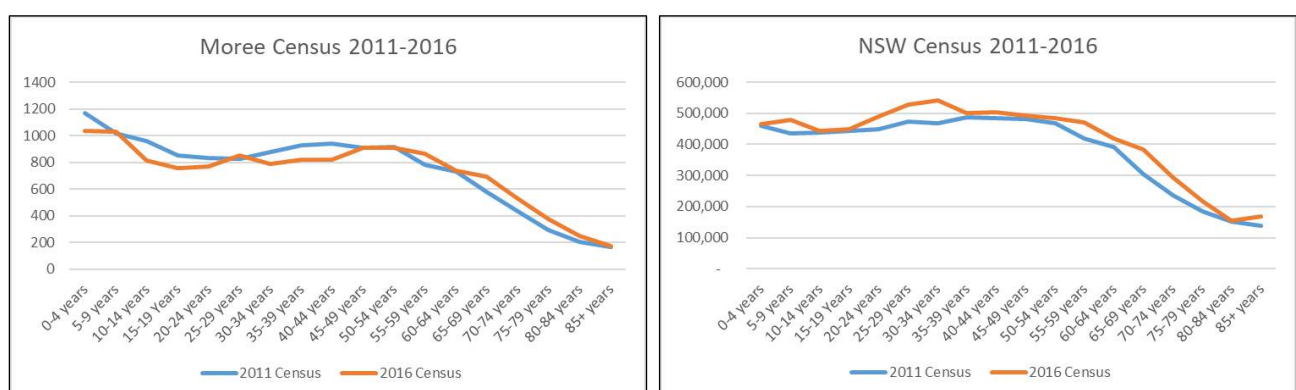


Figure 20: Moree and NSW population demographics over the 2006 -2016 period.

Figure 21 compares median weekly household incomes between 2006 – 2016.

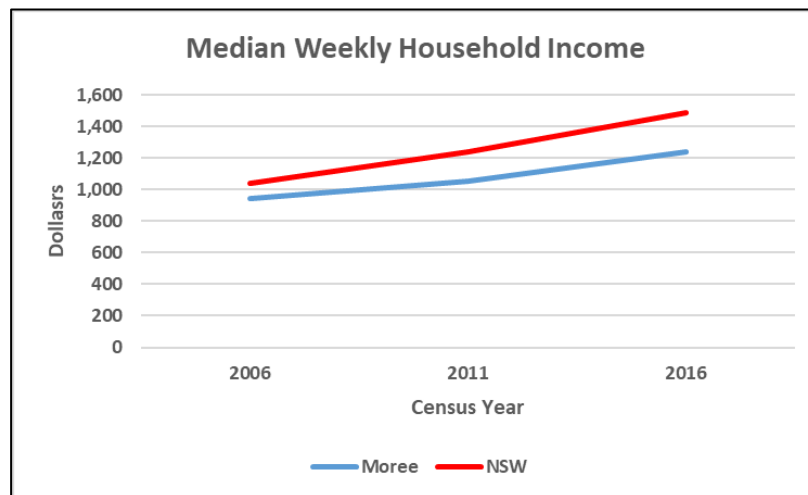


Figure 21: Median Weekly Household Income between 2006 -2016.

In comparing average income levels in the Moree LGA to those of the state, the graph in Figure 21 shows that while Moree households were lagging the NSW median by approximately \$100 in 2006, they had fallen over \$200 behind the State median in 2016.

3.13 Employment

Moree has a narrow economic base with the major employer being the primary production sector. During the 2011-2016, decade the number of people employed in the primary production has declined, while most other employment sectors fluctuated or remained flat.

New South Wales on the whole has shown steady growth in most employment sectors apart from wholesale trade, manufacturing and the primary industry sectors.

The abovementioned clearly demonstrates the need for economic stimulation and diversification in the study area to help arrest further decline in the population.

The expansion of the operations at Wandoona quarry is not considered likely to stimulate an additional employment and therefore population growth, however it would be considered as a contributing factor to the retention of current residents in the Shire through the maintenance and improvement of the local road network.

3.14 Road network and traffic volumes

Gwydirfield Road is a gravel road that runs from the Newell Highway and past the quarry site, re-joining the Highway at the Moree Bypass. Vehicles that utilise the Gwydirfield Road are JCQ vehicles associated with the quarry, private vehicles for residents who live along the road and other vehicles related to agriculture that may frequent the area.

The road is considered as a local road which services residences and farms throughout the Gwydirfield area.

The existing quarry operation involves intermittent extraction periods of approximately 2-3 days of extraction and processing over several weeks. The processed materials are then hauled from the site in a similar timetable to accumulate stockpiles at the Proponent's Drive In Road facility. The trucks consist of semi-trailers and various smaller truck combinations. The turn-around time between facilities is approximately 1 hour and a truck is capable of undertaking between 7 and 8 trips per day.

4 Justification for the Proposal

Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* requires a detailed justification of the proposal and suitability of the site for the proposed extension of the Wandoona Sand and Gravel Quarry. The following justification considers the potential biophysical, economic and social impacts and compliance with the principles of ecologically sustainable development (ESD).

4.1.1 Biophysical

The quarry is located on Lot 5 DP 236547, which is freehold land in the Gwydirfield area of Moree and owned by the proponent. The quarry has to date extended over an area of approximately 2 Ha. The proposal involves the following developments:

- Extending the footprint of the existing pit as per site plan in Appendix 1;
- Utilising the existing ridge gravel pit to extract a limited amount of ridge gravel for building pads and roads;
- When the existing sand pit reaches the north-western extent as per site plan, commencing a new pit area to the north of the sieve plant.

The whole development is to be located in a highly disturbed and modified habitat area that has to date been utilised for either gravel extraction, cultivation, or temporary holding paddocks for cattle. A single mature tree will be cleared as part of the proposed works.

All extractive industries must be co-located with the resource that is to be extracted. The quarry site contains a substantial deposit of high quality sand and gravel materials that meets the requirements of the local building and civil construction industry.

The quarry is existing and infrastructure such as roads and loading areas have been formed to allow operation of the existing site over the past decades. The extraction process occurs below ground.

4.1.2 Economic

The quarry is predicted to have minimal if any economic impact on the value of the land in Gwydirfield. The site at present has had a long history of occasional gravel extractions and this resource is considered to have elevated the value of the land. Such values are considered to pass on to adjoining land values.

JCQ and the residents of the Shire are the beneficiaries of the Wandoona quarry operation. Economic impacts will result in the form of securing a long-term sand and gravel supply for one of the two ready mixed concrete businesses in Moree. The Proponent employs more than 15 staff throughout their enterprise, which is a large employer for Moree. The continuity in this company would secure the long term employment for these staff. Hence, the proposed Quarry expansion is justified on economic grounds.

4.1.3 Social

The potential social impacts of the Quarry were assessed in the EIS, taking into account the potential effects of noise, dust and visual appearance on amenity; and aboriginal heritage.

The existing Quarry is located in a rural zoned area and has been operated by the Proponent since 2012 with minimal complaints. On this basis, no significant amenity impacts are predicted.

Aboriginal heritage was considered and appropriate investigations were undertaken. The investigation concluded that the Quarry expansion is unlikely to impact on known or newly identified sites of significance or artefacts.

Based on the results of site investigations, the project can be considered justified on social grounds.

4.1.4 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' (DPM 1990).

ESD is integrated into NSW environmental legislation and government policy. Schedule 2 of the *Environmental Planning and Assessment Regulation 1979* lists four guiding principles to assist in achieving ESD. They are:

- The precautionary principle: 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.
- Inter-generational equity: the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- Conservation of biological diversity and ecological integrity: conservation of biological diversity and ecological integrity should be a fundamental consideration.
- Improved valuation and pricing of environmental resources: environmental factors should be included in the valuation of assets and services, such as polluter pays, full life cycle costing, and utilising incentive structures / market mechanisms to meet environmental goals.

JCQ is committed to environmental sustainability and the protection of the environment through pursuing industry best practice in environmental performance and seeking to eliminate harm to the environment wherever possible.

JCQ has adopted the internationally recognised definition of environmentally sustainable development as the underlying management principle i.e. development which meets the

needs of the present without compromising the ability of future generations to meet their own needs, and is committed to continuous improvement of its environmental performance.

4.1.4.1 Precautionary Principle

The Quarry site can be developed in accordance with relevant Guidelines. Providing the Quarry is sited, built and operated as described in this EIS, the development can operate as a sustainable long term activity. No substantial threats of significant or irreversible environmental harm were identified. In addition, environmental monitoring will be used to confirm that the Quarry is operating in an environmentally sustainable way.

The development does not involve removal of natural habitat and therefore no additional long term flora impacts are predicted.

The quarry site is mostly located within a shifting river zone. There is a high probability that flood events will eventually back fill the lower pit area with silt and sand.

4.1.4.2 Intergenerational Equity

The quarry will have a lifespan of potentially 30-years or more. This will spread through more than one generation within the Moree area. The resource would continue to be utilised for construction of infrastructure and housing in Moree and the regional area. This should provide some long term benefits. The quarry will utilise a renewable resource in the form of river gravel which is washing down the Mehi River. The gravel source will continue to be replaced as the river flows. The floodplain also provides a substantial area of river gravel. The Wandoona site will involve extraction of only a small quantity of the material available. The proposed Quarry should not have a significant impact on 'intergenerational equity'.

4.1.4.3 Biological Diversity and Ecological Integrity

The extension of the Quarry is to occur on highly degraded habitat and areas currently used for cultivation. The adjoining areas of remnant vegetation will be preserved in their current condition. Biological diversity should therefore be maintained at the current level as the operation of the existing Quarry is considered to have minimal impact on the surrounding natural habitat.

Management intends to maintain appropriate and recommended buffers to the Mehi River and associated riparian vegetation, that will protect the integrity of the adjoining habitat. These buffers are set out in the proposal management documentation and mainly refer to the extraction and sediment controls.

4.1.4.4 Valuation and Pricing of Environmental Resources

Sources of gravel are not limited in Moree Plains Shire. They consist of an extensive layer of similar gravel beneath the floodplain between the Mehi and Gwydir Rivers. The Wandoona site provides reasonable quality gravel and sands, suitable for JCQ's ready-mix concrete batching.

The project has placed a high value of the remnant river gums on the property. The proposed pit expansion has been shaped to ensure that minimal disturbance occurs to these trees and therefore their survival is preserved.

4.2 Analysis of Alternatives

4.2.1 Alternatives

JCQ has investigated many alternative supplies of river gravel material in addition to ridge gravel in order to complement their main hard rock quarry operation in the Gwydir Shire as well as their ready mixed concrete operation. The river gravel resource extends throughout the floodplain between Moree and Pallamallawa. Numerous older pits provide extensive volumes of gravel. These alternatives would involve a similar investment in land, equipment and extraction costs.

Access to alternative sites is limited by available agreements or potential purchases of land. Many landholders would potentially offer some agreement through purchase or lease options for access to gravel. The cost base for these alternatives were analysed in relation to securing a long term aggregate resource for JCQ at a reasonable cost. When compared to the existing quarry at Wandoona, these alternatives proved more expensive in relation to royalties and covenants for extraction operations. The higher cost would need to be passed on through the associated products such as ready mixed concrete. The review of the cost base by the Proponent indicated a preference for maintaining close ownership over their own extraction site. Wandoona provides this option.

4.2.2 Consequences of not carrying out the development

If this proposal does not proceed, the operation at Wandoona would be restricted to a pit area of 2 Ha. This would limit the life of the site to potentially 5 – 6 years at which time alternative resource access would need to be found. The gravel would need to be sourced from other existing or new gravel pits at a higher cost base and similar level of disturbance.

If an alternate resource cannot be accessed, the ready mixed concrete operation would need to import sand and gravel material from outside of the local area. The cost of this would be considerably more than current supplies. This would result in an increase in the cost of concrete which would make the sales relatively uncompetitive with the one other supplier of this product in Moree. The potential for sales would therefore reduce resulting in potential loss of jobs within JCQ. Loss of jobs would not be beneficial to Moree. The potential higher cost of concrete would also be reflected in local building costs.

5 Statutory Matters

5.1 Commonwealth Legislation

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the EPBC Act as Matters of National Environmental Significance (MNES). The EPBC Act provides guidelines for a self-assessment process to determine whether a development needs referral to the Department of Environment and Energy in Canberra.

If a development requires referral the Commonwealth Minister for the Environment for actions on Commonwealth land will grant approval based on the potential for the development to have a significant impact on matters of national environmental significance, which include:

- World Heritage Properties;
- Ramsar Wetlands;
- Nationally threatened species and communities;
- Migratory species protected under international agreements;
- The commonwealth marine environment; and
- Nuclear actions.

The potential impacts of the proposed development upon MNES have been considered as part of an Assessment of Significance, conducted in accordance with EPBC Act assessment requirements. A copy of this assessment is included in Appendix 6. The results of the assessment indicate that the development will not have significant impacts upon any identified MNES, given that the site has a history of significant disturbance and that the proposed changes to existing operations are considered to be minor. Referral to the Department of Environment and Energy is not required. These considerations protect the objectives of the EPBC Act.

5.2 State Legislation and Planning Matters

5.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* defines development and in Part 4 sets out the approval process and assessment heads of consideration.

The objectives of the Act relevant to this proposal are:

- *the proper management, development and conservation of natural and artificial resources,*
- *the promotion and co-ordination of the orderly and economic use and development of land,*
- *the protection of the environment,*
- *ecologically sustainable development, and*
- *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The proposed development is considered to meet these objectives.

5.2.2 Environmental Planning and Assessment Regulation 2000

The *Environmental Planning and Assessment Regulation 2000*, inter alia, defines what constitutes designated development, requires the proponent to consult with the Director-General to obtain his requirements and sets out what documents must accompany a development application. Accordingly, the development proposal is Designated Development and this Environmental Impact Statement and its attachments satisfy the requirements for documentation contained in the Regulation.

The following provides an excerpt from the Regulation describing an extractive industry:

Extractive industries

(1) Extractive industries (being industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process extractive materials by methods including washing, crushing, sawing or separating):

- (a) that obtain or process for sale, or reuse, more than 30,000 cubic metres of extractive material per year, or*
- (b) that disturb or will disturb a total surface area of more than 2 hectares of land by:*
 - (i) clearing or excavating, or*
 - (ii) constructing dams, ponds, drains, roads or conveyors, or*
 - (iii) storing or depositing overburden, extractive material or tailings, or*
- (c) that are located:*
 - (i) in or within 40 metres of a natural waterbody, wetland or an environmentally sensitive area, or*
 - (ii) within 200 metres of a coastline, or*
 - (iii) in an area of contaminated soil or acid sulphate soil, or*
 - (iv) on land that slopes at more than 18 degrees to the horizontal, or*
 - (v) if involving blasting, within 1,000 metres of a residential zone or within 500 metres of a dwelling not associated with the development, or*
 - (vi) within 500 metres of the site of another extractive industry that has operated during the last 5 years.*

The proposed development triggers the provisions 1(b)(i), 1(b)(ii), 1(b)(iii), and 1(c)i).

5.2.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* came into effect in August 2017 and replaced the *Threatened Species Conservation Act 1995*. The BC Act outlines requirements in relation to the listing of threatened species, biodiversity impact assessment, offsetting and related offences. The assessment of biodiversity values on land and the impacts of activities on those biodiversity values are to be carried out in accordance with the Biodiversity Assessment Method (BAM). The objective of the BAM is to adopt a standard approach that will result in no net loss of biodiversity in NSW.

The Act also outlines the Biodiversity Offset Scheme (BOS). Development that is subject to the BOS scheme includes development needing consent under Part 4 of the EP&A Act (excluding complying development), activities under Part 5 of the EP&A Act, State significant development and State significant infrastructure.

Where development or an activity is, “likely to significantly affect threatened species”, a Biodiversity Development Assessment Report (BDAR) must be prepared and consent authorities are required to consider the likely impact of the proposed development on biodiversity values before granting approval.

The threshold test of whether development or an activity is “likely to significantly affect threatened species” (and therefore whether a BDAR is required) is reached if:

- the BOS Threshold is met;
- the development is carried out in a declared Area of Outstanding Biodiversity Value (AOBV); and
- the test in section 7.3 of the BC Act is met.

The proposed development footprint consists of cultivated, agricultural land, with a single mature River Red Gum to the west of the proposed development. The proposal footprint is classified as ‘non-native’ on the Sharing and Enabling Environmental Data (SEED) in NSW online mapping resource (see Figure 15, Section 3.10.1). This classification, with the exception of the mature River Red Gum, was confirmed by a site visit. Therefore, the development will not involve the clearing of native vegetation, with the exception of a single mature tree, and the BOS threshold (1Ha) will not be met.

The development is not located in or near an Area of Outstanding Biodiversity Value (AOBV). The Mehi River, a riparian area of Biodiversity Value (BV), is located adjacent to the property boundary. This watercourse will be protected from potential impacts associated with quarry operations by implementation of environmental management measures on site (including sediment and erosion control measures).

Proponents are also required to carry out a 'Test of Significance' for all development proposals that do not exceed the Biodiversity Offset Scheme Threshold. The required Test of Significance (as outlined in Section 7.3 of the BC Act) has also been included in Appendix 8.

Overall, it was determined that the proposal is not likely to significantly affect threatened species, and that further assessment under the BAM and the preparation of a BDAR is not required.

5.2.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* provides for the protection of native flora and fauna and the protection, preservation and management of Aboriginal relics throughout NSW regardless of land tenure. A flora and fauna assessment and Aboriginal cultural heritage assessment have been completed and are reported elsewhere in this EIS.

5.2.5 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* establishes procedures for the issue of Environmental Protection Licences for Scheduled works and premises. As set out above the proposal would not require an Environmental Protection licence in relation to extracting gravel as annual extraction will not exceed a 30,000 m³ threshold in any one-year period. This was confirmed with NSW EPA.

5.2.6 Water Management Act 2000

The *Water Management Act 2000* established a comprehensive statutory framework for the management of water in NSW. The object of the *Water Management Act 2000* is the sustainable and integrated management of the state's water for the benefit of both present and future generations. In particular, the framework covers volumetric licensing in areas covered by water sharing plans, including the subject area, and controls development activities within 40m of waterfront land.

A water management work approval is required to carry out work within the 40 m buffer zone along the river. The "work" would be defined as activity that occurs in or in the vicinity of a river, estuary or lake, or within a floodplain, and is of such a size or configuration that (regardless of the purpose for which it is constructed or used), it is likely to have an effect on the flow of water to or from a river, estuary or lake, or the distribution or flow of floodwater in times of flood.

The existing internal haul road is located within 40m of the river in parts. DPI Water have met onsite with the proponent. If works are required on this road, the Proponent would be obliged to submit an application for consideration to DPI Water. The proposed development does not include any initial requirement to obtain this approval as this is an existing road

which had been developed prior to the current sand extraction operating being approved. The use of this road is not subject to an application process.

Other matters relating to the WMA 2000 include the use of water from the Mehi River. This has been addressed by obtaining a Works Licence and a Water Access Licence for the existing pump and allocation for the current operation.

5.2.7 Heritage Act 1977

The *Heritage Act 1977* provides for the protection of the State's natural, built, marine and moveable heritage. The Act establishes the Heritage Council of NSW which maintains the State Heritage Register and Inventory. No heritage items recorded on the Register or the Inventory are located on the subject land.

5.2.8 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* establishes a process for investigating and (where appropriate) remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment. The Act provides that the EPA may declare land to be contaminated and to declare investigation areas. The EPA has not declared the subject land to be contaminated land nor part of an investigation area.

5.3 State Environmental Planning Policies and Development Codes

Table 9 presents a summary and comment on State Environmental Planning Policies and development code relevance to the proposed development.

Table 9: State Environmental Planning Policies and Development Codes

SEPP No. & Codes	Title	Relevance
No. 1	Development Standards	Not Relevant
No. 21	Caravan Parks	Not Relevant
No. 33	Hazardous & Offensive Development	Not Relevant
No. 36	Manufactured Home Estates	Not Relevant
No. 50	Canal Estate Development	Not Relevant
No. 52	Farm Dams and Other Works in Land and Water Management Plan Areas	Not Relevant
No. 55	Remediation of Land	Refer to the following section for Remediation of Land Review
No. 64	Advertising and Signage	Not Relevant
No. 65	Design & Quality Residential Apartment Development	Not Relevant
	Affordable Rental Housing 2009	Not Relevant
	Building Sustainability Index: BASIX 2004	Not Relevant

SEPP No. & Codes	Title	Relevance
	Concurrences 2018	Not Relevant
	Educational Establishments and Child Care Facilities	Not Relevant
	Exempt and Complying Development Codes 2008	Not Relevant
	Housing for Seniors or People with a Disability 2004	Not Relevant
	Infrastructure 2007	Refer to the following section for Infrastructure Review
	Mining, Petroleum Production and Extractive Industries 2007	Refer to the following section for Extractive Industries Review
	Miscellaneous Consent Provisions 2007	Not Relevant
	Primary Production and Rural Development 2019	Not Relevant
	Koala Habitat Protection 2019	Refer to the following section for Koala Habitat Protection review

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

This SEPP has the following aims:

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

Clause 12 of the SEPP provides a number of matters that a consent authority must consider before determining a development application. These matters are similar to, but are in different terms of the relevant matters contained in the MPLEP and are considered in the body of this report.

Clause 13 requires that Council must consider the compatibility of development proposals on land in the vicinity of existing mines etc. or of land containing mineral or extractive resources. This provision is to ensure that these resources are not sterilised by incompatible development on surrounding land and is a matter for Council to consider. The proposed development involves a long term plan to maintain access to a historically used gravel resource.

Clause 14 requires the consent authority to ensure that the development is undertaken in an environmentally responsible manner to avoid or minimise:

- Impacts on significant water resources;
- Impacts on threatened species and biodiversity; and
- Greenhouse gas emissions.

These are matters for Council and are addressed below.

Clause 15 requires that the consent authority consider whether the proposed resource recovery is efficient. Modern equipment and best practice management principles are used in the operation of the quarry to ensure that resource recovery is efficient and economically viable.

Clause 16 (1) requires the consent authority to consider whether a consent should contain conditions to:

- Require some or all of the material to be transported by means other than by public road;
- Require the preparation and implementation of a code of conduct relating to the transport of materials on public roads.

There are no other means other than road transport available for the transport of the sand and gravel from this quarry. No viable alternatives are available. The haul route does not pass through residential areas or near schools. The haul route consists of part of the gravel road network to be maintained or improved by the gravel resource available at this quarry site.

Clause 16 (2) requires the consent authority to provide a copy of the development application to each roads authority for the roads used and the Roads and Maritime Service within seven (7) days of receipt. This is a matter for Council.

Clause 16 (3) provides that the consent authority must not determine the development application until it has taken into consideration any submission received from the roads authorities and the Roads and Maritime Service within 21 days after the Authority was provided with a copy of the application, and provide each of them with a copy of the determination. This is a matter for Council.

Clause 17 requires that the consent authority must consider whether or not the consent should be issued subject to conditions requiring rehabilitation of the land affected by the development. This is a matter for Council and rehabilitation is considered below. The project proposal includes a rehabilitation component.

5.3.2 State Environmental Planning Policy (Koala Habitat Protection) 2019

The State Environmental Planning Policy (Koala Habitat Protection) 2019 was introduced on March 1, 2020. It replaces the SEPP 44 – Koala Habitat Protection (1995) and has been updated and improved to increase the level of protection of koala habitat within NSW.

Overall, the Policy aims to encourage 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.

The State Environmental Planning Policy (Koala Habitat Protection) 2019 includes the following key changes:

- An updated definition of koala habitat;
- Two new SEPP maps;
- An expanded list of tree species;
- New SEPP Guidelines; and
- A streamlined development assessment process

5.3.2.1 Habitat Definition and Feed Tree Species

The new SEPP no longer defines potential koala habitat. The definition of core koala habitat has been updated to allow areas with demonstrated koala presence in highly suitable habitat to be recognised, without the requirements of the previous definition which were difficult to meet. Core koala habitat will now be defined as:

- a) An area of land where koalas are present, or
- b) An area of land:
 - i. Which has been assessed by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable koala habitat; and
 - ii. Where koalas have been recorded as being present in the previous 18 years.

The list of feed tree species has also been updated, increasing the number of species from 10 to 123 species. These 123 species were categorised into 9 distinct regions (Koala Management Areas), according to what trees koalas prefer to use in each area.

5.3.2.2 Mapping

Two new maps have been introduced and are available for viewing:

- a) **The Koala Development Application Map** – this identifies areas that have highly suitable koala habitat and are likely to be occupied by koalas. On land where there is no approved Koala Plan of Management, the map will be used to identify land where Council needs to consider the development application requirements in the Guideline.
- b) **The Site Investigation area of Koala Plans of Management Map** – This identifies land that council are to focus their survey efforts on, particularly when identifying core koala habitat.

5.3.2.3 Development Assessment Process

Under SEPP 44, an initial flora survey was required to survey the land within development applications, and, where potential koala habitat had been established, a koala survey was required. If land contained core koala habitat, the proponent had to prepare an Individual Plan of Management to manage any impacts on the resident koala population. Each Plan of Management required approval from the Secretary of the Department. The new Koala Development Application Map eliminates the need to conduct any surveys. Instead of preparing an Individual Plan of Management, proponents are required to prepare their development application in accordance with the criteria in the new Guideline, for council to consider when assessing the application.

5.3.2.4 Wandoona Sand Quarry Assessment

Land within the local government areas listed under Schedule 1 is subject to consideration under this Policy. The Moree Plains Shire is included in Schedule 1 of the SEPP and therefore an assessment is required. Moree Plains Shire is in the Northwest Slopes Koala Management Area. A list of feed tree species for this management area is provided in Schedule 2 of the SEPP. Feed tree species of this management area are listed in the following table:

Table 2: Koala Feed Tree Species based on Management Area

Northwest Slopes Koala Management Area	
Scientific Name	Common Name(s)
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Callitris glaucophylla</i>	White Cypress Pine
<i>Casuarina cristata</i>	Belah
<i>Eucalyptus albens</i>	White Box
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum
<i>Eucalyptus bridgesiana</i>	Apple Box
<i>Eucalyptus caleyi</i>	Drooping Ironbark
<i>Eucalyptus caliginosa</i>	Broad-leaved Stringybark
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus canaliculata</i>	Large-fruited Grey Gum
<i>Eucalyptus chloroclada</i>	Dirty Gum
<i>Eucalyptus conica</i>	Fuzzy Box
<i>Eucalyptus coolabah</i>	Coolibah
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
<i>Eucalyptus dalrympleana</i>	Mountain Gum
<i>Eucalyptus dealbata</i>	Tumbledown Red Gum
<i>Eucalyptus dwyeri</i>	Dwyer's Red Gum
<i>Eucalyptus exserta</i>	Peppermint

Northwest Slopes Koala Management Area	
Scientific Name	Common Name(s)
<i>Eucalyptus fibrosa</i>	Broad-leaved Red Ironbark
<i>Eucalyptus goniocalyx</i>	Bundy
<i>Eucalyptus laevopinea</i>	Silver-top Stringybark
<i>Eucalyptus largiflorens</i>	Black Box
<i>Eucalyptus macrorhyncha</i>	Red Stringybark
<i>Eucalyptus mannifera</i>	Brittle Gum
<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus microcarpa</i>	Western Grey Box
<i>Eucalyptus moluccana</i>	Grey Box
<i>Eucalyptus nobilis</i>	Forest Ribbon Gum
<i>Eucalyptus parramattensis</i>	Parramatta Red Gum
<i>Eucalyptus pauciflora</i>	White Sally / Snow Gum
<i>Eucalyptus pilligaensis</i>	Narrow-leaved Grey Box
<i>Eucalyptus polyanthemus</i>	Red Box
<i>Eucalyptus populnea</i>	Bimble Box / Poplar Box
<i>Eucalyptus prava</i>	Orange Gum
<i>Eucalyptus punctata</i>	Grey Gum
<i>Eucalyptus quadrangulata</i>	White-topped Box
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark
<i>Eucalyptus viminalis</i>	Ribbon Gum

The NSW Department of Planning, Industry and the Environment's online mapping tool was searched to determine the assessment of koala habitat value within the proposal footprint and its vicinity. The proposed development site has been mostly cleared and developed for farming and cultivation. A single mature tree within the development footprint is included in the Site Investigation Area for Koala Plans of Management layer. Within the property, there are still a considerable number of Red River Gums (*Eucalyptus camaldulensis*) retained on the lower floodplain level on the site. This habitat is included within the Koala Development Application Map. Figure 22 presents the distribution of both of these Koala habitat categories across the subject site and its vicinity.



Figure 22: Koala Habitat Map of Wandoona Sand Quarry and Environs (DPI &E)

Anecdotal evidence from neighbouring landholders suggests that Koalas have been witnessed within the area. The site is bordered by River Red Gums which are a listed feed tree species for Koala habitat. Assessment of the site indicated that there is a small potential for Koalas to pass through the area as part of the Mehi River corridor.

A search of the Atlas of NSW Wildlife revealed 26 records of Koala within 10km of the quarry from 2004 to 2018. Sighting notes pertaining to these records describes a large proportion of these individuals as sick/diseased, stranded, attacked, or victims of collisions, suggesting they are outliers rather than part of a healthy population. The map of koala sightings recorded within 10km of the proposed development, as on the OEH BioNet Atlas of NSW Wildlife, has been included as Figure 23. The red triangles indicate recorded sightings. There are no sightings within or in close proximity to (within 1km) the proposed development site.

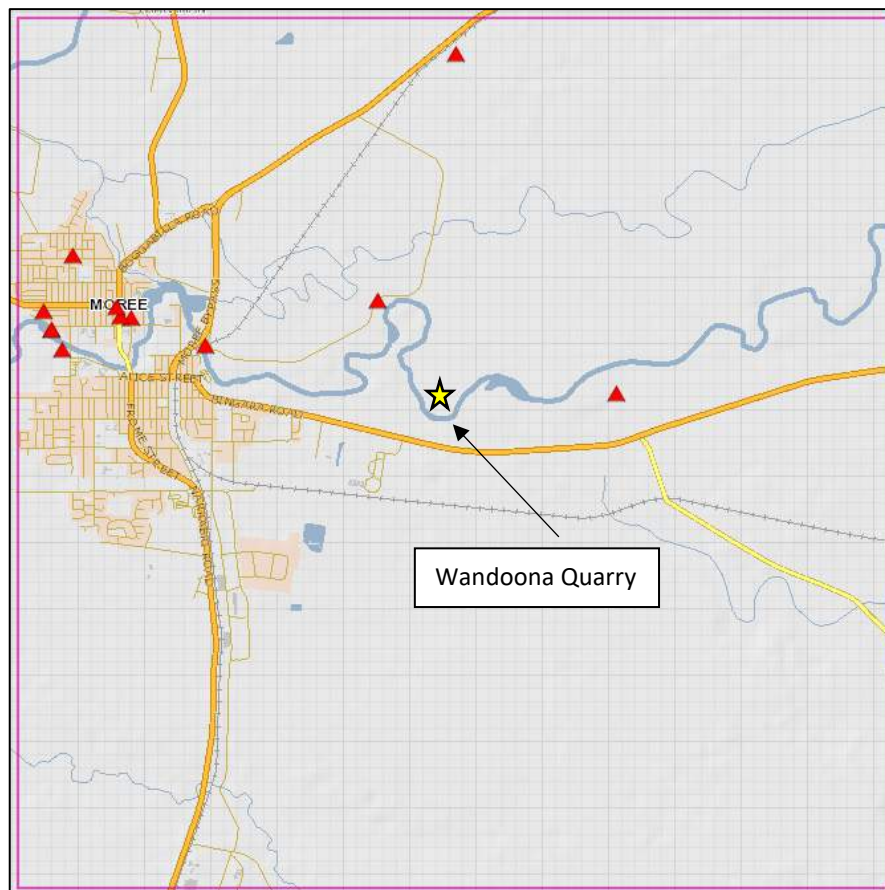


Figure 23: Koala sightings within Moree Plains Shire

No scats were recorded around the base of these trees during site inspection. It is noted that a single tree would be cleared as part of the proposed works. Trees bordering the development will also be retained within the development with sufficient distance to continue their growth without disturbance to the tree roots. As there are no Koalas present on the property and no historic records of the site being utilised by Koalas, the area cannot

be classified as “Core Koala Habitat”. On this basis, it is considered that the requirements of the SEPP do not need any further consideration in this assessment. The proposed development and continuing use of the land for farming purposes is not considered a threat to regional Koala populations or migration corridors.

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

The objective of this policy is to provide a State-wide planning approach for the remediation of contaminated land. Where it is proposed to rezone the land or to carry out a development that would change the use of the land a consent authority must consider whether the land is contaminated and if it is, whether the land is suitable for the proposed development in its present state or whether remediation is required. Even where no change of use is proposed a consent authority must consider whether the land is suitable for the proposed development if the land has been used for a purpose listed in Table 1 to the contaminated land planning guidelines. The land has been utilised for cultivation and grazing prior to the quarry opening and adjoining land is used for either residential or similar agricultural practices.

A visual inspection of the land did not reveal any signs of chemical contamination such as chemically affected patches of vegetation or bare or discoloured areas. A review of the site has indicated that the Wandoona quarry has only been utilised as a quarry. No refuse or waste has been disposed on the site intentionally or indiscriminately. Fuel is only kept on the site in sealed portable containers such as fuel trailers and no spillages are present. The visual inspection and the history of the land’s past and its present use have led to the conclusion that it is unlikely for there to be contamination such as to render the land unsuitable for the present and proposed uses. The Preliminary Assessment required by SEPP 55 is attached as Appendix 4.

5.3.4 State Environmental Planning Policy (Primary Production and Rural Development) 2019

The Primary Production and Rural Development SEPP aims to support the orderly, environmentally sustainable and economic use and development of land for primary production and development. It also facilitates the future recognition and protection of State significant agricultural lands.

The Shire supports the use of land for Extractive Industry within zone RU1 Primary Production under the *Moree Plains Local Environmental Plan 2011*. This development does not include the erection of any buildings or dwellings, or subdivision of land. The proposed quarry operation will be undertaken in a way that minimises land use conflicts in the area. Furthermore, it is intended to rehabilitate the development footprint to agricultural land, thus returning it to a favourable condition for agricultural grazing over time as revegetation takes place.

5.4 Regional Plan

The New England North West Regional Plan applies to the Moree Plains local government area. The Plan aims to present planning goals that will achieve a sustainable future that maximises the advantages of the region's diverse climates, landscapes and resources.

The Plan outlines the following regionally focused goals:

- A strong and dynamic regional economy
- A healthy environment with pristine waterways
- Strong infrastructure and transport networks for a connected future
- Attractive and thriving communities

Both the establishment and the operation of the proposed development will support the development of the regional economy. Environmental measures have been incorporated to protect environmental values. The proposed development is therefore aligned with the goals of the North West Regional Plan.

5.5 Local Planning Instruments

5.5.1 Moree Plains Local Environmental Plan 2011

The Moree Plains Shire Council is the consent authority for this proposal. The *Moree Plains Local Environmental Plan 2011* (MPLEP) is the current local government planning policy for the Moree Plains Shire. The framework of the MPLEP is derived from the *Environmental Planning and Assessment Act 1979*.

'Wandoona' Sand and Gravel Quarry is located in Zone RU1 – Primary Production of the Moree Plains Shire. Extractive operations are permitted with consent within the zone. Development consent for current operations was granted in November 2014. An Environmental Protection Licence is not required as extraction rates will not exceed 30,000 m³ per year.

The particular aims of the MPLEP are as follows:

- a) to encourage the management, development and conservation of environmental, economic and social resources,*
- b) to facilitate economic growth and development that is consistent with the aim specified in paragraph (a) and that:*
 - i. embraces the principles of environmentally sustainable development, and*
 - ii. minimises the cost to the community of fragmented and isolated development, and*
 - iii. facilitates the efficient and effective delivery of amenities and services, and*

- iv. *facilitates stimulation of demand for a range of residential, enterprise and employment opportunities and promotes agricultural diversity, and*
- v. *facilitates farm adjustments, and*
- vi. *utilises, where feasible, existing infrastructure and roads for new development and future potential development,*
- c) *to facilitate development in accordance with flood management planning,*
- d) *to facilitate development that is compatible with adjoining and nearby uses,*
- e) *to facilitate development that is appropriate in scale and type to the characteristics of the relevant zone,*
- f) *to recognise places of European heritage significance and Aboriginal heritage and cultural significance.*

Comment

The proposed development is considered consistent with aims of the Local Environment Plan. The proposal will stimulate economic growth and development in the local area. In particular, the proposal will facilitate the efficient and effective delivery of materials required to support community services and maintain the local road networks.

5.5.2 Land Use Definition

According to the MPLEP, the proposed land use is for an “Extractive Industry”. An Extractive Industry is further defined in the MPLEP as ‘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’. Extractive material is defined as ‘sand, gravel, rock or similar substances that are not minerals within the meaning of the *Mining Act 1992*’.

Comment

The intended land use, as defined in the MPLEP as an extractive industry, is a permissible land use, with development consent, within the RU1 – Primary Production zone.

5.5.3 Zone RU1 - Primary Production

The subject land is zoned as RU1 – Primary Production under the MPLEP. The proposed development is permissible with consent from Council under Part 2 and Part 4 of the MPLEP.

The MPLEP states that the objectives of the zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the*

area.

- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To permit development for certain purposes if it can be demonstrated that suitable land or premises are not available elsewhere.*

Comment

This sand quarry proposal aims to expand the area for extraction of sand and gravel materials only, not to increase the annual extraction limit. The proposed pits will be located in previously cultivated areas. The existing native vegetation remnants will, overall, be retained. The proposed extraction pits will also be positioned so as to not allow any areas to become fragmented and isolated from other parts of the property. The volume of resource available on the property is considered extensive and may last up to 40-years or more. As a result of flooding, the pits may also be refilled with sand material thus renewing some of the resource.

This development application allows for the expansion of a proven financially and environmentally sustainable operation. The extraction of sand is a primary resource available within the area and the approved expansion will result in securing a reliable long-term supply, that is capable of sustaining the building industry in Moree and therefore maintaining economic activity for the area. Appropriate remediation and initial site set up will enable the site to return to being a cultivation/grazing entity once the quarrying operations have concluded.

The continued utilisation of the land will minimise fragmentation and alienation. The northern section will continue to be utilised for cultivation on an opportunity basis.

The proposal aims to minimise the impact on adjoining landholders by carefully placing the sieve and screening plant in the middle of the property, giving it the greatest buffer in distance from surrounding dwellings to mitigate potential noise and dust impacts on these areas. The extraction areas will gradually move further away from the closest neighbouring receptor and therefore potential disturbance from emissions during extraction works would generally decrease over time.

Cultivation will be able to continue on areas undisturbed by the extractive activities, particularly in the northern section of the property which borders other farming lots.

This proposal allows the continuation of extraction from a known sand and gravel deposit. The sand deposits available on the property are not available throughout the district.

The assessment of the proposed development has determined that the proposal generally conforms to the aims and objectives of the LEP & land use zone.

5.5.4 Bushfire Hazard Reduction

Section 5.11 of the LEP deals with land that is considered bushfire prone and may require bushfire hazard reduction work. Bushfire hazard reduction work authorised by the *Rural Fires Act 1997* may be carried out on any land without development consent.

Bushfire hazard reduction work includes the following:

- a) The establishment or maintenance of firebreak on land, and
- b) The controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bushfire,

But does not include construction of a track, trail or road.

Comment

The subject site and the Lot to which it pertains are mapped as Category 3 Bushfire Prone Land. The development does not involve the erection of any buildings or dwellings. The site will be kept clear of vegetation and other readily flammable materials, and a 10m firebreak will be maintained around the perimeter of the development. It is noted that the gravel access road provides access in most weather conditions, thus providing operational access to permit evacuation and fire fighting in the event of a fire.

5.5.5 Development Control Plan

Moree Plains Shire Council Development Control Plan applies to this development. In accordance with this policy Council Officers will use their discretion in determining whether adjoining landowners will be notified of this proposal by letter.

5.5.6 Development Contributions Plan

The Moree Plains Contribution Plan was adopted in 2006 and amended in 2016. The plan allows Moree Plains Shire Council to impose the payment of a levy as part of certain development consents where developments would result in heavy vehicular use on public roads and the existing road maintenance schedule is inadequate to carry the additional load. The Plan applies to applications for development consent and applications for complying development certificates to be made under Part 7 (previously Part 4) of the *Environmental Planning and Assessment Act 1979* in respect of development on land to which the plan applies.

It is stated in the plan that under Section 7.4 (previously Section 93F) of the *Environmental Planning and Assessment Act 1979*, the applicant may enter into a voluntary planning

agreement with Council in lieu of paying a development contribution or levy. The Applicant and SMK Consultants met with Council on the 19th October, 2020. Council calculated an annual maintenance contribution requirement of Gwydirfield Road in accordance with current Council contribution policy would amount to 1 cent/tonne/kilometre which converts to 2.7 cents per tonne for use of the section of Gwydirfield Road between Wandoona and the Newell Highway. The Applicant has agreed to this contribution rate. The payment would be made on an annual basis to the Moree Plains Shire Council. It is noted that under this voluntary planning agreement, the market rate of any materials obtained by council from this quarry will either be paid by Council at market rate, or may be deducted at market rate from the Applicant's payment to Council under the voluntary planning agreement.

Council also indicated that the Gwydirfield Road requires upgrade works over a 600 metre section of the Gwydirfield road. The intersection between the internal access road and the Gwydirfield also needs minor upgrade works in the form of widening the left-hand side of the intersection by 3 metres, in order to allow trucks to enter the site at a 90 degree angle from the Gwydirfield Road. The Applicant and Council have agreed of the option for Johnstone Concrete & Quarries to carry out these works under a self-help scheme, whereby the Applicant would provide 100% of the contribution costs and would arrange the procurement of the upgrade works. Should the development be approved, it is proposed that the Applicant would carry out these works within 12-months of the development consent being issued, as part of a construction certificate phase for the development.

5.6 Consultation and Liaison with Government Authorities

The requirements of the Director-General, Department of Planning and relevant government agencies are attached as Appendix 2. Replies received from authorities are attached as Appendix 3.

Information, advice and comments from the consent authority, Moree Plains Shire Council, along with the requirements of the Director-General were taken into account in the preparation of this EIS. The proposal is Designated Development. The quarry does not require an Environmental Protection Licence as annual extraction would not exceed the 30,000 m³ POEO threshold.

A formal public consultation will take place in accordance with the requirements of section 4.15 (previously section 79C) of the *Environmental Planning and Assessment Act 1979* once the development application is lodged.

5.7 Identification and Prioritisation of Issues

The following table outlines the key issues identified during the planning and consultation phases of the proposed development including the specific issues outlined in the DGRs; and the general issues identified during consultation with state agencies.

Table 10: Identified Key Issues Associated with the Proposed Development

Specific issues identified	DPE	RMS	DPI R&E	DPI Ag	DPI Water	DPI Fisheries	OEH	MPSC	Section
Strategic Context including a justification of the project, its consistency with planning instruments and list of approvals.	✓								4, 5
Identification of the resource, including the extraction amount, type and composition, as well as details regarding the timing and intensity of operations.								✓	2.2, 2.3, Appendix 13
Air Quality - Dust generation from quarrying operations and vehicle movements, including mitigation measures.	✓							✓	6.4
Noise and Vibration – Noise generation from quarrying machinery and trucks, including mitigation measures.	✓							✓	6.3, Appendix 4
Soil impacts and management including erosion and sediment control	✓			✓				✓	3.5, 6.7, Appendix 7
Groundwater including potential impacts on water sources and groundwater dependent ecosystems.					✓				3.8, 6.6.2
Surface Water including quality of river water and management systems for the protection of surface and groundwater from runoff to prevent offsite discharge.			✓	✓	✓	✓			3.7, 6.6.1
Water Impacts and Management – including an annual site water balance that demonstrates sufficient water availability to meet operational requirements. Licensing and approvals under the relevant legislation and consistency with any relevant Water Sharing Plan.	✓				✓			✓	6.6

Specific issues identified	DPE	RMS	DPI R&E	DPI Ag	DPI Water	DPI Fisheries	OEH	MPSC	Section
Traffic and Transport including details on road transport routes and access to the site; traffic predictions and an assessment of the safety and function of the road network.	✓	✓						✓	3.3, 3.14, 6.2
Biodiversity including any vegetation clearing, an assessment of potential impacts on threatened species including measures to avoid, minimise, mitigate and offset biodiversity impacts.	✓						✓	✓	3.10, 6.8, Appendix 8 and 9
Heritage Impacts including Aboriginal and non-Aboriginal cultural heritage.	✓						✓		3.11, 6.9, Appendix 6
Land – including potential impacts on the quality and quantity of the soils and land capability of the site.	✓			✓					3.5.1, Appendix 5
Waste – including estimates of quantities and any measures implemented to minimise, manage or dispose of these waste streams.	✓								6.12
Aquatic Habitat						✓			6.6
Visual including an impact assessment.	✓								6.5
Social and Economic Impacts	✓								3.12, 6.13
Land Use Conflict								✓	3.2
Weed, pest animal, biosecurity and bushfire hazards				✓					2.3.3., 3.9
Public Safety	✓								6.14
Rehabilitation	✓			✓					8

6 Environmental Impact Assessment and Proposed Mitigation Measures

This section assesses possible impacts of the proposed development and the ameliorative measures proposed to minimise such potential impacts.

6.1 Environmental Risk Analysis of Proposal

An environmental risk analysis was undertaken as part of the proposal. The analysis forms part of the management activity for operation of the quarry and related activity that may

impact the local environment and therefore require further investigation or implementation of appropriate mitigation measures. Various independent consultations were also undertaken and the results of all consultations were prioritised in the following Environmental Risk Analysis.

Risk is the chance of something happening that would have an impact on the environment or operation of the project and is measured in terms of consequence and likelihood. Qualitative consequence and likelihood ratings developed for this project are set out in the following tables.

Table 11: Qualitative Consequence Rating

Qualitative Consequence Rating		
Level	Descriptor	Description
1	Insignificant	Negligible and temporary detrimental impact on the environment Affects an isolated area No remediation costs Reportable to internal management only No operational constraints posed No injuries or health impacts
2	Minor	Minor detrimental impact on the environment Affects a small area Minimal remediation costs Reportable to internal management only No operational constraints posed Minor injuries which would require basic first aid treatment
3	Moderate	Substantial temporary or minor long-term detrimental impact on the environment Moderately large area of impact Moderate remediation cost Reportable to government agencies Further action may be requested by government agency Injuries requiring medical treatment
4	Major	Extensive and/or permanent detrimental impacts on the environment Large area of impact Very large remediation costs Reportable to government agencies Possible prosecution and fine Serious injuries requiring medical treatment
5	Catastrophic	Massive and permanent detrimental impacts on the environment

Qualitative Consequence Rating		
Level	Descriptor	Description
		Very large area of impact Massive remediation costs Reportable to government agencies Large fines and prosecution resulting in potential closure of operation Severe injuries or death

Table 12: Qualitative Likelihood Rating

Qualitative Consequence Rating		
Level	Descriptor	Description
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Would probably occur in most circumstances
C	Possible	Could occur
D	Unlikely	Could occur but not expected
E	Rare	Occurs only in exceptional circumstances

The risk associated with each environmental impact was assessed without the inclusion of any operational controls or safeguards based on the qualitative assessment of consequence and likelihood and a risk ranking in order of low (L), medium (M), high (H) or extreme (E) was assigned to each potential impact based on the matrix below.

Table 13: Consequence Rating

Likelihood	Consequences				
	1 (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Catastrophic)
A (Almost certain)	M	H	E	E	E
B (Likely)	M	H	H	E	E
C (Possible)	L	M	H	E	E
D (Unlikely)	L	L	M	H	E
E (Rare)	L	L	M	H	H

The four risk rankings are defined as follows:

Low (L) – requiring a basic assessment of proposed controls and residual impacts. Any residual impacts are unlikely to have any major impact on the local environment or stakeholders.

Moderate (M) – requiring a medium level of assessment of proposed controls and residual impacts. It is unlikely to preclude the development of the project but may result in impacts deemed unacceptable to some local or government stakeholders.

High (H) – requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures. This level of risk could preclude the development if effective control and mitigation measures are unavailable.

Extreme (E) – requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures and possible preparation of specialised management plan. This level of risk may preclude the development if not considered to be adequately managed by the controls and/or management plan.

For each environmental risk identified in the following table the potential environmental impacts have been allocated a rating based on the potential consequences and likelihood of occurrence.

Table 14: Analysis of Unmitigated Risk

Analysis of Unmitigated Risk			
Potential Impact	Consequence	Likelihood	Risk Rating
Transport/traffic			
Increased traffic on roads	1	A	L
Increased wear on road pavement	1	A	M
Increased risk of accident – major accident	5	E	M
Increased risk of accident – serious accident	4	E	M
Increased risk of accident – minor accident	3	E	M
Noise			
Increased noise impact at sensitive receptors	2	A	H
Increased traffic noise	1	A	M
Air quality			
Deposited dust impact on off-site vegetation	1	E	L
Deposited dust impact on residences	3	C	L
TSP – nuisance to residences	1	E	L
PM10 – health impact at residences	1	E	L
Significant emissions of GHG	2	D	L
Visual amenity			
View from public place	2	C	L
Surface water			
Reduced water quality in Mehi River	1	E	L
Reduced flow in Mehi River	1	E	L
Groundwater			
Reduced water quality of groundwater	1	E	L
Impacted level of groundwater table	1	E	L
Soils and land capability			

Analysis of Unmitigated Risk			
Potential Impact	Consequence	Likelihood	Risk Rating
Loss of soil by erosion	2	D	L
Sedimentation	2	D	L
Reduction in land capability	2	C	M
Flora and fauna			
Significant impact on threatened species	2	D	L
Heritage			
Aboriginal	2	E	L
European	1	E	L
Technological hazard			
Hydrocarbon spill	2	D	L
Explosive accident	4	E	L
Machinery accident	3	C	H
Natural hazard			
Bushfire	3	D	M
Waste			
Litter and waste contamination	1	D	L
Socio-economic impacts			
Increased employment	2	A	M
Increased economic activity	3	B	M
Loss of value on adjoining properties	1	E	L

The results of this risk analysis are incorporated in the following sections which consider the potential environmental impact of the extension of area for this quarry site.

6.2 Transport

The proposed development will involve an increase in the potential number of truck trips to and from the site on a daily basis. At present, this is restricted to 16 heavy vehicle movements per day or 8-trucks moving to and from the site. This was considered impractical by the Proponent in relation to potential supply requirements to specific projects.

The internal haul roads to be used by this development proposal currently consist of formed gravel roads. These roads will require normal maintenance which will be the responsibility of the Proponent.

As part of the existing development approval, a Dilapidation report was undertaken on Gwydirfield road. This enabled Council and the Proponent to establish a bench mark condition on the section of Gwydirfield road to be used by the Proponent to move trucks between Wandoona and the Newell Highway. This is a section of Council road. This section is now the subject of an agreement between the Proponent and Council in relation to contribution of either capital or materials to maintain this section of Gwydirfield road in a condition suitable for truck use. Once Council review the new development proposal, it is

expected that minor modifications may be required to the current agreement in relation to maintenance of the Council road, however the principle of the agreement in place under condition 13 of the existing approval was established through a Voluntary Planning Agreement.

There are no traffic accident statistics available for the haul route, however, the low traffic density and good sight distances on the haul route suggest that serious traffic accident probability would remain low.

6.3 Noise and Vibration

6.3.1 Environmental Noise Impact Assessment

The low frequency of on-site operations, proposed hours of operation and traffic movements, which have been detailed previously in this report were all considered in determining the potential impact of noise and vibration on surrounding receptors. An Environmental Noise Impact Assessment (ENIA) for the proposed development has been provided by an independent consultant and is presented in Appendix 5.

The ENIA provides an assessment of the acoustic impacts of the proposed expansion on nearby noise sensitive receivers. The nearest of which, Receiver 1, is located approximately 370m south-west of extractive operations, across the Mehi River.

Project Specific Noise Levels (PSNL) for the site have been determined by the methodology outlined in the NSW Industrial Noise Policy (INP). On 28th January 2016, Moree Plains Shire Council provided direction to the assessment of the existing noise environment adjacent to the development site and determined the PSNL relevant to the proposed development. It was considered and agreed that the noise criteria be set at 35 dBA_{Leq} for the assessment of impacts associated with the proposed development. This criterion was conservatively applied, and represents the most stringent impact assessment criteria level that is generally permitted under the INP.

The proposed expansion of the quarry is not expected to alter the frequency of noise emissions from the site. The proposal would enable the continuation of the quarry's life. Whilst noise from vehicles will impact on nearby receptors the level of operation is not constant and only within daylight hours. No blasting operations are proposed by this development.

Vibration levels are expected to be below the threshold of human detection, before reaching the property boundary.

The model produced by the ENIA presents worse case noise impact for the proposed operations, comprising:

- Processing plant and stockpile operations and associated water pump operations
- Sand and gravel pit operations (belowground extraction of materials)
- Haul trucks transporting products from extraction pits to processing plant area; and
- 12 Axil A-double road trains will be utilised to haul processed sand and gravel products

Predicted noise levels for these activities were modelled using Predictor (Type 7810) software, producing the results listed in the tables below.

Table 15: Sand and Gravel Pit Operations - Predicted Noise level

Noise Receiver	L _{Aeq,11hour} (Day) Amenity Noise Impact			Worst Case L _{Aeq,15min}
	Neutral Conditions	Worst Case (R1) (Northerly winds)	Worst Case (R2 to R6) (Easterly winds)	Intrusive Noise Impact
Receiver 1	32	35	35	36
Receiver 2	27	24	30	32
Receiver 3	26	23	29	31
Receiver 4	27	24	30	31
Receiver 5	27	24	30	32
Receiver 6	25	25	28	30

Table 16: Gravel Pit Operations – Predicted noise level, dB(A)

Noise Receiver	L _{Aeq,11hour} (Day) Amenity Noise Impact			Worst Case L _{Aeq,15min}
	Neutral Conditions	Worst Case (Northerly winds)	Worst Case (Easterly winds)	Intrusive Noise Impact
Receiver 1	32	34	34	36
Receiver 2	29	26	32	34
Receiver 3	29	25	32	33
Receiver 4	30	26	33	34
Receiver 5	30	29	33	34
Receiver 6	28	28	31	32

The results shown in Tables 15 and 16 are representative of worst case scenario conditions. The Acoustic consultant has recommended the following mitigation strategies to reduce the potential impact of ongoing site operation. The strategies to be implemented include:

- Agison Water Pump – replace southern façade of wire mesh enclosure within solid barrier.
- Sand and Gravel Pit – installation of a 3m high, earthen mound acoustic barrier on the eastern and southern sides of the pit.
- Ridge Gravel Pit – installation of a 1m high earthen mound acoustic barrier on the south-eastern side of the pit.
- Processed sand and loading operations to be arranged so that trucks serve as a temporary barrier between loader movements and Receiver 1.

Based on these modelled conditions, noise generated from the quarry can be expected to produce only a minor 1dB(A) intrusive noise impact upon Receiver 1, under worst case conditions. Under neutral conditions, the noise impact generated by quarry operations falls beneath the conservative adopted PSNL for all sensitive noise receivers. Given the low frequency of on-site operations, adoption of proposed mitigation strategies, and the relatively minor modelled intrusive noise impact on nearby receivers, the proposal is considered to present only minimal impact in regard to noise.

6.3.2 Noise Attended Monitoring

At council's request, noise attended monitoring was undertaken during site operations to corroborate operational findings with the ENIA results described in Section 6.3.1.

Noise attended monitoring was carried out by SMK Consultants on March 24th, 2020 while normal quarry activities were underway and plant machinery was operational. This included:

- Processing plant and stockpile operations;
- Associated water pump operations;
- Haul trucks transporting products from sand pit to processing plant area; and
- Haul trucks transporting material offsite.

Noise measurements were taken over a duration of approximately 15 minutes and at two locations using a Svantek 977 Sound and Vibration Level Meter. Both locations are representative of and located closer to the noise emission sources than the sensitive receptors associated with Wandoona quarry.

Weather conditions were noted during the survey period. Throughout the sampling period, the weather was dry with temperatures of 28°C and northerly winds of approximately 17km/hr. Note that northerly winds corresponds to the 'worst case' meteorological scenario for sensitive Receptor R1, the closest receptor to the proposed development.

Figure 24 shows the location of nearby sensitive receptors relative to Wandoona Quarry, and the location of the two stations at which noise monitoring took place.



Figure 24: Attended Noise Monitoring Station Locations at Wandoona Quarry

Extraneous noise sources were also noted throughout the noise monitoring. At station 1, this consisted mainly of birds singing in the trees adjacent to the monitoring locations on a regular basis. At station 2, extraneous noise sources were less regular and consisted of singing birds, and of a passing car at the end of the recording period.

Peaks due to extraneous noise sources were selectively removed from raw data to obtain an accurate measurement of the contribution of quarry operations to noise source levels at the receptor points.

Results of noise attended monitoring are presented in Figures 25 and 26.

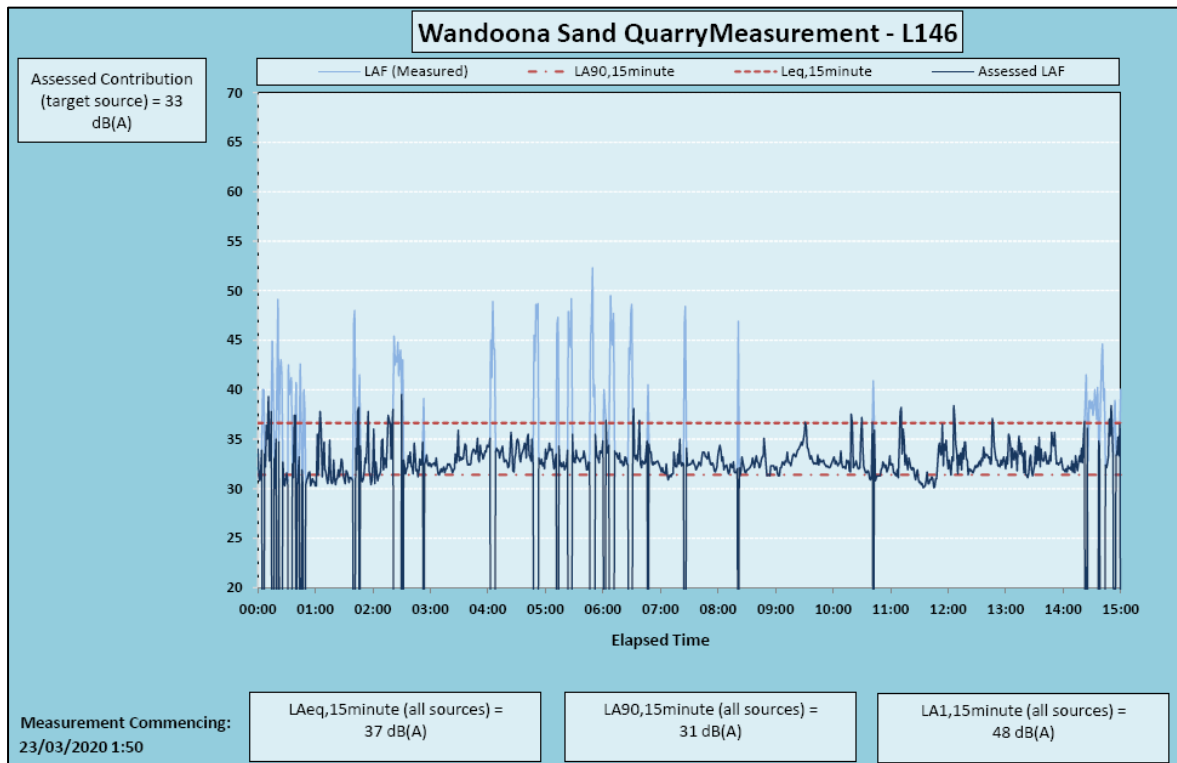


Figure 25: Noise Attended Monitoring Results for Station 1.

As shown in Figure 25, $LA_{eq,15min}$ is 37 dB(A) at Station 1. This corresponds to noise levels emitted by quarry operations as well as ambient noise. The assessed contribution from quarry operations only, having removed extraneous noise sources from the analysis, corresponds to 33dB(A). This is lower than the $LA_{eq,15min}$ of 36dB(A) associated with sand pit operations in worst case meteorological conditions (northerly winds) predicted for sensitive receptor R1 in the Environmental Noise Impact Assessment (ENIA) (see Section 6.3.1. and Appendix 4). It is also noted that attended monitoring was carried out on the northern bank of the Mehi river, approximately 120m closer to the noise emission source than Receptor 1.

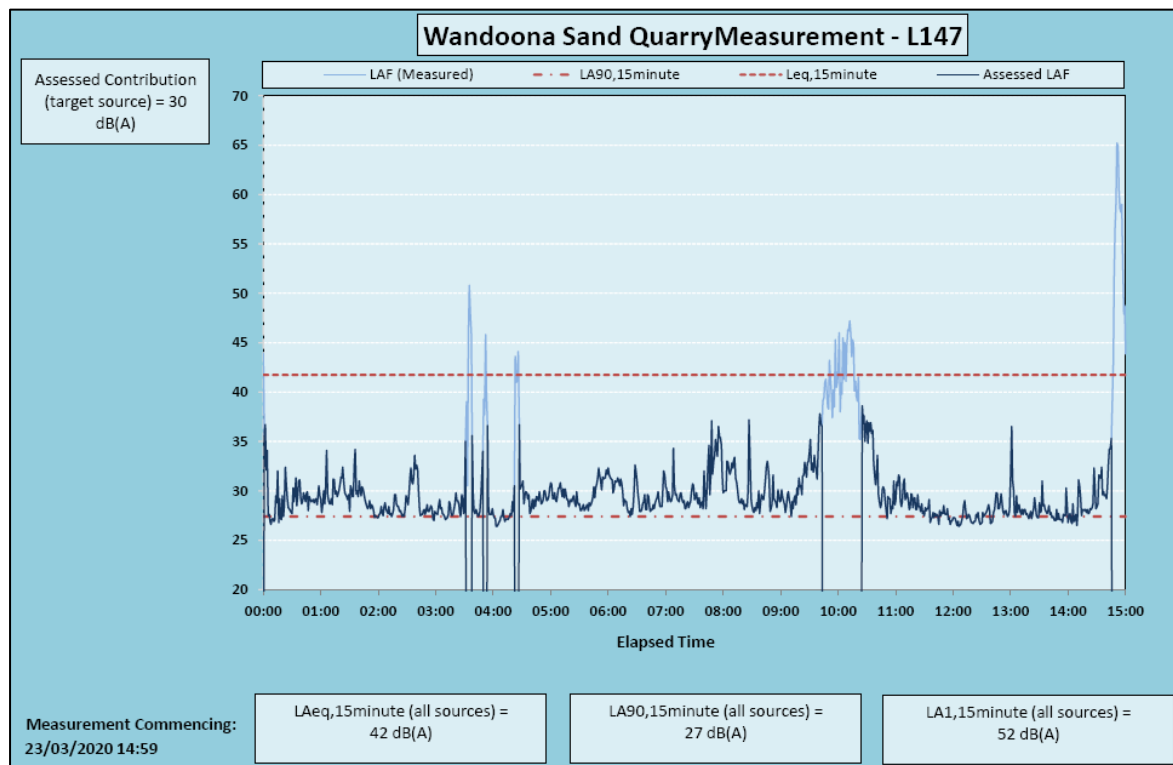


Figure 26: Noise Attended Monitoring Results for Station 2

At station 2, $LA_{eq,15min}$ calculated from raw data is 42 dB(A). Data adjusted to exclude extraneous noises calculates an assessed contribution of 30dB(A) from sand pit operations. This is below the predicted $LA_{eq,15min}$ of 32 dB(A) predicted in the ENIA in the context of neutral meteorological conditions for sensitive receptors R2-R6.

It is therefore considered that the $LA_{eq,15min}$ impacts associated with the existing development are slightly lower than those predicted in the ENIA for the proposed development operations. It is noted that operational activities associated with the proposed development will be very similar to those of the existing development.

6.4 Air

This section provides an assessment of the potential impacts of air emissions from the site and a comparison of existing conditions.

6.4.1 Diesel exhaust

Exhaust emissions are generated by existing diesel powered excavator during winning of sand and gravel, diesel powered washing/sieving plant, loaders to manage the materials within the pit and trucks to remove the resources from the site. The rate of emissions is not predicted to alter from existing rates as site operations are intended to remain in the same format. This involves 2-3 days of onsite activity, over several weeks, followed by extended periods of no activity between operations.

Diesel exhaust emissions are not expected to have a significant impact on air quality in the locality due to its open nature.

6.4.2 Dust

The movement of vehicles on around the site will generate some dust in dry sections of road. Minimal dust would be generated from the excavation of gravel material as both the gravel products on the site are generally moist. The sieving process involves wet separation of fine sand and river pebbles and therefore no dust would be generated from this process.

The applicant intends to mitigate the generation of dust where possible from their operations. The applicant intends to limit these dust emissions by inclusion of a water truck to wet down the internal haul route of the quarry and around the entrance area. The water truck would use the wash water or fresh river water to wet the roads during any busy period. Sections of the road will be targeted more than others. These will include the haul road from the ridge gravel pit to the sieving plant in addition to the haul road around the sieving plant which is not wetted up by the sieving process.

Additionally, observation of trucks hauling sand from the site has indicated that a certain amount of water spills from the rear of the trucks as the sand is hauled from the site. The water generally keeps the loading area and the initial 50-100 m of the haul road in a wet condition.

6.4.3 Dust Mitigation Measures

The following mitigation and management measures are recommended to control the generation of dust and to ensure compliance with relevant air quality standards.

- Ceasing dust generating activities during certain meteorological conditions
- Watering roads when trucks are in use
- Maintenance of hard gravel surface on haul roads including removal of wheel dust as it is generated.

Provided that the recommended mitigation measures are implemented, the potential risks of adverse impacts to ambient air quality posed by the proposal would be minimal.

6.5 Visual

The proposed development is visible to one property. This is Receptor 1 as outlined in the acoustic impact assessment. This receptor is located on the river bank opposite Wandoona. For the past 20 or more years, this receptor has been exposed to irregular extractions of gravel from Wandoona, but most of this time the property was either cultivated or grazed.

The existing sand and gravel operation has provided some visual intrusion into the rural aspect that the receptor had in the form of earthen banks around the existing sand pit and the presence of the sieve and stockpiles. This has been present for approximately 12-months.

The proposed development as described in this EIS does not involve any new equipment. The operation will remain the same or similar. The extended sand pit will be screened with an earthen bank to mitigate again noise impact toward receptor 1. This will hide the southern below ground pit. The pits to the north of the sieve plant will be visible but at an extended distance from the receptor.

The major visual intrusion consists of the sieve plant. This is already present and therefore the current landscape will not be altered.

6.6 Water

6.6.1 Surface Water

Wandoona is surrounded by the Mehi River on the southern and part of the eastern sides. Runoff from the property naturally enters the river at present. The potential impact from the development on the river has been identified to be runoff which has excessive silt material. This runoff could be generated from normal rain or potentially over flow from the sediment pond system.

Assessment of the operation of this site has indicated that the gravel extraction process will be below ground and therefore runoff from within the disturbed area would be captured within the extraction area. This would prevent any runoff from these areas from adding additional silt to the adjoining river.

Roads developed within the site will create some silt as the gravel is worn down by truck use. The potential for this silt to enter the river system is minor in relation to the potential silt load that the river would capture during a significant runoff event.

The sieving process for separation of sand and gravel is a wet process. The water from this process is currently captured in silt ponds and some of this water is recycled through the sieve plant once the silt settles in the pond. Overflow of the sediment system would drain through a natural gully line within the property and potentially flow back into the river. In order to avoid this situation, the sediment ponds need to be installed as per design to enable appropriate settling time for the silt to occur. Once these ponds are full, the Proponent needs to consider an increase in recycling of this water, a larger settling pond system or cessation of the sieving process until the accumulated silt laden water dissipates.

The Proponent intends to install a centre pivot system as part of the farming operations on the site. This would enable the rapid disposal of water from the sediment ponds onto cropping areas and make use of this water for agricultural production. The incorporation of a centre pivot for disposal of water from the sieving plant would significantly reduce the potential for overflow from the pond system.

If in the case that a sediment pond overflows, the water would need to travel approximately 1 km over a slope of less than 0.5 % fall before it could enter the river. Water velocity would be less than 0.1 m/s which would enable deposition of the silt. The area between the sediment pond and the river is generally cropped and also contains areas of grass and other forbs. The grass and forbs would provide appropriate filtration of the sediment laden water to minimise potential silt impacts that may degrade water quality in the river. Cultivation of this area after the event would incorporate the silt into the topsoil.

6.6.2 Groundwater

Groundwater is an important and valuable resource and *The NSW State Groundwater Policy* aims to encourage the ecologically sustainable management of the State's groundwater resource to:

- slow and halt, or reverse any degradation of groundwater resources;
- ensure long term sustainability of the systems ecological support characteristics;
- maintain the full range of beneficial uses of these resources;
- maximise economic benefit to the Region, State and Nation.

The sand and gravel resource to be extracted is located at a depth of approximately 0.5 m below ground level and extends to depths of 6 m to 8 m or more. Figure 1 presents an aerial image of the site showing the areas that have this gravel source and would provide potential gravel pits. The proposal would involve removal of the over-burden material and stockpiling of this material around the edge of the pit area. Direct access to the gravel would then be possible. The floor of the open pit would gradually be lowered until shallow groundwater associated with the adjacent Mehi River system was encountered. No further excavation depth would be possible. The water table would rise and fall under varying conditions in the adjacent river. Such conditions include the summer period with large volumes of irrigation water being supplied to irrigators via the Mehi River which would elevate the groundwater level in the pit area. This can be compared to extended dry periods from March through until September when minimal irrigation water is delivered and the natural stream flow is reduced to a bare minimum or no flow at all.

The gravel material in this aquifer provides a natural filter to capture any disturbed silt. This silt would resettle in the immediate aquifer and be incorporated in the strata.

The project does not require the use of groundwater and therefore the potential impact of this project on the groundwater table is considered as minimal.

6.7 Soils

The site has been previously utilised for extraction, grazing and cultivation. The surface soil on the property varies from a sandy loam in the lower floodplain area to a loamy clay in the upper area. Exploratory investigations of the property have identified a 0.5m to 1 m layer of soil overlying the sand and gravel resource to be targeted for extraction. The exploration indicated a 5 m to 8 m depth of sand and gravel under part of the property as outlined in Figure 2.

6.7.1 Soil Erosion

The soils on the site are not subject to instability such as subsidence, slip or mass movement.

Soil protection works that are present for the existing development include a sediment management system around the sieve plant to capture and settle sediment washed from the sieving operation. This system aims to settle silt in the ponds before either recycling the water or pumping the water through a proposal for a centre pivot. The sediment ponds currently capture an area of approximately 50m x 50m which is used for the sieving plant and washed stockpiles. Under worst case conditions if the sediment pond overflows, the sediment needs to travel up to 1 km distance across a slope of less than 0.5%. The velocity in this water would be minimal and therefore silt would settle in the grassed area adjacent to the pond. The risk of direct sedimentation in the Mehi River is minimal.

The extraction areas are below ground and therefore disturbance associated with these pits would result in any eroded sediment being captured within the pit area.

The remainder of the property will continue to be cultivated for mainly wheat or barley crops under a minimum till program.

6.8 Flora and Fauna

Wandoona Quarry has been operating in its existing format since it gained development approval in 2014. Prior to that, the site had been extensively cleared and utilised for quarrying operations intermittently over the past 50 years, but predominantly for livestock grazing and cultivation purposes.

The site has been significantly disturbed by this history of extraction and agricultural use and at present, provides only a low diversity of flora species and limited habitat for local fauna.

The dominant tree species on site, mature River Red Gum (*Eucalyptus camaldulensis*), are considered to have a few tree hollows which would provide habitat for fauna species such as birds, bats and possums. It appears, as observed during the various stages of this investigation, that these trees mainly support a roving possum population. The proposed works involve the clearing of one of these mature River Red Gum in the south west of the Lot.

There is minimal native ground cover across the majority of the property. Small patches of mimosa and native grassland have been retained in areas that cannot be farmed. The remainder, apart from a strip along the river corridor, is regularly farmed. Cattle and horses run on the property at various times which has resulted in some reduction in pasture species. The most natural remnant area on the property is the riverine corridor associated with the Mehi River. This is highly modified on both sides of the river, leaving a narrow corridor of gums and acacia species.

No extensive traverses of the property were undertaken on the basis that minimal native vegetation has been retained. During cropping periods, the higher mature crop would provide some refuge for various species which are able to migrate up and down the river. Occasionally this may include Koala. Such migrating species would be dominated by birds. Species such as Koala would be subjected to the impacts of rural residential areas where domesticated animals such as dogs and cats cause some disruption to normal migration pathways.

Tree clearing associated with the proposed development is limited to the removal of one mature River Red Gum, and as such, direct habitat removal will be minimal. A second factor to be considered in this assessment is the frequency in which the site operates. The proposal would involve site operations for 6 to 10 weeks per year based on 2 to 3-week project periods.

However, the proposed development still has the potential to adversely impact flora, fauna and their habitat through the potential loss and/ or degradation of adjoining riparian vegetation as a result of the movement of sediments in surface water.

An 'Assessment of Significance' under the EPBC Act and a 'Test of Significance' under the BC Act have been conducted and are presented in Appendix 8 and Appendix 9 respectively. These assessments consider potential threatened species, populations and ecological communities which may be present within the locality of the development site, and assess the potential impacts of the development upon these species. The results of the assessments are that the development is unlikely to impact upon threatened species/populations/communities, given the modified nature of the habitat area within the subject site.

Overall, the proposed development is not considered to pose a risk to threatened species, populations or communities. Therefore, the impacts of the development upon biodiversity values of the locality are minimal.

6.9 Heritage

A desktop study of online heritage databases was undertaken followed by site inspection. The results are presented below.

6.9.1 Aboriginal heritage

The proposed site has been historically cleared for cultivation and grazing activities. In assessing the proposal in accordance with Council's *Procedural Practice: Assessment of Aboriginal Cultural Heritage* the assessment concluded that an Aboriginal heritage impact assessment was not required as the land contains no sensitive landforms and the development is to be carried out on an area that has been extensively modified by clearing and cultivation in addition to existing gravel extraction pits. The higher areas of the property consist of hard clay which has a relatively low probability of being utilised for burial sites. There are no scarred trees on the property or other potential signs of historical aboriginal presence other than for hunting and collecting along the river system, noting that the Mehi River was a dry flood channel only up until the Tareelaro weir was constructed. The probability of Aboriginal Archaeological artefacts being identifiable on the site is minimal due to the historic agricultural farming practices.

A search of the AHIMS register revealed 0 results on the property or closely located around the property spanning a buffer of 50 metres. A copy of this report is attached as Appendix 6.

On this basis, no Aboriginal Cultural Heritage assessment is considered necessary due to historical disturbances and landscape features which would not be considered beneficial to potential archaeological sites.

If during the development of the site, any object is found that is suspected to be of Aboriginal origin, work in that location must cease until it is inspected by a person suitably experienced in identifying Aboriginal cultural material. Work may continue around the site at an appropriate distance considered to be more than 50 m from the potential Aboriginal object.

6.9.2 European heritage

A search of the NSW and Commonwealth heritage registers and Moree Plains Local Environmental Plan 1992 found no items of European heritage recorded on the site. The existing quarry and proposed area of expansion did not contain any infrastructure or historically used sites other than the quarry.

6.10 Technological hazards

6.10.1 Blasting

The sand and gravel to be extracted from the site does not require blasting. The material can be excavated in a raw condition.

6.11 Natural hazards

6.11.1 Flooding

The site is flood prone, which results in a considerable portion of the land submerged from the Mehi River banks up to the ridge of the property. Figure 14 (Section 3.9.2) depicts satellite imagery of the property during the February 2012 floods. The image outlines the ridge that runs through the property where the inundation stopped in this specific flood event. This appears to relate to an existing internal property access road which is elevated by approximately 100 – 200 mm above ground level. The proposed development does not include any equipment that is considered of concern in a flood event, nor does the development include a habitable building or residence. The extraction operation would cease in flood conditions and therefore no employee would be present under such circumstances. All components of the plant will be portable.

The current development has limited flood control measures. A 2-3 m high earth bank was constructed along the southern and western edges of the existing sand and gravel pit. The purpose of this is to shield the southern receptor from noise and visual disturbance from the pit, however the earth bank also acts as a flood diversion bank around part of the pit. The Proponent intends to maintain the current earth bank and extend this along the southern side of the pit area as it extends to the north-west. This bank will not enclose the development and therefore will have a minimal impact on the distribution of waters across the floodplain.

The sieve plant has been raised on a pad to a height of approximately 1m above natural surface level. The purpose of this pad is firstly to provide drainage around the plant and also to raise the plant above small flood levels. The pad would have a minor impact on flood flows as it is approximately 40 m wide, including stockpiles.

There are no flood protection measures in place to protect internal access roads.

No additional flood protection measures, such as levee banks, are proposed as part of the proposed works. Overall, flood protection measures associated with Wandoona sand quarry are minimal and these will not have a significant impact on the movement or distribution of waters across the floodplain in the event of a flood.

The proposed development does not include any equipment that is considered of concern in a flood event, nor is it proposed to construct a building or habitable residence. All

components of the plant that are currently on site are portable and this will remain unchanged. In the event of a flood, the extraction operation would cease, resuming once flood waters have receded.

6.11.2 Geological instability

The land is geologically stable, consisting of volcanic basement rock, and not subject to subsidence, slip or mass movement.

6.11.3 Bushfire

Wandoona Quarry is situated on Lot 5 in Deposited Plan 236547. The majority of the lot has been cleared for agricultural purposes. However, the immediate vicinity of the proposed development consists of sparse open woodland. Both the subject site and the property as classified as Category 3 Bushfire Prone Land (see Figure 13 in Section 3.9.1).

The vegetation within and adjacent to the site has been classified according to “Planning for Bush Fire Protection” (RFS, 2019) as:

- Grassland on the proposed development site; and
- Woodland adjacent to the site.

The development does not involve the erection of any buildings or dwellings.

6.11.3.1 RFS Bushfire Planning Objectives

Fire protection objectives considered with regards to the development site are outlined in the Rural Fire Service (RFS) guideline “Planning for Bush Fire Protection” (PBP) (RFS 2019). For commercial and industrial developments where no residential component is included, PBP states that these developments are addressed through the aim and objectives of the PBP.

The PBP does not provide for any bushfire specific performance requirements industrial facilities, and as such there is not a set of criteria deemed to satisfy provisions for the application of Asset Protection Zones (APZ) and building construction standards to these types of developments under PBP. An Asset Protection Zone was nevertheless calculated using the RFS Online APZ Calculator; this was conservatively determined to be 10m based on LGA (Moree), vegetation class (Grassland) and effective slope (Flat).

The aim and objectives of PBP apply to the proposal in relation to other matters such as access, water and services, emergency planning, and landscaping/vegetation management. An overview of the bushfire environment and an assessment of the proposal against the aim and objectives of PBP is set out below.

The aim of PBP is to “provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to the development potential, site characteristics and protection of the environment.”

As discussed below, the proposed development would not significantly decrease the existing level of bushfire protection for workers and emergency personnel. The development is also not considered an asset that requires specific bushland building setbacks or construction standards under PBP.

The objectives of PBP are as follows:

- **Afford occupants of any building adequate protection from exposure to a bushfire;**

The proposed development does not consist of a dwelling or building. The development is not expected to offer protection for people from a passing fire front although a buffer of 10m will be observed between any structures present or erected onsite, and bushfire prone vegetation. Workers and employees are also not expected to defend the facility from fire and would be evacuated should a bushfire threaten the site.

This objective is satisfied.

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

An Asset Protection Zone (APZ) of 10m will be maintained around any structures on site which will act as defensible space around these structures. Access to the quarry is by roads suitable for heavy vehicles. These roads can be used by fire services to attend to fire at the facility.

This objective is satisfied.

- **Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;**

A minimum APZ of 10m will be maintained between all potential fire hazards and on site equipment. It is noted that the quarry site is kept clear of vegetative growth and therefore the majority of the subject site will not support flammable materials. No activities which would have potential to generate fire on site (such as blasting) will be conducted as part of the proposed works.

This objective is satisfied.

- **Ensure that appropriate operational access and egress for emergency service personnel and occupants is available;**

As the quarry development provides for large truck movements, there is adequate access to proposed assets for fire fighting operations. The gravel road is accessible in most, but not all, weather conditions. There is no residential use of the land.

This objective is satisfied.

- **Provide for ongoing management and maintenance of bushfire protection measures; and**

A minimum APZ of 10m will be observed between fire supporting vegetation adjacent to the quarry site, and structures and flammable materials associated with the quarry site. The majority of the site will remain free of vegetation. Sufficient heavy machinery is available on-site to manage buffer zones in a fuel-reduced condition.

This objective is satisfied.

- **Ensure that utility services are adequate to meet the needs of fire fighters.**

Utility services such as water supply exist in the form of a sediment dam within the property. This will ensure that there is sufficient water availability on site for firefighting.

This objective is satisfied.

6.11.3.2 Potential Ignition Sources

Quarry operations will include some activities which may act as potential sources of ignition, such as the use of machinery which may generate hot surfaces. To minimise the risk of fires being ignited as a result of quarry operations, excavation sites will be kept clear of vegetation and other potentially flammable materials. This will ensure that any potential sparks generated on site will not catch onto materials which may lead to fire spreading into the surrounding region.

6.11.3.3 Storage of Fuels and Hazardous Materials

Fuel and other flammable substances that are stored on site will be stored in accordance with relevant Australian Standards, and will be located at a distance from any potential fire fuel loads (such as vegetation).

6.11.3.4 Proposed Bushfire Protection Measures

The following safeguards and mitigation strategies will be implemented on site to minimise the bushfire hazard at Wandoona Quarry:

- Incorporating a firebreak around the quarry site;
- Ensuring any equipment (such as the sieving plant) are set back 10m from any potential fuel sources (such as surrounding vegetation);
- Keeping the quarry site clear of potential fuel sources (such as vegetation);

- Maintaining appropriate fire-fighting equipment at the site, ensuring fixed plant and mobile equipment are fitted with fire-fighting equipment including fire extinguishers, fire blankets, knapsack spray pumps and rake-hoes;
- Checking the underside of vehicles periodically to ensure they are kept free of vegetation debris that could dry out and ignite;
- Storing flammable materials such as waste hydrocarbons away from ignition sources;
- Refuelling only to occur in cleared areas of the project site;
- Engines in all vehicles to be turned off during refuelling;
- No smoking policy to be enforced in designated areas of the project site; and
- Ensuring that there is sufficient water availability on site for firefighting.

Water requirements for the project will be sourced from water captured in a harvestable rights dam, which also acts as a sediment pond. This water resource will also be made available for fire-fighting purposes.

6.11.3.5 Operational Access for Fire Fighting

The site is accessible from the north via Gwydirfield Road, which traverses cleared agricultural land to the north of the development site. Therefore, the site is unlikely to be cut off in the event of a fire, ensuring practical access for fire fighting purposes.

6.11.3.6 Emergency and Evacuation Planning

In the event of a fire, the site would be evacuated. Evacuation would occur via the site access route which leads onto Gwydirfield Road. It is noted that neither the site access nor Gwydirfield Road are fringed by dense vegetation and therefore would not be cut off in the event of a fire.

6.11.3.7 Assessment of Impacts

The proposed operations are unlikely to increase the number and type of ignition sources in the local area relative to existing conditions. Nevertheless, the proposed management and mitigation measures would ensure that an acceptable bushfire hazard is maintained within the project site.

6.12 Waste

No general waste will be disposed of onsite. The small amount of domestic waste will be removed as it is generated on a daily basis.

No oil or waste fuel will remain on the site. The Proponent intends to remove these products for recycling through their existing operation on Drive In road.

6.13 Social & Economic

The provision of quality building and construction materials produced by the quarry is seen as a social benefit due to its contribution to the provision of community infrastructure at reasonable cost. If this material is not available locally then public infrastructure would potentially suffer as a result of increased maintenance on local roads. Any reduction in road standards would lead to a reduction in social wellbeing in the region as roads deteriorated or money was diverted from other projects to fund the additional road and infrastructure construction and maintenance costs.

The proposal would not result in direct employment of additional staff or contractors as the work undertaken to operate the quarry is considered as an existing activity. From a social perspective the proposal will provide a long-term source of sand and gravel material for continued operations of the Proponents Concrete and Gravel business. This would therefore secure longer term employment of its current workforce which is based around Moree residents.

6.14 Public Safety, security & crime prevention

The subject land is fenced from the Gwydirfield Road boundary. The machinery at the site is set back from the road and is secured when not in use. There are few landholders in the area and these few are considered by the applicant to be vigilant and report unusual activities to one another as a form of neighbourhood watch. This generally results in a lower level of rural crime in this locality compared to other areas without this level of public cooperation.

6.15 Energy

The proposed development would not alter the energy consumption or produce any excessive demand for energy.

6.16 Site design

The design of the quarry is dictated by the size and location of the extractive resource. The operation is set back from the Gwydirfield Road, with the nearest pit lying greater than 800m to the south and processing plant situated approximately 1.2 km south-east. These works are screened from the road by existing vegetation corridors that will not be impacted upon by the development. The existing entrance has recently been upgraded to allow for safer access of trucks into the site and will be retained in its present location.

At present, there are two operational extraction pits on-site. The primary pit, located in the southern portion of the lot, is utilised for its sand and gravel resources. The pit is progressing to the north-west, following the extractive resource, but remaining confined by the existing mature vegetation. Additionally, there is a secondary, smaller gravel pit on the western border of the property. Sediment laden water from disturbed areas flows to lower areas within the pits, but does not discharge from them.

The proposed development includes an extension of the sand and gravel pit to the north of the sieve plant. This pit would move in a northerly direction. This extraction process will also be below ground. The pit will be set more than 40m from the river bank.

The sites processing plant is located approximately 150m north of the existing sand pit. The washing and sieving plant is serviced by a secure water supply from the Mehi River. This plant is portable. The potential therefore exists to move this machinery to the north to be closer to the northern pit once this is developed.

6.17 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 the EIS, the assessment of cumulative impacts considers the impacts of existing and proposed extractive industry development in the local area.

The closest, operational quarry is the Seven Mile Gravel Pit which is owned and managed by the Moree Plains Shire Council. The pit is located approximately 6.2 km east of the Wandoona Quarry site and is unlikely to contribute impacts upon the amenity of identified receptors and residents within the Gwydirfield area. There are no other, known, quarry proposals situated within the subject area that would cause either a beneficial or adverse cumulative impact. In fact, a number of quarries and pits within the area have been closed in recent years.

The proposed development consists of an expansion of the area to be quarried and does not alter the intended frequency or intensity of the activity on the quarry site. On this basis, the potential impacts relating to the effects of noise, dust and traffic on neighbouring receivers would remain similar. An assessment of these impacts has indicated that some dust and potential noise impacts occur as the site is located in a relatively isolated area with no other similar industrial or extractive activity. The location is in a quiet relatively undisturbed location and therefore any noise or dust generated from the site could be considered an unacceptable impact. These impacts will not be any different from current levels as sensitive areas such as houses will not be further encroached upon and extraction levels will not increase.

On this basis, it is considered that no cumulative impacts are predicted for the locality. Positive cumulative impacts such as the ability of local Council to maintain the local road network at a more reasonable cost compared to alternatives would be achieved. On this basis, impacts associated with the Wandoona quarry are seen to be beneficial.

7 Environmental Management Plan

Wandoona Quarry management will be responsible for the preparation of an Environmental Management Plan (EMP) for operation of the site. The plan would form part of the standard approach required for the Applicants operation of the site in order to establish and monitor objectives of the operation.

Relevant monitoring programs should be included in the EMP relating to specific performance criteria. These criteria should include the following aspects of the operation:

- Operation schedule and production
- Noise emission criteria
- Dust emission criteria
- Complaints receipt and mitigation actions
- General environmental compliance

A draft EMP is presented in Appendix 9. This draft provides a basic EMP including performance criteria. The draft should be adopted by site management and updated for the specifics of the operation. The EMP should be modified when required for various mitigation measures that maybe required on occasion in order for the quarry operation to meet the target criteria.

8 Site Rehabilitation

8.1.1 Rehabilitation and Final Land Use Objectives

Remediation of the quarry will be undertaken in accordance with the site's draft Operation Remediation and Management Plan (ORMP) as part of continued operations.

The following objectives have been adopted to guide rehabilitation procedures for the site:

- a) To produce a stable final landform and rehabilitate the land for grazing purposes;
- b) To minimise the environmental impact of all site earthworks associated with the rehabilitation works;
- c) To optimise the use of available overburden and top soil as a substrate for vegetation; and
- d) To achieve a stable and functional drainage system at the site under extreme rainfall events.

8.1.2 Rehabilitation Method

Routine rehabilitation will occur over the lifetime of the quarry as part of continuous operations. All spoil material removed during the process of extending the extraction area for raw sand and gravel material shall be placed around the edge of the excavation, to provide a diversion bank to minimise local inflow and rainwater runoff. Revegetation of the completed batter is encouraged with a final layer of topsoil material, obtained from any overburden removal process.

At the cessation of extraction activities by the proponent, final remediation works would include the placement of all above ground aggregate materials that have been extracted from the quarry, into the batter area of the excavation to slope the batters. The remaining batters around the edge of the excavation area would be shaped to create a batter slope of no steeper than 3H:V1. The immediate surrounding land is to be cleared of all remaining aggregate materials and smoothed to allow for future cultivation. This smoothing process would target all on-site batters, with the exception of access roads and ramps into the base of the quarry site. Remaining roads or ramps would be left in a trafficable state.

The sieving and washing plant will be removed, including all steel and concrete structures. All associated sediment and holding ponds are to be drained and backfilled, leaving a surface suitable for cultivation.

The site is to be left free of contaminating materials, such as oils and fuels, to a standard that satisfies the NSW Contaminated Sites Guidelines for Agricultural landuse.

8.1.3 Final Land Form

The final landform would be free draining with a gently sloping floor to the southwest, towards the lower section of the quarry area and the Mehi River.

The existing extraction faces would be sloped to a batter of no steeper than 3 horizontal to one vertical, to allow the establishment of suitable vegetation without a high risk of complete erosion. Remaining stockpiles of sands and raw or crushed gravel should be spread evenly over the site to enhance drainage. Stockpiled topsoil and overburden would then be spread on the batters and quarry floor to provide suitable topsoil material to allow vegetation growth. Where appropriate, reseedling would be undertaken to provide a cover crop to stabilise the surface and allow natural and local pioneering species to establish on the site, which would then allow the eventual natural regrowth of local tree species. Existing fencing should remain to exclude domestic stock if required and therefore limit the disturbance of the revegetation process.

8.1.4 Rehabilitation Funding

The applicant should consider funding of the rehabilitation works as part of the cost of site operations. The proposed work would be undertaken by a dozer or excavator to shape the site and spread the topsoil material. The applicant would then be required to revegetate some small, steeper parts of the site. Total cost of the works is anticipated to be in the order of \$15,000 based on 1-week of machine hire and an allowance for revegetation. Based on the surveyed quantity of material available on the site, this cost would be covered by a levee of 8c per cubic metre or the equivalent of approximately \$375 per annum to be set aside for

rehabilitation. This is considered a minor amount in relation to the value of the material obtained from the site.

9 Conclusion

The resource available in the subject area represents a regionally important source of sand and gravel for the Moree Plains area. The proposed expansion of the Wandoona quarrying operations by approximately 9 to 10 hectares will ensure a continued supply of material for a range of building and construction uses in NSW.

This assessment of the potential environmental impacts resulting from the proposed extension of Wandoona Quarry has demonstrated that there would be minimal additional impact on the environment, provided that the additional mitigation measures proposed in this report and management procedures contained in the Wandoona Quarry Environmental Management Plan are implemented.

Overall, the proposal is considered consistent with relevant legislative and environmental requirements. If the proposal were to be approved the Wandoona Quarry is considered to provide long-term economic benefits to the local and regional community through access to cost effective materials.

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Appendix 1 – Site Plan



SCALES: HORIZ 1 in 5500 VERT DATUM: MGA ZONE 55		A2	SMK CONSULTANTS surveying - irrigation - environmental PO BOX 774 MOREE 2400 PHONE (02) 67 521021	CLIENT: Johnstone Concrete and Quarries	DESCRIPTION: Johnston's Concrete and Quarries Site Plan of Wandoona Sand and Gravel Pit	PLAN REVISION:		DATE	1 of 1 <small>SHEET No.</small>		
SURVEYED DESIGNED CHECKED	SMK CONSULTANTS SMK CONSULTANTS PETER TAYLOR	CONTOUR INTERVAL		Major: 1.0 m Minor: 0.2 m		PROJECT: Wandoona Site Plan	A	FIRST ISSUE	28-01-2016	JOB No. 14-150 COMPUTER FILE:	
							B			Detail Survey.mxd	
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Appendix 2 – Secretary’s Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements

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

Designated Development

EAR Number	991
Proposal	Expansion of existing sand and gravel quarry to extract up to 29,000 tonnes of material per year.
Location	Gwydirfield Road, Moree, Lot 5 DP236547
Applicant	Johnstone Concrete and Quarries Pty Ltd
Date of Issue	13 November 2015
Date of Expiry	13 November 2017
General Requirements	<p>The Environmental Impact Statement (EIS) for the development must comply with the requirements in Clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>.</p> <p>In particular, the EIS must include:</p> <ul style="list-style-type: none"> • an executive summary; • a comprehensive description of the development, including: <ul style="list-style-type: none"> - a detailed site description and history of previous quarrying on the site, including a current survey plan; - identification of the resource, including the amount, type and composition, as well as details regarding the timing and intensity of extractive operations, having regard to DRE's requirements (see Attachment 2); - 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 summary of all proposed environmental management and monitoring measures for the development; - a detailed rehabilitation plan for the site; - any likely interactions between the development and any existing/approved developments and land uses in the area; and - a list of any other approvals that must be obtained before the development may commence; - the permissibility of the development, including identification of the landuse 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; • the reasons why the development should be approved, having regard to the economic, social and environmental aspects of the development and taking into consideration the objects of the <i>Environmental Planning & Assessment Act 1979</i>; and • a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.
Key Issues	<p>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.</p> <p>The EIS must address the following specific issues:</p> <ul style="list-style-type: none"> • Noise – including: <ul style="list-style-type: none"> - an assessment of the likely construction and operational noise impacts of the development in accordance with the <i>NSW Industrial Noise Policy</i> and the <i>Interim Construction Noise Guideline</i>; and - an assessment of the likely road noise impacts (traffic and haulage) of the development under the <i>NSW Road Noise Policy</i>. • Air – including an assessment of the likely air quality impacts of the development in accordance with the <i>Approved Methods for the Modelling and Assessment of Air Pollutants in NSW</i>. The assessment is to give particular attention to potential dust impacts on nearby private receivers due to construction activities, the operation of the quarry and/or road haulage; • Water – including: <ul style="list-style-type: none"> - an annual site water balance for representative years over the life of the development and demonstration that sufficient water supplies would be available

	<p>to meet operational requirements;</p> <ul style="list-style-type: none"> - identification of any licensing requirements or other approvals required under the <i>Water Act 1912</i> and/or <i>Water Management Act 2000</i>; - 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; and - an assessment of the likely impacts of the development on the quality and quantity of surface and ground water resources, having regard to the requirements of the documents listed in Attachment 1 as well as DPI Water's requirements (see Attachment 2); and - a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts; <ul style="list-style-type: none"> • Transport – including: <ul style="list-style-type: none"> - 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, having regard to RMS' requirements (see Attachment 2); - 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; and - evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; • Biodiversity – including: <ul style="list-style-type: none"> - 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 and/or populations (or their habitats), endangered ecological communities and groundwater dependent ecosystems, having regard to OEH's requirements (see Attachment 2); - 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: <ul style="list-style-type: none"> - 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. The assessment is to have regard to relevant policies and guidelines listed in Attachment 1, as well as OEH's requirements outlined in Attachment 2; 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 requirements of relevant policies and guidelines listed in Attachment 1; • Land – including: <ul style="list-style-type: none"> - an assessment of potential impacts on the quality and quantity of the soils and land capability of the site, including any likely disturbance of contaminated soils, and the proposed mitigation, management and remedial measures (as appropriate); - an assessment of the likely impacts on landforms and topography, including the long term geotechnical stability of any new landforms; - an assessment of the compatibility of the development with other land uses in the vicinity of the development, in accordance with the requirements of Clause 12 of <i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i>, having regard to DPI Agriculture's requirements (Attachment 2); • Public Safety – including an assessment of the likely risks to public safety, paying particular attention to the transport, storage, handling and use of any hazardous or dangerous goods; • Visual – including an assessment of the likely visual impacts of the development (including any night lighting) on surrounding private landowners and key vantage points in the public domain, paying particular attention to impacts on nearby private residences and road users; • 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. • Social & Economic – including: <ul style="list-style-type: none"> - an assessment of the likely social impacts of the development, including any impacts associated with the demand for utilities and services; and - an assessment of the likely 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: <ul style="list-style-type: none"> - a detailed description of the proposed rehabilitation measures that would be undertaken throughout the development and during quarry closure, having regard to the requirements of DPI Agriculture (see Attachment 2); - a detailed rehabilitation strategy, including justification for the proposed final
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	<p>landform and consideration of the objectives of any relevant strategic land use plans or policies; and</p> <ul style="list-style-type: none"> - the measures that would be undertaken to ensure sufficient financial resources are available to implement the proposed rehabilitation strategy.
Environmental Planning Instruments	<p>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.</p> <p>During the preparation of the EIS you must also consult the Department's EIS Guideline – Extractive Industries – Quarries. This guideline is available for purchase from the Department of Planning and Environment's Information Centre, 23-33 Bridge Street, Sydney or by calling 1300 305 695.</p> <p>In addition, the EIS must assess the development against relevant Council local environmental plans and development control plans/strategies.</p>
Consultation	<p>In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups and any surrounding landowners that may be impacted by the development.</p> <p>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.</p>

ATTACHMENT 1

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

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.bookshop.nsw.gov.au>

<http://www.publications.gov.au>

Environmental Planning Instruments, Policies, Guidelines & Plans

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

	Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DECC) 2004
	The Threatened Species Assessment Guideline – The Assessment of Significance (DECC) 2007
	NSW State Groundwater Dependent Ecosystem Policy (NOW)
	Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW)
	State Environmental Planning Policy No. 44 – Koala Habitat Protection
	Policy & Guidelines – Aquatic Habitat Management and Fish Conservation (NSW Fisheries)
	Aquatic Ecology in EIA – EIS Guideline series (DP&E)
Heritage	
	The Burra Charter (The Australia ICOMOS charter for places of cultural significance)
	Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW (OEH) 2011
	Draft Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (DP&E)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH)
	Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (OEH)
	Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (OEH)
	NSW Heritage Manual (OEH)
	Statements of Heritage Impact (OEH)
Noise	
	NSW Industrial Noise Policy (EPA)
	Interim Construction Noise Guideline (EPA)
	NSW Road Noise Policy (EPA)
Air	
	Protection of the Environment Operations (Clean Air) Regulation 2002
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA)
	Assessment and Management of Odour from Stationary Sources in NSW (DEC)
	National Greenhouse Accounts Factors (Commonwealth)
Transport	
	Guide to Traffic Generating Development (RTA)
	Road Design Guide (RMS) & relevant Austroads Standards
Public Safety	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Hazardous and Offensive Development Application Guidelines – Applying SEPP 33
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
Resource	
	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 (JORC)
Waste	
	Waste Classification Guidelines (DECC)
	Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes 1999 (EPA)
Rehabilitation	
	Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Strategic Framework for Mine Closure (ANZMEC-MCA)

AGENCIES' CORRESPONDENCE

Appendix 3 – Authority Correspondence

Enquiries to: Murray Amos
Direct Line: (02) 6757 3252
Email: Murray.amos@mpsc.nsw.gov.au
Reference: TRIM FILE DA2014/58



2 November 2015

Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Genevieve Seed

Dear Ms Seed,

**Proposal -Expansion of Wandoona Sand and Gravel Quarry
EAR ID No. 991**

Thank you for the opportunity to review the above proposed development.

Council considers that the key issues to be addressed for this development are as follows:

- Land use conflict with respect to dwellings located near the quarry site and those located close to internal haulage roads and Gwydirfield Road;
- Dust generation from quarrying operations and vehicle movements. Mitigation measures for dust;
- Noise generation from quarrying machinery and trucks. Mitigation measures for noise;
- Traffic movements. The types of vehicles to be used and frequency of trips. Also needed is details of safety measures for trucks travelling on Gwydirfield Road and accessing the site;
- Hours of operation;
- Soil impacts and management including erosion and sediment control;
- Flora and fauna management;
- Water impacts and management.

Council would also like to know how the applicant intends to verify the volume of material removed. It is noted that the existing development does not have a weighbridge. Council is of the view that the applicant should verify extraction volumes on at least an annual basis.

Please contact me on the details above if you would like to discuss this matter further.

Regards,

**Murray Amos
SENIOR STRATEGIC DEVELOPMENT OFFICER**

PO Box 420, Moree NSW 2400
Telephone (02) 6757 3222
Facsimile (02) 6752 3934
council@mpsc.nsw.gov.au
mpsc.nsw.gov.au



V15/2812#58
OUT15/30571

Ms Genevieve Seed
Planning Officer
Resource Assessments
Planning Services
Department of Planning & Environment
23-33 Bridge Street
GPO Box 39
SYDNEY NSW 2001

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

Dear Gen

**Proposal –Expansion of Wandoona Sand and Gravel Quarry EAR ID No. 991
Request for Input into Secretary's Requirements**

I refer to the request by the Department of Planning and Environment in an email dated 19 October 2015 regarding input from NSW Agriculture regarding the Secretary's environmental Assessment Requirements (SEARs) for the above proposal.

The impacts of the quarry activities on agricultural operations in the vicinity in particular should address the following:

- a) An assessment of current resources and land uses should be used as a benchmark for future rehabilitation goals. This should include local soil landscape information (including topography), land and soil capability and/or agricultural land suitability.
- b) Management of soil resources pre and post quarrying activities. The removal and stockpiling of the surface soils in appropriate sites located on the upper floodplain or adjacent to quarried areas that will be immediately remediated, the management of these topsoils, subsequent resspreading and management of the area for final land use should be considered in the operational aspects of this proposal.
- c) Design of the final landform of rehabilitated land should be appropriate and consider the surrounding landscape. The final landform should be stable and free from erosion potential. This should include the areas that have already been subject to extraction and are used for agricultural activities as part of the whole site management.
- d) The quality of river water and in particular its impact on stock and domestic water use for agriculture.
- e) Consultation with adjoining rural stakeholders.
- f) Weed, pest animal, biosecurity and bush fire hazards require a Management Plan particularly with topsoil storage and viability considerations, erosion potential, and the impact on adjacent agricultural land use.

The guideline "Agriculture Issues for Extractive Industry Development" provides further information on the issues and information to be included in an EIS for extractive industries and can be accessed at: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/367763/Agriculture-issues-for-extractive-industry-development.pdf

Agriculture NSW, a division of Department of Primary Industries (DPI), is concerned with the protection and growth of agricultural industries and the resources upon which these industries depend. The proposed facility is on mapped Biophysical Strategic Agricultural Land which indicates that the land is of high significance to New South Wales in terms of agricultural potential. Although this proposal is not mining or coal seam gas related, it should be acknowledged that the site is of strategic importance to agriculture in the region and its future management for agricultural land use be considered fully.

Please contact myself for further enquiry.

Yours sincerely

A handwritten signature in black ink, appearing to read 'H. Squires', with a stylized flourish at the end.

Helen Squires
Resource Management Officer
Hunter and Acting North West and Regions
2 November 2015

2 November 2015

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

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

Your Reference: EAR ID No. 991
Our Reference: OUT15/30556

Dear Ms Seed,

**Re: Request for Secretary's Environmental Assessment Requirements -
Expansion of Wandoona Quarry - EARs ID No. 991 (Moree Plains LGA)**

Thank you for the opportunity to provide advice on the subject proposal. This is a response from NSW Department of Industry – Division of Resources & Energy (DRE), incorporating advice from the Agriculture and Fisheries Branches. Specific Fisheries or Forests issues arising may be provided in separate correspondence.

The building and construction industries in NSW require ongoing replacement of supplies as sources are exhausted. The development of new quarries and expansion of existing quarries, subject to environmental assessment, helps to ensure a continued supply of material for a range of building and construction uses in NSW. The resource in the subject area represents a regionally important source of sand and gravel for the Moree Plains area.

Mineral Resources Issues

Sand and gravel are not prescribed minerals under the *Mining Act 1992*. Therefore, DRE has no statutory role in authorising or regulating the extraction of these commodities, apart from its role under the *Work Health & Safety Act 2011* and associated regulations and the *Mine Health and Safety Act 2004* and associated regulations, for ensuring the safe operation of mines and quarries.

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

- Documents the size and quality of the resource and demonstrates that both have been adequately assessed; and
- Documents the methods used to assess the resource and its suitability for the intended applications.

Applications to modify, expand, extend or intensify an existing consent that has already been adequately reported using the above protocol in publicly available documents, may restrict detailed documentation to the additional resources to be used, if accompanied by a summary of past resource assessments and of past production.

DRE collects data on the quantity and value of construction materials produced annually throughout the State. Forms are sent to all operating quarries at the end of each financial year for this purpose. The statistical data thus collected is of great value to Government and industry in planning and resource management, particularly as a basis for analysing trends in production and for estimating future demand for particular commodities or in particular regions. In order to assist in the collection of construction material production data, the proponent should be required to provide annual production data for the subject site to DRE as a condition of any new or amended development consent.

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the DRE – Geological Survey of New South Wales Land Use team at landuse.minerals@industry.nsw.gov.au

Agricultural Issues for Extractive Industries (Quarries)

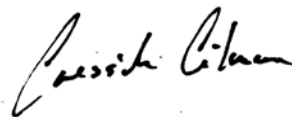
The relevant agricultural issues to consider when preparing and also when assessing extractive industry proposals are set out in the Departments' Guideline: *Agricultural issues for Extractive Industries* available on our website; <http://www.dpi.nsw.gov.au/agriculture/resources/lup/development-assessment>. The guideline also documents recommended project design and mitigatory responses.

The guideline is part of a series designed to help consent authorities identify potential agricultural impacts, and assess whether such proposals can avoid conflict with existing agricultural developments; and protect valuable food and fibre production resources. The guidelines can similarly help consultants and proponents and are available from the Department of Primary Industries land use planning web portal: <http://www.dpi.nsw.gov.au/agriculture/resources/lup/development-assessment>.

Fisheries Issues

General issues are summarised in **Attachment B**.

Yours sincerely



Cressida Gilmore
Team Leader Land Use

Encl. Attachments "A to B"

ATTACHMENT A

NSW Department of Industry RESOURCES & ENERGY DIVISION

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

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

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

Resource Assessment

1. A summary of the regional and local geology including information on the stratigraphic unit or units within which the resource is located.
2. The amount of material to be extracted and the method or methods used to determine the size of the resource (e.g. drilling, trenching, geophysical methods). Plans and cross-sections summarising this data, at a standard scale, showing location of drillholes and/or trenches, and the area proposed for extraction, should be included in the EA or EIS. Relevant supporting documentation such as drill logs should be included or appended. Major resource proposals should be subject to extensive drilling programs to identify the nature and extent of the resource.
3. Characteristics of the material or materials to be produced:
 - a) For structural clay/shale extraction proposals, ceramic properties such as plasticity, drying characteristics (e.g. dry green strength, linear drying shrinkage), and firing characteristics (e.g. shrinkage, water absorption, fired colour) should be described.
 - b) For sand extraction proposals, properties such as composition, grain size, grading, clay content and contaminants should be indicated. The inclusion of indicative grading curves for all anticipated products as well as the overall deposit is recommended.
 - c) For hard rock aggregate proposals, information should be provided on properties such as grain size and mineralogy, nature and extent of weathering or alteration, and amount and type of deleterious minerals, if any.

- d) For other proposals, properties relevant to the range of intended uses for the particular material should be indicated.

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

4. An assessment of the quality of the material and its suitability for the anticipated range of applications should be given.
5. The amount of material anticipated to be produced annually should be indicated. If the proposal includes a staged extraction sequence, details of the staging sequence needs to be provided. The intended life of the operation should be indicated.
6. If the proposal is an extension to an existing operation, details of history and past production should be provided.
7. An assessment of alternative sources to the proposal and the availability of these sources. The impact of not proceeding with the proposal should be addressed.
8. Justification for the proposal in terms of the local and, if appropriate, the regional context.
9. Information on the location and size of markets to be supplied from the site.
10. Route(s) used to transport quarry products to market.
11. Disposal of waste products and the location and size of stockpiles.
12. Assessment of noise, vibration, dust and visual impacts, and proposed measures to minimise these impacts.
13. Proposed rehabilitation procedures during, and after completion of, extraction operations, and proposed final use of site.
14. Assessment of the ecological sustainability of the proposal.

Health and Safety Issues

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

1. All operations are to comply with the following Acts & Regulations
 - a. *Work Health & Safety Act 2011*
 - b. *Work Health & Safety Regulations 2011*
 - c. *Mine Health & Safety Act 2004*
 - d. *Mine Health & Safety Regulations 2007*

2. The mine holder must nominate the mine operator in writing on the prescribed form to the Chief Inspector as required by the *Mine Health & Safety Act 2004* Section 22 prior to the commencement of extraction.
3. The operator of the mine must appoint a production manager as required by the *Mine Health & Safety Regulation 2007* Clause 16 and the operator must notify the Chief Inspector of the appointment in writing as required by the *Mine Health & Safety Regulation 2007* Clause 18 prior to the commencement of extraction.
4. Any blasting operations carried out by the mine operator must comply with the *Explosives Act 2003* and the *Explosives Regulations 2005*.

Mineral Ownership

The *Mining Act 1992* applies to those commodities prescribed by the regulations of the Act (Schedule 2, *Mining Regulation 2003*). Most construction materials are not prescribed minerals under the *Mining Act 1992*. In general terms, this means these materials are owned by the Crown where they occur on Crown land and by the landowner in the case of freehold land. A Mining Title is not required for their extraction although a Crown Lands licence is required where they occur on Crown land.

Construction materials such as *sand (other than marine aggregate), loam, river gravel, and coarse aggregate materials such as basalt, sandstone, and granite* are not prescribed minerals under the *Mining Act 1992*. Therefore, NSW Department of Industry has no statutory responsibility for authorising or regulating the extraction of these commodities, apart from its role under the *Mine Health and Safety Act 2004* with respect to the safe operation of mines and quarries. However, the Department is the principal government authority responsible for assessing the State's resources of construction materials and for advising State and local government on their planning and management.

Some commodities, notably *structural clay (ie clay for brick, tile and pipe manufacture), dimension stone (except for sandstone), quartzite, kaolin, limestone and marine aggregate* are prescribed minerals under the *Mining Act 1992*. Minerals which are prescribed as minerals under the terms of the Mining Act may, in some cases belong either to the Crown or to the landowner, depending on a number of factors including the date on which the mineral was proclaimed and the date of alienation of the land. The proponent needs to determine whether the material is privately owned or Crown mineral (publicly owned). If it is privately owned, then either a notification under Section 8 of the *Mining Act 1992* or, alternatively, a mining lease or mineral claim would be required. If it is a Crown mineral, an application for a mining lease or mineral claim will have to be lodged.

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

ATTACHMENT B

Primary Industries Division - Aquatic Habitat Protection Requirements

Matters to be Addressed

Definitions

The definitions given below are relevant to these requirements:

Fish means any part of marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead). This includes aquatic molluscs, crustaceans, echinoderms, worms, aquatic insect larvae and other macroinvertebrates.

Marine vegetation means any species of plant that at any time in its life must inhabit water (other than fresh water).

Waters refers to all waters including tidal waters as well as flowing streams, irregularly flowing streams, gullies, rivers, lakes, coastal lagoons, wetlands and other forms of natural or man made water bodies on both private and public land.

1. General Requirements

- Area which may be affected either directly or indirectly by the development or activity should be identified and shown on an appropriately scaled map (1:25000) and aerial photographs.
- All waterbodies and waterways within the proposed area of development are to be identified.
- Description and maps of aquatic vegetation, snags, gravel beds and any other protected, threatened or dominant habitats should be presented. Description should include area, density and species composition.
- A survey of fish species should be carried out and results included. Existing data should be used only if collected less than 5 years previously.
- Identification of recognised recreational and commercial fishing grounds, aquaculture farms and/or other waterways users.
- Details of the location of all component parts of the proposal, including any auxiliary infrastructure, timetable for construction of the proposal with details of various phases of construction
- Aspects of the management of the proposal, both during construction and after completion, which relate to impact minimisation and site rehabilitation eg Environment Management Plans, Rehabilitation Plans, Compensatory offsets
- For each freshwater body identified on the plan, the plan should include, either by annotation or by an accompanying table, hydrological and stream morphology information such as: flow characteristics, including any seasonal variations, bed substrate, and bed width
- For each marine or estuarine area identified on the plan, the plan should include, either by annotation or by an accompanying table, hydrological and stream morphology information such as: tidal characteristics, bed substrate, and depth contours

DREDGING AND RECLAMATION ACTIVITIES

- Purpose of works
- Type(s) and distribution of marine vegetation in the vicinity of the proposed works
- Method of dredging to be used

- Timing and Duration of works
- Dimension of area of works including levels and volume of material to be extracted or placed as fill
- Nature of sediment to be dredged, including Acid Sulphate Soil, contaminated soils etc
- Method of marking area subject to works
- Environmental safeguards to be used during and after works
- Measures for minimising harm to fish habitat under the proposal
- Spoil type and source location for reclamation activities
- Method of disposal of dredge material
- Location and duration of spoil stockpiling, if planned

ACTIVITIES THAT DAMAGE MARINE VEGETATION

- Type of marine vegetation to be harmed
- Map and density distribution of marine vegetation
- Reasons for harming marine vegetation
- Methods of harming marine vegetation
- Construction details
- Duration of works/activities
- Measures for minimising harm to marine vegetation under the proposal and details of compensatory habitat development to replace lost vegetation.
- Method and location of transplanting activities or disposal of marine vegetation

ACTIVITIES THAT BLOCK FISH PASSAGE

- Type of activity eg works in a stream that change flow or morphological characteristics of the stream, including culvert and causeway construction, sediment and erosion control measures, stormwater diversion structures.
- Length of time fish passage is to be restricted, whether permanent or temporary
- Timing of proposed restriction. Should be timed to avoid interfering with migratory movements of fish.
- Remediation or compensatory works to offset any impacts

THREATENED SPECIES

- Threatened aquatic species assessment (Section 5c, EP&A Act 1979). This must be addressed even if there are no Threatened Species present on the site.
- Seven Part Test

FISHING AND AQUACULTURE

- Outline and document commercial, recreational and indigenous fishing activities that may be affected by the activity, including regular commercial fishing grounds, popular recreational fishing sites, recognised indigenous harvesting sites.
- Will the activity interfere with or cause an impact on the continuing operation and viability of nearby aquaculture or mariculture ventures.

2. Initial Assessment

A list of threatened species, endangered populations and endangered ecological communities must be provided. In determining these species, consideration must be given to the habitat types present within the study area, recent records of threatened species in the locality and the known distributions of these species.

In describing the locality in the vicinity of the proposal, discussion must be provided in regard to the previous land and water uses and the effect of these on the proposed site. Relevant historical events may include land clearing, agricultural activities, water

abstraction/diversion, dredging, de-snagging, reclamation, siltation, commercial and recreational activities.

A description of habitat including such components as stream morphology, in-stream and riparian vegetation, water quality and flow characteristics, bed morphology, vegetation (both aquatic and adjacent terrestrial), water quality and tide/flow characteristics must be given. The condition of the habitat within the area must be described and discussed, including the presence and prevalence of introduced species. A description of the habitat requirements of threatened species likely to occur in the study area must be provided.

In defining the proposal area, discussion must be provided in regard to possible indirect effects of the proposal on species/habitats in the area surrounding the subject site: for example, through altered hydrological regimes, soil erosion or pollution. The study area must extend downstream and/or upstream as far as is necessary to take all potential impacts into account.

Please Note: Persons undertaking aquatic surveys may be required to hold or obtain appropriate permits or licences under relevant legislation. For example:

Fisheries Management Act 1994

- Permit to take fish or marine vegetation for research or other authorised purposes (Section 37)
- Licence to harm threatened (aquatic) species, and/or damage the habitat of a threatened species (Section 220ZW).

Animal Research Act 1985:

- Animal Research Authority to undertake fauna surveys.

It is recommended that, prior to any field survey activities taking place, those persons proposing to undertake those activities give consideration to their obligation to obtain appropriate permits or licences which may be required in the specific context of the proposed survey activities.

3. Assessment of Likely Impacts

The EIS must:

- describe and discuss significant habitat areas within the study area;
- outline the habitat requirements of threatened species likely to occur in the study area;
- indicate the location, nature and extent of habitat removal or modification which may result from the proposed action;
- discuss the potential impact of the modification or removal of habitat;
- identify and discuss any potential for the proposal to introduce barriers to the movement of fish species; and
- describe and discuss any other potential impacts of the proposal on fish species or their habitat.

For all species likely to have their lifecycle patterns disrupted by the proposal to the extent that individuals will cease to occupy any location within the subject site, the EIS must describe and discuss other locally occurring populations of such species. The relative significance of this location for these species in the general locality must be discussed in terms of the extent, security and viability of remaining habitat in the locality.

4. Ameliorative Measures

The EIS must consider how the proposal has been or may be modified and managed to conserve fisheries habitat on the subject site and in the study area.

In discussing alternatives to the proposal, and the measures proposed to mitigate any effects of the proposal, consideration must be given to developing long term management strategies to protect areas within the study area which are of particular importance for fish species. This may include proposals to restore or improve habitat.

Any proposed pre-construction monitoring plans or on-going monitoring of the effectiveness of the mitigation measures must be outlined in detail, including the objectives of the monitoring program, method of monitoring, reporting framework, duration and frequency.

In the event of a request for concurrence or consultation of the Secretary of NSW Department of Industry, one (1) copy of the EIS should be provided to NSW Department of Industry in order for the request to be processed.

It should be noted that NSW Department of Industry has no regulatory or statutory role to review draft EISs unless they are accompanied by or are requested as part of a licence application under Part 7A of the FM Act. However, NSW Department of Industry is available to provide advice to consent and determining authorities regarding Fisheries' opinion as to whether the requirements have been met if requested, pending the availability of resources and other statutory priorities.

Useful Information

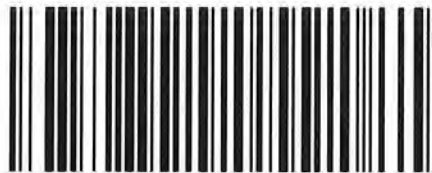
To help you in the preparation of an EIS, the publication "*Guidelines for the Assessment of Aquatic Ecology in EIA*" (Draft 1998) produced by the Department for Urban Affairs and Planning may prove useful in outlining appropriate procedures and methodologies for conducting aquatic surveys.

Should you require any further information on these requirements please contact the Aquatic Habitat Protection Office at Port Stephens on 4916 3931.

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Telephone: 1300 NSW RFS
e-mail: csc@rfs.nsw.gov.au



PCU062402



Director General
Dept. Of Planning - Coastal
GPO Box 39
Sydney NSW 2001

Your Ref: EAR ID 991
Our Ref: D15/3194
DA15102199038 AB

ATTENTION: Genevieve Seed

29 October 2015

Dear Ms Seed

Designated Development for Request For E I S Requirements - Expansion Of Wandoona Quarry, Gwydirfield Road Moree 2400

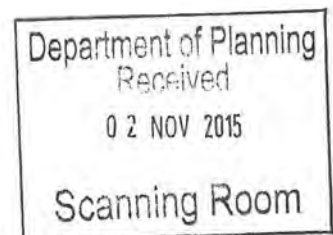
I refer to your letter dated 20 October 2015 seeking advice regarding bush fire protection for the above Designated Development in accordance with Part 4 of the 'Environmental Planning and Assessment Act 1979'.

The Service has reviewed the plans and documents received for the proposal and subsequently raise no concerns or issues in relation to bush fire.

For any queries regarding this correspondence please contact Alan Bawden on 1300 NSW RFS.

Yours sincerely

John Ball
Manager



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



SF2015/171139; WST15/00139

The Manager
Resource Assessments
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Ms Genevieve Seed

Dear Ms Seed

**EAR ID No.991: Lot 5 DP 236547; 'Wandoona' Gwydirfield Road, Moree
Expansion of Wandoona Quarry
Request for input into Secretary's Environmental Assessment Requirements (SEARs)**

Thank you for your email on 19 October 2015 requesting input into SEARs for the proposed expansion of Wandoona Quarry from Roads and Maritime Services.

Roads and Maritime notes development consent (DA2014/58) was granted by Moree Plains Shire Council for extraction of sand and gravel from the subject land in November 2014. The expansion of the quarry will increase its footprint and alter access arrangements but will not affect traffic volumes generated by existing operations.

Based on the information provided, in accordance with clause 16(2) of *State Environmental Planning Policy (Mining Petroleum Product and Extractive Industries) 2007*, DA2014/58 should have been referred to Roads and Maritime for comment. Unfortunately this did not occur and Roads and Maritime does not have any previous data regarding traffic generation or haulage routes associated with Wandoona Quarry.

Roads and Maritime has identified the following key issues which need to be included and addressed in the Environmental Impact Statement being prepared in support of the project:

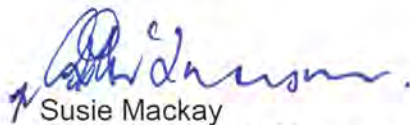
- A traffic impact study prepared in accordance with the methodology set out in Section 2 of the *RTA's Guide to Traffic Generating Developments 2002* and including:
 - Road transport volumes and types broken down into origin and destination, travel routes and peak hours for extension construction and operation of the quarry. The study is to provide details of projected transport operations including peak and average volumes of traffic and tonnage to be transported. Volumes will need to also include input related traffic generation (e.g. fuel deliveries, potable water deliveries, maintenance, services; etc) and impacts of related traffic generation on public roads and other road users. The traffic study is to address internal traffic movements and parking facilities.

- Any oversize and over-mass vehicles and loads expected for the construction and operation of the project.
 - Temporary and permanent staff numbers (including employees and contractors) during construction and operation of the project.
 - The impact and cumulative impacts of quarry related traffic and measures employed to ensure efficiency and safety on the public road network during construction and operation of the project.
 - Any mitigating measures required to address expected traffic generation.
 - Local climate conditions that may affect road safety during construction and operation of the project (e.g. dust, fog, wet weather, etc) and appropriate measures to mitigate the impacts of such conditions.
- Access locations and treatments, including the intersection of Gwydirfield Road and the Newell Highway (HW17), are to be identified and in accordance with *Austroads Guide to Road Design* and Roads and Maritime Supplements.
 - Details of required infrastructure work to support any increased demand on the road network as a result of the project.

Roads and Maritime appreciates the opportunity to provide comment and requests a copy of the SEARs be forwarded to Roads and Maritime at the same time they are sent to the applicant.

Should you require further information please contact the Development Assessment Officer, Andrew McIntyre, on 02 6861 1453.

Yours faithfully



Susie Mackay
Network & Safety Manager
Western

30/10/15



Contact Christie Jackson

Phone 02 6763 1426

Email christie.jackson@dpi.nsw.gov.au

Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Genevieve Seed

Dear Ms Seed,

**Secretary's Environmental Assessment Requirements (SEAR 991)
Expansion of Wandoona Sand and Gravel Quarry**

I refer to your email dated the 19 October 2015 seeking the Department of Primary Industries – Water's (DPI Water) input into the Secretary's Environmental Assessment Requirements (SEARs) for an Environmental Impact Statement (EIS) for the proposed expansion of Wandoona Sand and Gravel Quarry at Moree.

DPI Water has reviewed the supporting documentation accompanying the request for Secretary's Environmental Assessment Requirements (SEARs) and provides the following comments below, and further detail in **Attachment A**.

It is recommended that the EIS be required to include:

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased. The EIS should outline all current water licences and volumes. If further water licences are required this should also be outlined in the EIS.
- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.

- A description of all drainage lines and watercourses on the site, including a plan outlining them in relation to the proposed development.

It appears from the information provided a road may be constructed within 40 metres of the high bank of a watercourse. The proponent will be required to obtain a Controlled Activity Approval from DPI Water. It is recommended if an approval is required under the *Water Management Act 2000* then the proposed development is classed as Integrated Development. Plans should be included in the EIS outlining all works within 40 metres of the high bank of a watercourse.

All development within 40 metres of the high bank should be in accordance with the Department of Primary Industries – Water's Guidelines for Controlled Activities.

- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

If you require clarification on any of the above please contact Christie Jackson on (02) 6763 1426 at the Tamworth office.

Yours sincerely,



Tracey Lawson
Manager Water Regulation North North Coast
27 October 2015

DPI Water General Assessment Requirements for general projects

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

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

Key Relevant Legislative Instruments

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

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

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979 (EP&A Act)*.
- No exemptions for volumetric licensing apply as a result of the *EP&A Act*.
- Basic landholder rights, including harvestable rights dams
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the *WMA 2000*

Water Act 1912 (WA 1912)

Key points:

- Volumetric licensing in areas where no water sharing plan applies
- Monitoring bores
- Aquifer interference activities that are not regulated as a water supply work under the *WMA 2000*.
- Flood management works
- No exemptions apply to licences or permits under the *WA 1912* as a result of the *EP&A Act*.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals

- Provides further detail on requirements for dealings and applications.

Water Sharing Plans – these are considered regulations under the *WMA 2000*

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

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

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

The EIS is required to:

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

Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

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

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)

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

DPI Water policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>

<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

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

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

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

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

Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

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

Surface Water Assessment

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

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

- planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Groundwater Assessment

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

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

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

- The known or predicted highest groundwater table at the site.
- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.
- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

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

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

Groundwater Dependent Ecosystems

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

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

Watercourses, Wetlands and Riparian Land

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

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
- A detailed description of all potential impacts on the watercourses/riparian land.

- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.

Landform rehabilitation

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

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.

Consultation and general enquiries

General licensing enquiries can be made to Advisory Services:

water.enquiries@dpi.nsw.gov.au, 1800 353 104.

**End
Attachment A**

DOC15/414492-1
EAR ID No. 991
Date: 29th October 2015

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

Dear Ms Seed

RE Expansion of Wandoona Sand and Gravel Quarry, EAR ID No. 991

Thank you for your email (dated 19th October 2015) seeking advice from the Office of Environment and Heritage (OEH) regarding our requirements for the preparation of an Environmental Impact Statement (EIS) for the above proposal.

The background information provided indicates that the proposal will increase the size of the existing quarry by an unspecified area, and will include use of an access road that is located within 40m of the Mehi River.

OEH Role

OEH has responsibilities under the:

- *National Parks and Wildlife Act 1974* - namely the protection and care of Aboriginal objects and places, the protection and care of native flora and fauna and the protection and management of reserves; and the
- *Threatened Species Conservation Act 1995* which aims to conserve threatened species of flora and fauna, populations and ecological communities to promote their recovery and manage processes that threaten them.
- *Native Vegetation Conservation Act 2003* – ensuring compliance with the requirements of this legislation.
- OEH understands from the correspondence that the proposed activity is a Part 4 application pursuant to the *Environmental Planning and Assessment Act 1979 (EP&A Act)*, and has not been classified as State Significant Development. As such OEH only has a statutory role in assessing such an activity if the consent authority determines that:
 - a) the activity is likely to significantly affect a threatened species, population, ecological community, or its habitat, as listed under the *Threatened Species Conservation (TSC) Act 1995*; and/or

- b) An Aboriginal Heritage Impact Permit is required.

The *Environmental Planning and Assessment Act 1979 (EP&A Act)* and *Environmental Planning and Assessment Regulation 2000* require that the EIS should fully describe the proposal, the existing environment and impacts of the proposal. It is the responsibility of the proponent and consent authority to adequately consider the requirements under the *EP&A Act and Regulation*.

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

This letter directs you primarily to our generic guidance material. However please note that it is up to the proponent (and later the consent/determining authority after appropriate consultation) to determine the detail and comprehensiveness of the surveys and level of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the level of investigation. It is important that all conclusions are supported by adequate data.

OEH Requirements

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

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

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

Flora, Fauna and Threatened Species

A copy of our generic Environmental Assessment Guidelines are included in Attachments A and B. These guidelines address requirements under the *EP&A Act* and OEH's areas of responsibility relating to flora, fauna and threatened species, populations and ecological communities and their habitats.

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

Negative impacts to native vegetation (eg clearing) should be avoided where possible. Where impacts cannot be avoided, the EIS should detail how a "maintain or improve" outcome for biodiversity will be achieved. BioBanking provides a voluntary mechanism through which this can be achieved. The BioBanking Assessment Methodology allows quantification of impacts and assessment of the value of offset areas and associated management regimes for those areas. The BioBanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process. Information about BioBanking is located on OEH's website at <http://www.environment.nsw.gov.au/biobanking/>.

Cultural Heritage

The importance of protecting Aboriginal Cultural Heritage is reflected in the provisions under Part 6 of the *NP&W Act 1974*, as amended. That Act clearly establishes that Aboriginal objects and places are protected and may not be harmed, disturbed or desecrated without appropriate authorisation. Importantly, approvals under Parts 4 and 5 of the *EP&A Act 1979* do not absolve the proponent of their obligations under the *NP&W Act 1974*.

Under the *NP&W Act 1974*, it is the responsibility of each individual proposing to conduct ground disturbance works to ensure that they have conducted a due diligence assessment to avoid harming Aboriginal objects by the proposed activity. OEH has produced a generic due diligence process, which

is not mandatory to follow, however any alternative process followed must be able to demonstrate their process was reasonable and practicable in attempts to avoid harm to Aboriginal objects.

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

Further advice regarding Aboriginal cultural heritage can be found on the OEH web-site at: <http://www.environment.nsw.gov.au/licences/achregulation.htm>. and within guidance documents listed in Attachment 2.

Should you require further information please contact Liz Mazzer Conservation Planning Officer on (02) 68835325 or email liz.mazzer@environment.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'S Ardill'.

SONYA ARDILL
Team Leader Planning, North West Region
Regional Operations

Contact officer: Liz Mazzer
02 6883 5325

ATTACHMENT A

Office of Environment and Heritage

EIS Requirements for the expansion of Wandoona Sand and Gravel Quarry

1. Environmental impacts of the project

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

- **Cumulative impact**
- **Aboriginal cultural heritage**
- **Biodiversity**

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

2. Cumulative Impact

The cumulative impacts from all clearing activities and operations, associated edge effects and other indirect impacts on cultural heritage, biodiversity and OEH Estate need to be comprehensively assessed in accordance with the *Environmental Planning and Assessment Act 1979*.

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

3. Aboriginal cultural heritage

The EIS report should contain:

- a. A description of the Aboriginal objects and declared Aboriginal places located within the area of the proposed development.
- b. A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposed development, and the significance of these values for the Aboriginal people who have a cultural association with the land.
- c. A description of how the requirements for consultation with Aboriginal people as specified in clause 80C of the *National Parks and Wildlife Regulation 2009* have been met.
- d. The views of those Aboriginal people regarding the likely impact of the proposed development on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
- e. A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified, and the need apply for a Aboriginal Heritage Impact Permit (AHIP).

- f. A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
- g. A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.
- h. A specific Statement of Commitment that the proponent will complete an Aboriginal Site Impact Recording Form and submit it to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through the proposed development.

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

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

Notes:

- i. An *Aboriginal Site Impact Recording Form* (<http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm>) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.
- ii. Under section 89A of the *National Parks and Wildlife Act 1974*, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar (<http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm>), for each Aboriginal site found during investigations.

4. Biodiversity

Biodiversity impacts can be assessed using **either**:

- The BioBanking Assessment Methodology (scenario 1) **or**
- A detailed biodiversity assessment (scenario 2).

The requirements for each of these approaches are detailed below.

The BioBanking Assessment Methodology can be used either to obtain a BioBanking statement, or to assess impacts of a proposal and to determine required offsets without obtaining a statement. In the latter instances, if the required credits are not available for offsetting, appropriate alternative options may be developed in consultation with OEH officers.

Note:

- i. The Shire may be listed in Schedule 1 of **SEPP No. 44 - Koala Habitat Protection**. If so, the requirements of the SEPP regarding Koala habitat protection should also be considered by the proponent.

SCENARIO 1 - Where a proposal is assessed using the BioBanking Assessment Methodology (BBAM)

1. Where a BioBanking Statement is being sought under Part 7A of the *Threatened Species Conservation Act 1995* (TSC Act), the assessment must be undertaken by an accredited BioBanking assessor (as specified under Section 142B (1)(c) of the TSC Act 1995) and done in accordance with the *BioBanking Assessment Methodology* (OEH, 2014). To qualify for a BioBanking Statement a proposal must meet the 'improve or maintain' standard.
- 1a. The EIS should include a specific Statement of Commitments that reflects all requirements of the BioBanking Statement including the number of credits required and any DG approved variations to impact on Red Flags.
2. Where the BioBanking Assessment Methodology is being used to assess impacts of a proposal and to determine required offsets, and a BioBanking Statement is not being obtained, the EIS should contain a detailed biodiversity assessment and all components of the assessment must be undertaken in accordance with the *BioBanking Assessment Methodology* (OEH, 2014).
- 2a. The EIS should include a specific Statement of Commitments which:
 - is informed by the outcomes of the proposed BioBanking assessment offset package;
 - sets out the ecosystem and species credits required by the BioBanking Assessment Methodology and how these ecosystem and/or species credits will be secured and obtained;
 - if the ecosystem or species credits cannot be obtained, provides appropriate alternative options to offset expected impacts, noting that an appropriate alternative option may be developed in consultation with OEH officers and in accordance with OEH policy;
 - demonstrates how all options have been explored to avoid red flag areas; and
 - includes all relevant 'BioBanking files (e.g. *.xml output files), data sheets, underlying assumptions (particularly in the selection of vegetation types from the vegetation types database), and documentation (including maps, aerial photographs, GIS shape files, other remote sensing imagery etc.) to ensure that the OEH can conduct an appropriate review of the assessment.
3. **Where appropriate**, likely impacts (both **direct** and **indirect**) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* or any marine and estuarine protected areas under the *Fisheries Management Act 1994* or the *Marine Parks Act 1997* should

be considered. Please refer to the *Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water* (DECCW, 2010).

4. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the assessment should identify and assess any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

SCENARIO 2 - Where a proposal is assessed outside the BioBanking Assessment Methodology

1. The EIS should include a detailed biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters included in the following sections.
2. A field survey of the site should be conducted and documented in accordance with relevant guidelines, including:
 - the *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna -Amphibians* (DECCW, 2009);
 - *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004); and
 - Threatened species survey and assessment guideline information on www.environment.nsw.gov.au/threatenedspecies/surveyassessmenttgdlns.htm.
 - Commonwealth survey requirements (birds, bats, reptiles, frogs, fish and mammals): <http://www.environment.gov.au/topics/environment-protection/environment-assessments..> These are relevant when species or communities listed under the *Environment Protection and Biodiversity Conservation Act* are present.

It is preferable for proponents to use the Interim Vegetation Mapping Standard data form to collect the vegetation plot data for the project site, and any offset site associated with the project. This will provide data that is useful for vegetation mapping as well as in the BioBanking Assessment Methodology. This is available at <http://www.environment.nsw.gov.au/research/VISplot.htm>.

If a proposed survey methodology is likely to vary significantly from the above methods, the proponent should discuss the proposed methodology with the OEH prior to undertaking the EIS, to determine whether the OEH considers that it is appropriate.

Recent (less than five years old) surveys and assessments may be used. However, previous surveys should not be used if they have:

- been undertaken in seasons, weather conditions or following extensive disturbance events when the subject species are unlikely to be detected or present, or
- utilised methodologies, survey sampling intensities, timeframes or baits that are not the most appropriate for detecting the target subject species,

unless these differences can be clearly demonstrated to have had an insignificant impact upon the outcomes of the surveys. If a previous survey is used, any additional species listed under the TSC Act since the previous survey took place, must be surveyed for.

Determining the list of potential threatened species for the site must be done in accordance with the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004).

The OEH Threatened Species website <http://www.environment.nsw.gov.au/threatenedspecies/> and the *Atlas of NSW Wildlife* database must be the primary information sources for the list of threatened species present.

The Vegetation Types database (available via the OEH website at <http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm>, and other data sources (e.g. PlantNET, Online Zoological Collections of Australian Museums (<http://ozcam.org.au/>), previous or nearby surveys etc.) may also be used to compile the list.

Other reference literature may be available for the subject locality/region. The proponent should explore this possibility thoroughly.

3. The EIS should contain the following information as a minimum:

- a. Description and geo-referenced mapping of study area (**and associated spatial data files**), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area. Separate spatial files (.shp format) to be provided to the OEH should include, at a minimum, shapefiles of the project site, impact footprint, vegetation mapping and classification for both the impact and any offset site(s);
- b. Description of survey methodologies used, including timing, location and weather conditions, and a comparison of survey effort (in tabular form) with that recommended in the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004). Where survey effort is not consistent with those guidelines justification must be provided;
- c. Detailed description of vegetation communities (including classification and methodology used to classify) and including all plot data. Plot data should be supplied to the OEH in electronic format (eg MS-Excel) and organised by vegetation community;
- d. Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the EIS;
- e. Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status;
- f. Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including **direct** and **indirect** and **construction** and **operation** impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor;
- g. Identification of the **avoidance**, **mitigation** and **management measures** that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed;
- h. Description of the residual impacts of the proposal. **If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected** (see the requirements for this at point 6 below); and
- i. Provision of specific Statement of Commitments relating to biodiversity.

4. An assessment of the significance of **direct** and **indirect** impacts of the proposal must be undertaken for threatened biodiversity **known or considered likely to occur** in the study area based on the presence of suitable habitat. The Assessment of Significance is a statutory mechanism which allows decision makers to assess whether a proposed development or activity is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats. This assessment must take into account:

- a. the factors identified in s.5A of the EP&A Act¹; and
 - b. the guidance provided by *The Threatened Species Assessment Guideline – The Assessment of Significance* (DECCW, 2007). This guideline is available on the OEH website:
<http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf>
5. Where an offsets package is proposed by a proponent for impacts to biodiversity (and a BioBanking Statement has not been sought) this package should:
- a) Meet the OEH's *Principles for the use of biodiversity offsets in NSW*², which are available at: <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>
 - b) Identify the conservation mechanisms to be used to ensure the long term protection and management of the offset sites; and
 - c) Include an appropriate Management Plan (such as vegetation or habitat) that has been developed as a key amelioration measure to ensure any proposed compensatory offsets, retained habitat enhancement features within the development footprint and/or impact mitigation measures (including proposed rehabilitation and/or monitoring programs) are appropriately managed and funded.
6. **Where appropriate**, likely impacts (both **direct** and **indirect**) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* or any marine and estuarine protected areas under the *Fisheries Management Act 1994* or the *Marine Parks Act 1997* should be considered. Refer to the *Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water* (DECC, 2010).
7. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the assessment should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

¹ Following threatened species assessment via the Assessment of Significance, it may be necessary to prepare a **Species Impact Statement** (SIS). The proponent will need to prepare a SIS in the following circumstances:

- If (after having addressed Section 5A) the flora/fauna assessment concludes that there is likely to be a significant impact to threatened species, or
- The proposed development is likely to affect critical habitat declared under the TSC Act.

If a SIS is required, the proponent (not the consultant) must write to OEH for any formal requirements for the SIS that may be deemed appropriate. The SIS must then be prepared in accordance with these requirements and provided to the OEH. In some instances the Minister for the Environment will also need to be consulted for approval.

Methods to reduce the impact on the protected and threatened species should be considered fully, and are considered an integral requirement within any SIS document.

Conducting an Assessment of Significance or an SIS according to the provisions of the *EP&A Act* and the *TSC Act* is a complex task and should be undertaken by suitably qualified person(s).

² **Please note** that the OEH's *Principles for the use of biodiversity offsets in NSW* ('the Principles') require offsets to be based on a **quantitative assessment** of the loss in biodiversity from the proposal and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable, and used for calculating both the impact and offset sites. Even where a proponent does not intend to use the BioBanking Assessment Methodology and Credit Calculator (Scenario 1), use of a **suitable alternative metric**, justified in the EA, is necessary to demonstrate that the proposal is consistent with the Principles. Ultimately the proponent is expected to demonstrate quantitatively that the biodiversity losses associated with the project will be adequately compensated for by the improvement in vegetation condition and security expected from the offset site. This cannot be properly determined by a hectare comparison alone.

Attachment B – Guidance Material

Title	Web Address
<i>Commonwealth Environment Protection & Biodiversity Conservation Act 1999</i>	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
<i>Environmental Planning and Assessment Act 1979</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
<i>Fisheries Management Act 1994</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
<i>National Parks and Wildlife Act 1974</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
<i>Threatened Species Conservation Act 1995</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
<i>Water Management Act 2000</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N

Aboriginal Cultural Heritage

Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (2005)	Available from DoPI.
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Due Diligence Code for the Protection of Aboriginal Objects in NSW (DECCW 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHiMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHiMSRegistrar.htm

Biodiversity

BioBanking Assessment Methodology (OEH, 2014)	http://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)	http://www.environment.nsw.gov.au/biobanking/calculator.htm
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna –Amphibians (DECCW, 2009)	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Survey requirements (birds, bats, reptiles, frogs, fish and mammals) for species listed under the EPBC Act	http://www.environment.gov.au/topics/environment-protection/environment-assessments
OEH Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/

Atlas of NSW Wildlife	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org.au/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm

**PLANNING : Request for EIS Requirements – Expansion of Wandoona Quarry
- EAR ID No. 991 (Moree Plains LGA)**

Kharl Turnbull [Kharl.Turnbull@epa.nsw.gov.au]

To:

Gen Seed

Cc:

Rebecca Scrivener [Rebecca.Scrivener@epa.nsw.gov.au]

Attachments:

(2)Download all attachments

SEE.pdf (8 MB)[Open as Web Page]; Form A.pdf (3 MB)[Open as Web Page]

Hi Gen

I note that the proposal does not trigger a requirement for an Environment Protection Licence from the EPA for either of the scheduled activities of Crushing, grinding or separating or Extractive activities as no more than 29,000 tonnes per annum will be extracted/ crushed. Consequently, the EPA will not be issuing any requirements for the EIS and has no further comment on the proposal.

Regards

Kharl Turnbull

A/ Senior Operations Officer- North Branch | NSW Environment Protection Authority |
Phone (: (02) 6773 7000 | Fax 7: (02) 6772 2336 | 8 kharl.turnbull@epa.nsw.gov.au

Please Note: The EPA has introduced an electronic document management system. Please electronically submit all letters and documents for the EPA's Armidale office to our email address: armidale@epa.nsw.gov.au. If you wish to submit a larger document (i.e. more than 10 mb in size) please provide us with an electronic copy via an alternative download method; or on a USB memory stick or DVD to: "EPA, PO Box 494, Armidale NSW 2350".

Appendix 4 – Environmental Noise Impact Assessment



advitech

Report

Wandoona Quarry

Environmental Noise Impact Assessment

SMK Consultants

11 February, 2016

Rev 0 (Final)

Report Details

Wandoona Quarry - Environmental Noise Impact Assessment

Filename: 14303 Wandoona Quarry - Noise Impact Assessment Rev0

Job #: J0150410 Folder #: F14303

Revision: 0 (Final), Date: 11 February, 2016

Prepared For

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History

Date	Revision	Comments
9/02/2016	B	Draft
11/2/2016	0	Final Issue

Endorsements

Function	Signature	Name and Title	Date
Prepared By	 Signed in his absence in accordance with Advitech QMS Policy 3.02	Ian Guy Senior Acoustic Consultant (M.A.A.S)	11 February, 2016
Checked By		Clayton Sparke Senior Environmental Scientist (M.A.A.S)	11 February, 2016
Authorised for Release By		Clayton Sparke Senior Environmental Scientist (M.A.A.S)	11 February, 2016

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TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	Background	1
1.2	Site Location and Surrounding Land Use	1
1.3	Sensitive Noise Receivers	3
2.	REFERENCES	3
3.	NOISE ASSESSMENT CRITERIA	4
3.1	Assessing Industrial Noise Sources	4
4.	OPERATIONAL NOISE IMPACTS	5
4.1	Project Specific Noise Levels	5
4.2	Modelling Methodology	5
4.3	Noise Sources	5
4.4	Assumptions of the Model	6
4.5	Results	7
5.	CONCLUSION	8

APPENDICES

APPENDIX I

Noise Impact Contours

1. INTRODUCTION

Advitech Pty Limited (trading as Advitech Environmental) was engaged by SMK Consultants on behalf of Johnstone's Concrete and Quarries (JCQ) to prepare an Environmental Noise Impact Assessment (ENIA) for Wandoona Quarry owned and operated by JCQ. The ENIA forms part of the development and operation of a sand and gravel quarry, including a screening and washing plant operation on the property located on Lot 5 in DP 236547, Gwydirfield Road, Moree, to be lodged with the Moree Plains Council.

The purpose of this assessment was to conduct an environmental noise assessment of the Wandoona Quarry operations and determine the potential acoustic impact on the local community in accordance with the requirements of Moree Plains Council and to comply with the requirements of the NSW Industrial Noise Policy (INP).

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

1.1 Background

JCQ are presently preparing a development application to be lodged with the Moree Plains Council to obtain approval to operate a sand and gravel quarry on Lot 5 in DP236547. The proposal will involve extraction of sand and gravel materials from this lot, screening and washing the gravel on site through portable equipment, and haulage of product from the site to JCQ's ready mixed concrete plant located on Inverell road in Moree.

The property had up until the late 1970's been utilised for commercial extraction of sand and gravel materials. Lesser amounts of material have been extracted from the property up until the mid-2000's when the property changed hands. The property is located to the east of the Gwydirfield rural residential area, and is presently utilised for cultivation of dryland crops and grazing.

The proposed development aims to produce 15,000 tonnes of sand and gravel each year to supply the ready mixed concrete operation run by JCQ. The 15,000 tonne production rate has been established on the basis of annual average requirements of JCQ over the past 15 years. On occasion, the annual requirement is lower than 15,000 tonne and on occasions exceeds 15,000 tonne. Notwithstanding this, and so as to not constrain the quarry operations, the objective of this NIA is to evaluate potential noise impacts associated with operation of plant capable of producing on the order of 28,000 to 29,000 tonne per annum.

1.2 Site Location and Surrounding Land Use

The property is located in the Gwydirfield area of Moree. **Figure 1** presents an aerial image of the area showing the location of the stationary screening and washing plant and the surrounding rural and rural residential area.



Figure 1: Locality Map (Source: SMK Consultants) Proposed Development

1.3 Sensitive Noise Receivers

Figure 3 presents an aerial photograph of noise sensitive receivers in the surrounding rural district. The nearest residence (Residence 1) not associated with the proposal is located approximately 630 metres south of the quarry processing plant location. The next closest receiver group (receivers 2 to 6) are located further west of the main quarry operations; these receivers are more likely to be impacted by the intermittent gravel pit operations.



Figure 2: Sensitive Noise Receivers

2. REFERENCES

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

1. SMK Consultants Project Work Request - Noise Impact Assessment for Johnstone Concrete and Quarries Pty Ltd - Wandoona Quarry expansion dated 8 December 2015;
2. NSW Environment Protection Agency (2000). *NSW Industrial Noise Policy*, NSW Environment Protection Agency, Sydney; and
3. NSW Department of Environment, Climate Change and Water (2011). *NSW Road Noise Policy*, NSW Department of Environment, Climate Change and Water, Sydney.

3. NOISE ASSESSMENT CRITERIA

3.1 Assessing Industrial Noise Sources

3.1.1 Project Specific Noise Levels

The NSW Industrial Noise Policy (INP) presents a methodology for determining Project Specific Noise Levels (PSNL) for industrial development. On 28 January 2016 during a telephone conversation, the Moree Plains Council provided direction to the assessment of the existing noise environment adjacent to the development site, and determined the PSNL relevant to the proposed development. It was considered and agreed that the noise criteria be set at 35dBA_{Leq} for the assessment of impacts associated with the proposed development. This criteria is conservatively applied, and represents the most stringent impact assessment criteria level that is generally permitted under the INP.

3.1.2 Assessment Periods

Noise generated by the project will be measured and evaluated in accordance with the relevant requirements and exemptions of the NSW Industrial Noise Policy (INP). The INP states:

- Day is defined as the period from 7am to 6pm Monday to Saturday, and 8am to 6pm Sundays and public holidays;
- Evening is defined as the period from 6pm to 10pm; and
- Night is defined as the period from 10pm to 7am Monday to Saturday, and 10pm to 8am Sundays and public holidays.

3.1.3 Evaluating Noise Impacts

The INP presents the following procedure to evaluate noise impacts from an industrial noise source:

- Identify all possible source, site and receiver parameters so that noise can be adequately predicted;
- Predict noise levels from the source at receiver locations, taking into account all important parameters including the source noise levels and locations, operating times, receiver locations, weather conditions applicable to the site, site features and topography, as well as the project-specific noise levels; and
- Compare the predicted noise level with the project-specific noise levels to determine the noise impact.

The INP requires noise impacts to be quantified at all potentially affected receivers. Specifically, the noise levels predicted should correspond to the noise descriptor of the project specific noise levels applicable to the project. Any assumptions made when determining descriptors should be clearly validated and reported in the noise assessment.

4. OPERATIONAL NOISE IMPACTS

4.1 Project Specific Noise Levels

As stated in **Section 3.1.1**, the PSNL adopted was $35\text{dBA}_{\text{Leq}}$ for the assessment of impacts associated with the proposed development over the daytime assessment period.

4.2 Modelling Methodology

Prediction of the cumulative $L_{\text{Aeq},15\text{-minute}}$ noise level resulting from the proposed development was undertaken by modelling noise sources using the Predictor (Type7810) software. The Predictor software package calculates the noise level at specified receiver locations (Single Point Calculation) and generates noise level contours over a defined area (Contour Calculation).

The predicted noise levels are then compared against the project specific noise levels. If the project specific noise levels are exceeded, feasible and reasonable noise mitigation strategies will need to be assessed for the proposed development, to ensure compatibility with the existing noise environment.

The proposed development is planned to operate between the hours of 7am and 5pm, Monday to Friday and 7am to 1pm on a Saturday. The site is not proposed to operate during the more sensitive evening, night periods (or Sundays). Consequently, noise impacts are assessed only against the project specific noise levels for the Day period.

4.3 Noise Sources

The modelled impact of the proposed operation was based on the Sound Power Level (SWL) and location of noise sources within the project, as shown in the project layout (**Figure 1**). **Figure 2** provides a photograph of the sand sieve processing plant and stockpile area established on the quarry site.



Figure 3: Sand Sieve Processing Plant & Stockpile Area

The mechanical plant octave band SWLs applied to the model were calculated from field measurements of current fixed plant infrastructure and of the mobile plant, including transportation vehicles, utilised at typical quarry operations. The SWLs of noise sources used in the model are presented in **Table 1**.

Table 1: Representative source noise levels

Description	SWL, dB(A)
Terex Findlay Sand Sieve	108
Agison Water Pump	105
Processed Sand Loading Operations	103
Road Train Movements	107
Caterpillar 962H Loader	100
Komatsu PC300 Excavator	104
Caterpillar 773 Rear Dump Truck	112
Sand Pit Operations	106
Gravel Pit Operations	108

The model presents a worst case noise impact for proposed operations, comprising:

- Processing Plant and Stockpile Operations and associated Water Pump Operations;
- Sand or Gravel Pit Operations (extraction of materials);
- Haul trucks transporting products from sand pit to processing plant area; and
- Road Trains hauling processed sand and gravel products.

It is noted that extraction activities in the sand and gravel pits are not proposed to occur simultaneously, hence operations scenarios are based on either sand-pit or gravel-pit operations (plus associated supporting activities relevant to that operation). Impact predictions are provided on the basis of the $L_{Aeq,15\text{minute}}$ criteria, and assume that all sources relevant to the operations scenario are active within any single 15 minute period.

4.4 Assumptions of the Model

The following assumptions are implicit in the noise model:

- Noise emissions were modelled as a worst case noise level from the proposed Wandoona Quarry site. The model assumes noise is emitted as:
 - a point source from each of the specified fixed plant noise sources; and
 - as moving point sources for mobile plant and transportation vehicles;
- The plant layout was based on the Wandoona Quarry site arrangement provided in **Figure 1** and from Advitech staff observation during the quarry site inspection.
- Sound Power Level (SWL) and location of noise sources within the project are consistent with the site arrangement and representative source noise levels provided in **Table 1**.
- Worst case meteorological propagation scenario was applied to the model in accordance with Section 5.1 of the INP. Propagation was assessed under the following meteorological scenarios:

- Neutral (calm) conditions; and
- Worst case gradient wind (source to receiver wind at 3m/s).
- the following operational scenarios are considered and include the following noise sources:
 - Sand and Gravel Pit quarrying operations - processing plant (Sand Sieve, Water Pump, Loader), loading of material from stockpiles into transport trucks (Loader, Road Train) and transport offsite via Access Road and Sand and Gravel pit operations (Excavator, Rear Dump Truck); and
 - Gravel Pit quarrying operations - processing plant (Sand Sieve, Water Pump, Loader), loading of material from stockpiles into transport trucks (Loader, Road Train) and transport offsite via Access Road and additional Gravel pit operations (Excavator, Road Train) located northwest of the specified Sand and Gravel pit.
- the following noise controls treatments were included in the noise assessment:
 - Agison Water Pump - wire mesh enclosure; replace southern façade of enclosure with a solid barrier;
 - Sand and Gravel Pit - acoustic barrier; install an earth mound on the eastern and southern sides of the pit. The height of the barrier is to be 3-metres above the noise source/s when the nominated plant (Excavator, Rear Dump Truck) is operating at any level within the pit area.
 - Gravel Pit - acoustic barrier; install an earth mound on the south-eastern side of the pit. The height of the barrier is to be 1-metre above the noise source/s when the nominated plant (Excavator/Loader, Road Train) is operating at any level within the pit area.
 - Processed sand and loading operations should be arranged such that Road Trains can be used as a temporary barrier between loader movements and Receiver 1.

4.5 Results

Table 2 presents the results of noise modelling associated with the Sand-pit operational scenario, while **Table 3** presents the results of noise modelling associated with the Gravel-pit operational scenario.

Table 2: Sand & Gravel Pit Operations - Predicted noise level, dB(A)

Noise Receiver	L _{Aeq,11hour} (Day) Amenity Noise Impact			Worst Case L _{Aeq,15min}
	Neutral Conditions	Worst Case (R1) (Northerly winds)	Worst Case (R2 to R6) (Easterly winds)	Intrusive Noise Impact
Receiver 1	32	35	35	36
Receiver 2	27	24	30	32
Receiver 3	26	23	29	31
Receiver 4	27	24	30	31
Receiver 5	27	24	30	32
Receiver 6	25	25	28	30

Table 3: Gravel Pit Operations - Predicted noise level, dB(A)

Noise Receiver	L _{Aeq,11hour} (Day) Amenity Noise Impact			Worst Case L _{Aeq,15min}
	Neutral Conditions	Worst Case (Northerly winds)	Worst Case (Easterly winds)	Intrusive Noise Impact
Receiver 1	32	34	34	36
Receiver 2	29	26	32	34
Receiver 3	29	25	32	33
Receiver 4	30	26	33	34
Receiver 5	30	29	33	34
Receiver 6	28	28	31	32

4.5.1 Assessment of Industrial Noise Impacts

Results of this assessment indicate that L_{Aeq,15minute} impacts associated with the proposed operations would not exceed the PSNL at noise sensitive receivers (R2 to R6) located to the West of Wandoona Quarry, under worst case meteorological conditions. However, continuous operations of all quarry plant and equipment within a worst case 1-hour period have the potential to impact on Receiver 1.

- A minor 1dB(A) intrusive noise impact may be expected at R1 due to the location of the Terex Findlay Sand Sieve and stockpile/loading operations;
 - it is noted that impact predictions for this activity are less than the 35dB(A) PSNL under neutral meteorological conditions.

Notwithstanding the above the acoustic energy produced by the Sand Sieve could be further reduced by the installation of a shield/barrier to specific components (vibratory screens, conveyors) of the sieve that directs its noise towards the nearest sensitive receiver (R1).

5. CONCLUSION

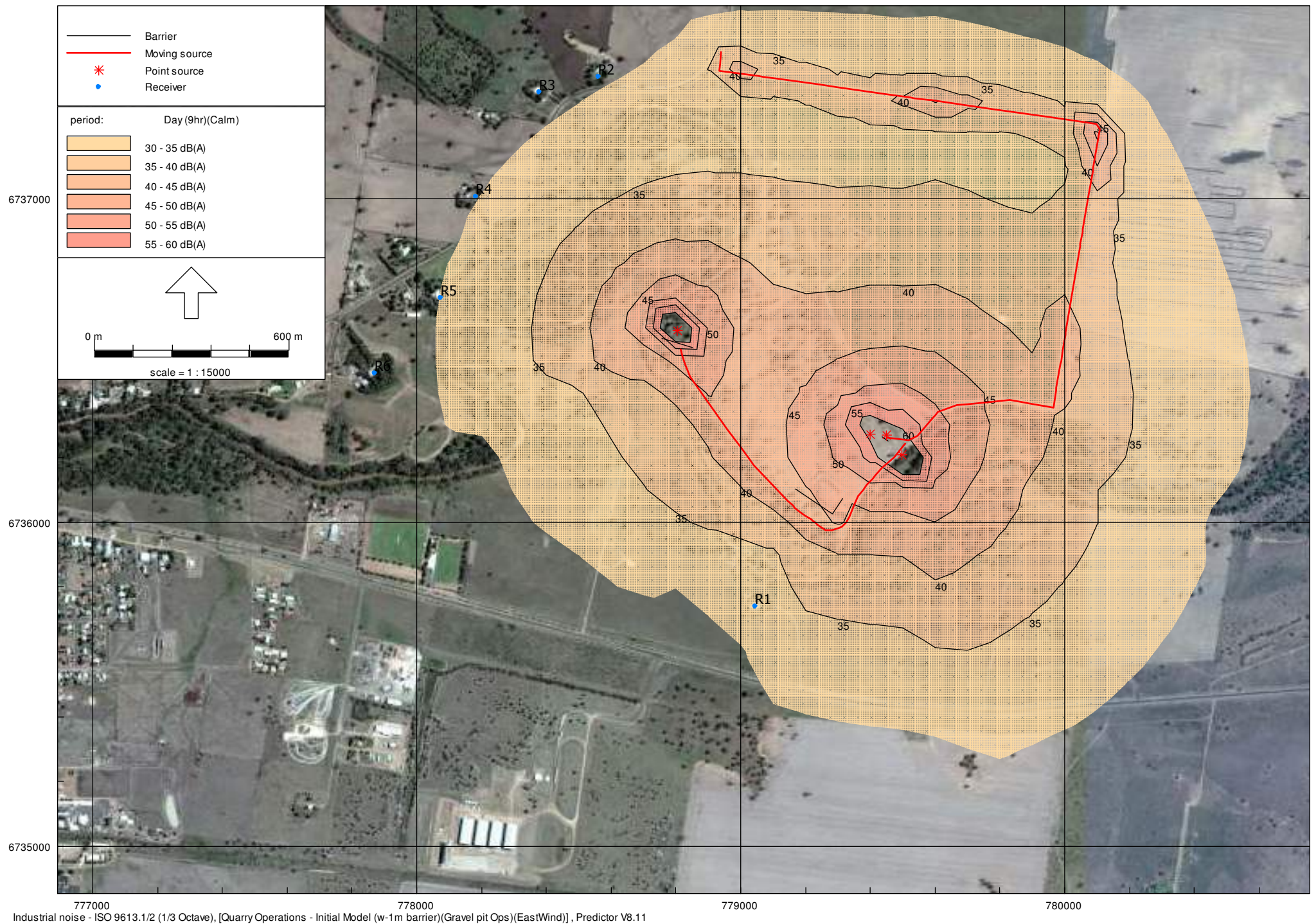
The acoustic impact of the proposed expansion of Wandoona Quarry operations is not predicted to exceed the adopted PSNL of 35dB_{A,Leq} at the noise sensitive receivers during typical quarry operations. Minimal acoustic impact is predicted at Receiver 1 under worst case quarry operations.

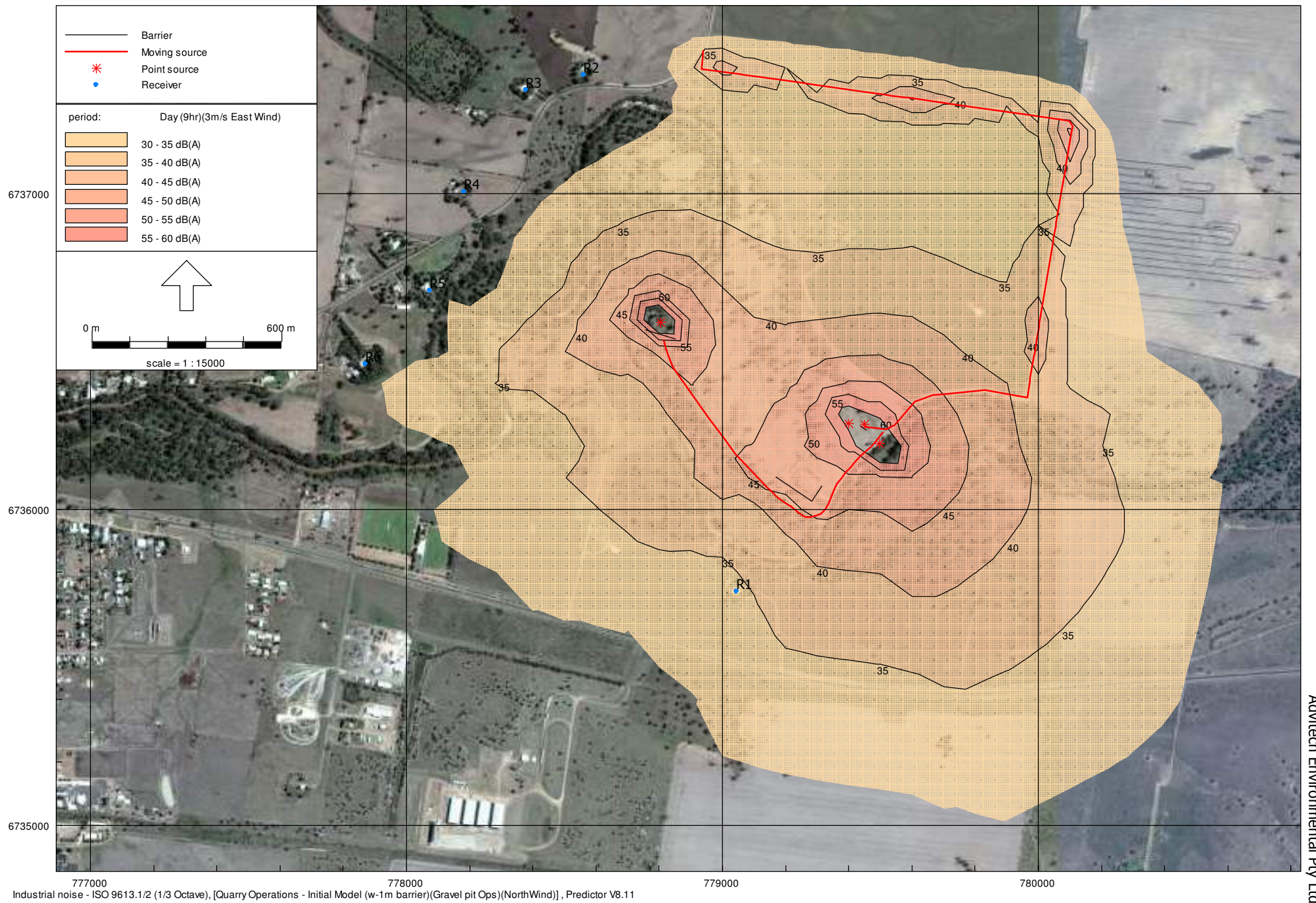
On the basis of JCQ's production requirements, it is considered that potential impacts at receiver R1 may be managed via application of effective noise controls to the Terex Findlay Sand Sieve and stockpile/loading operations.

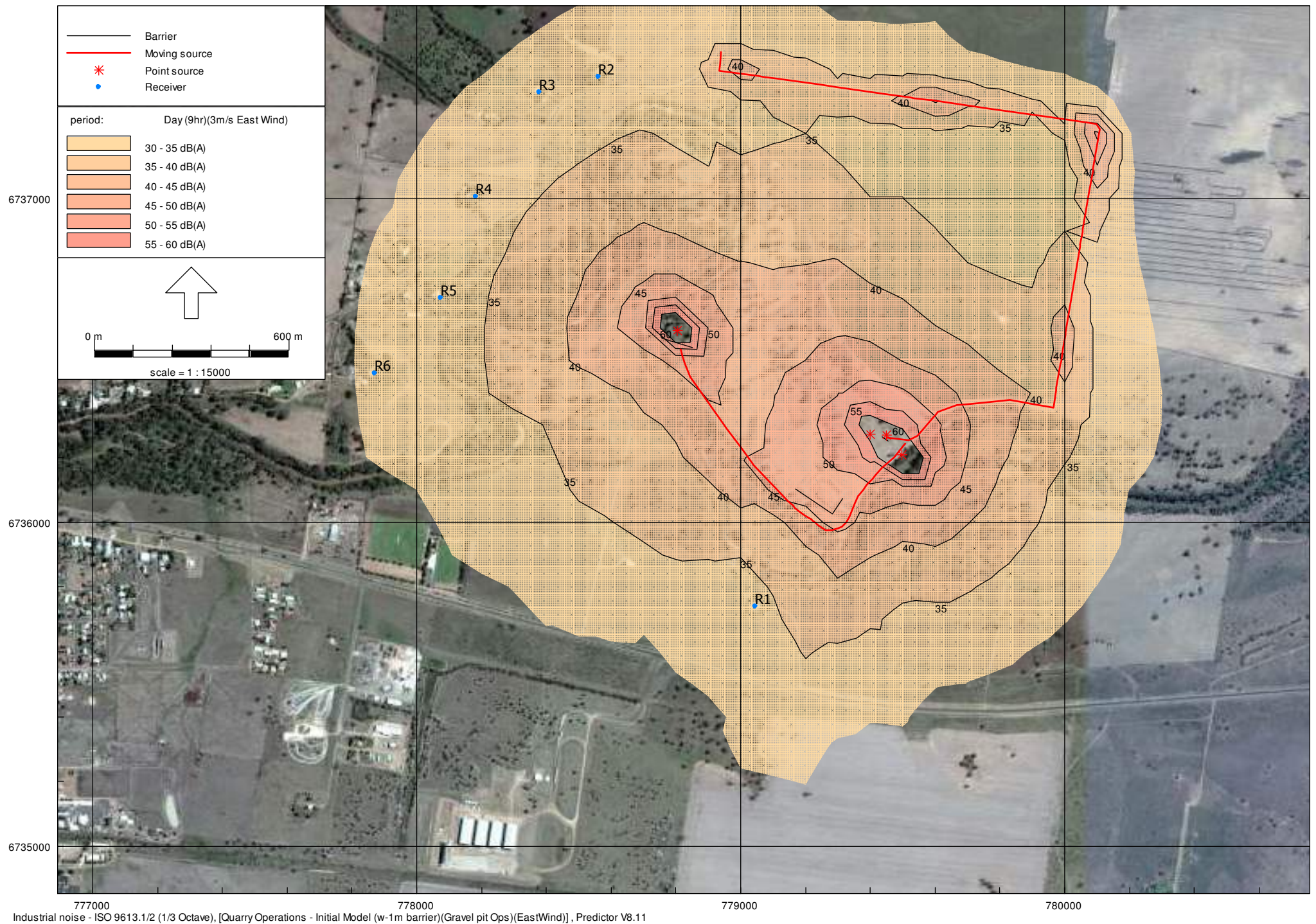


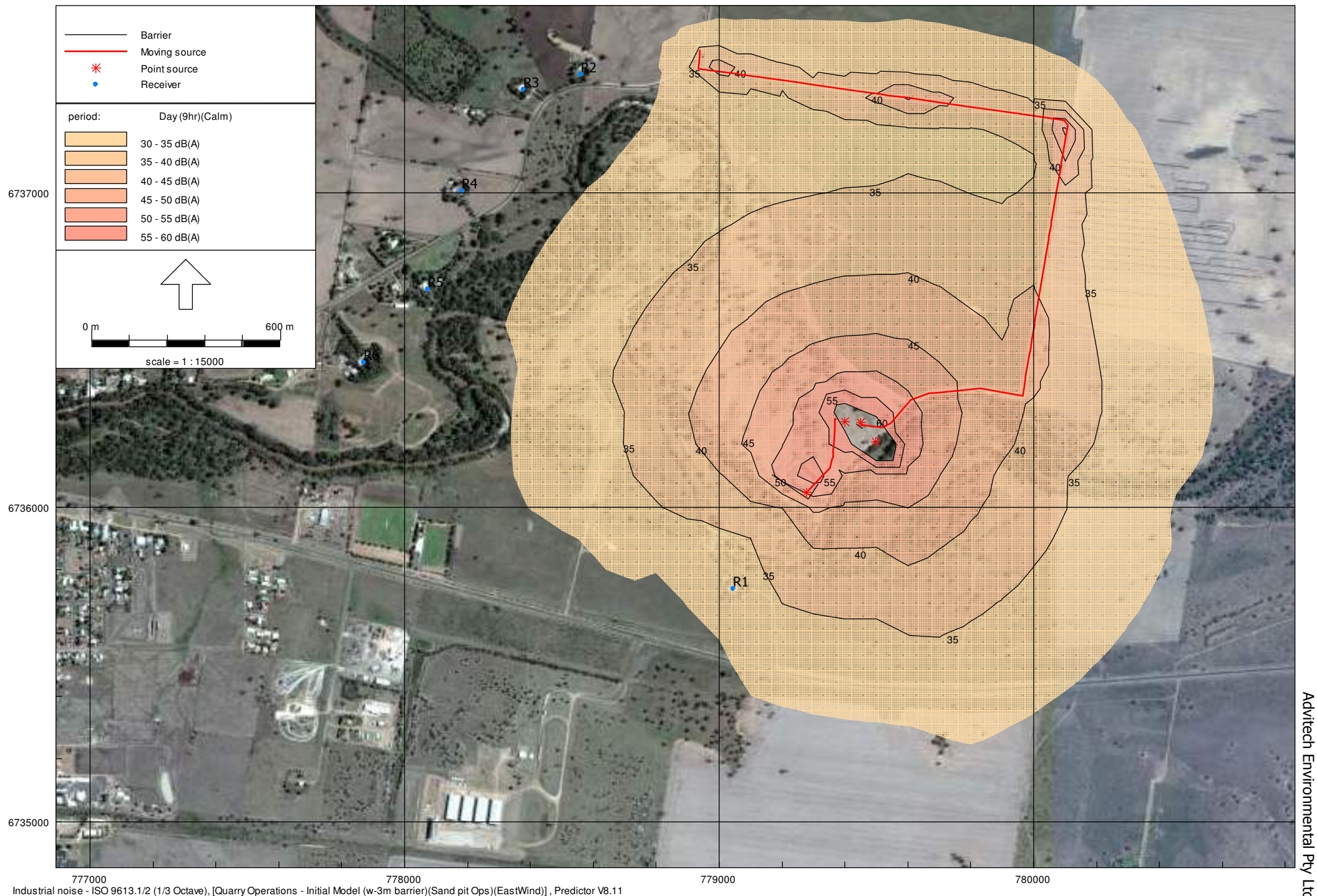
Appendix I

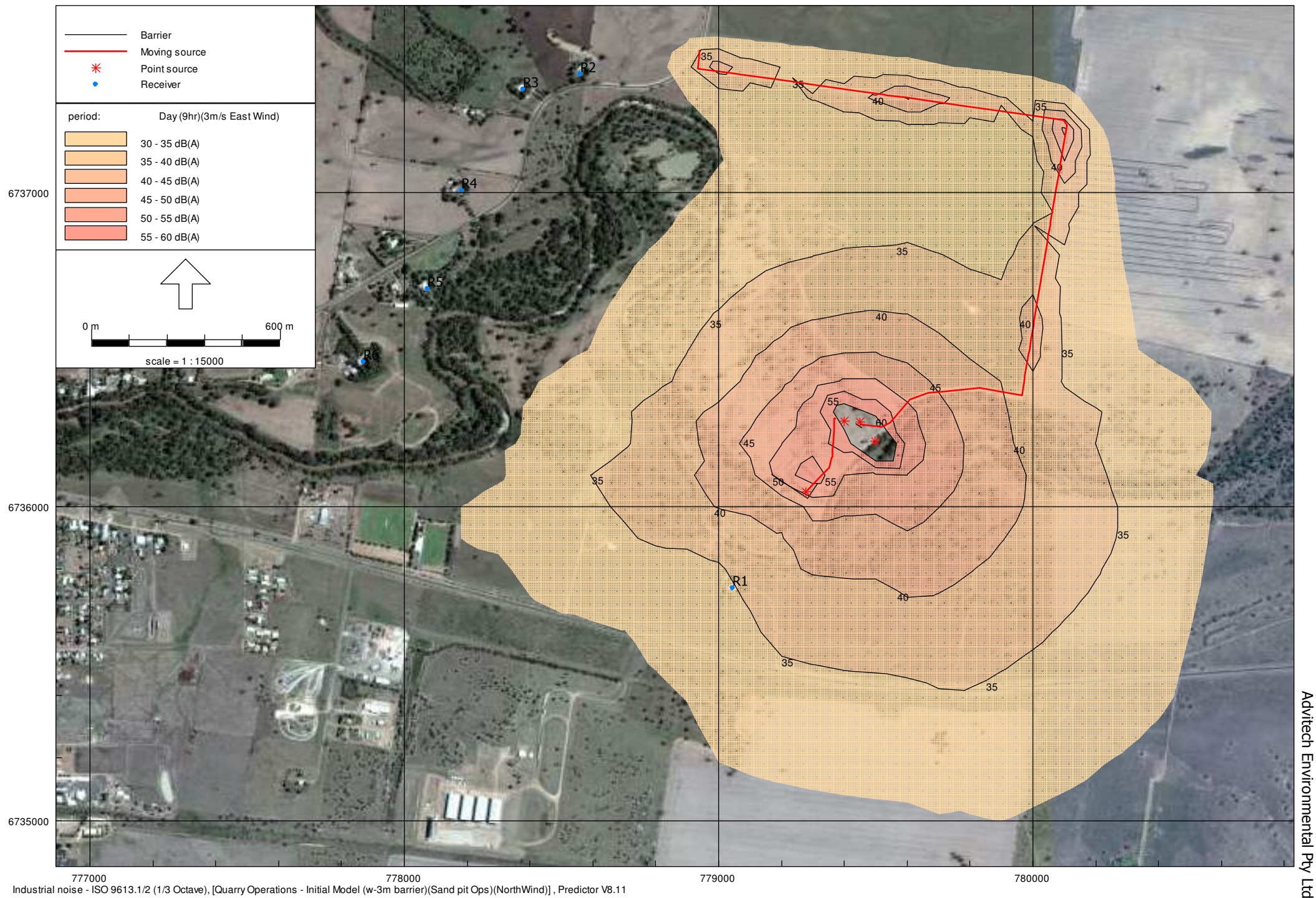
Noise Impact Contours

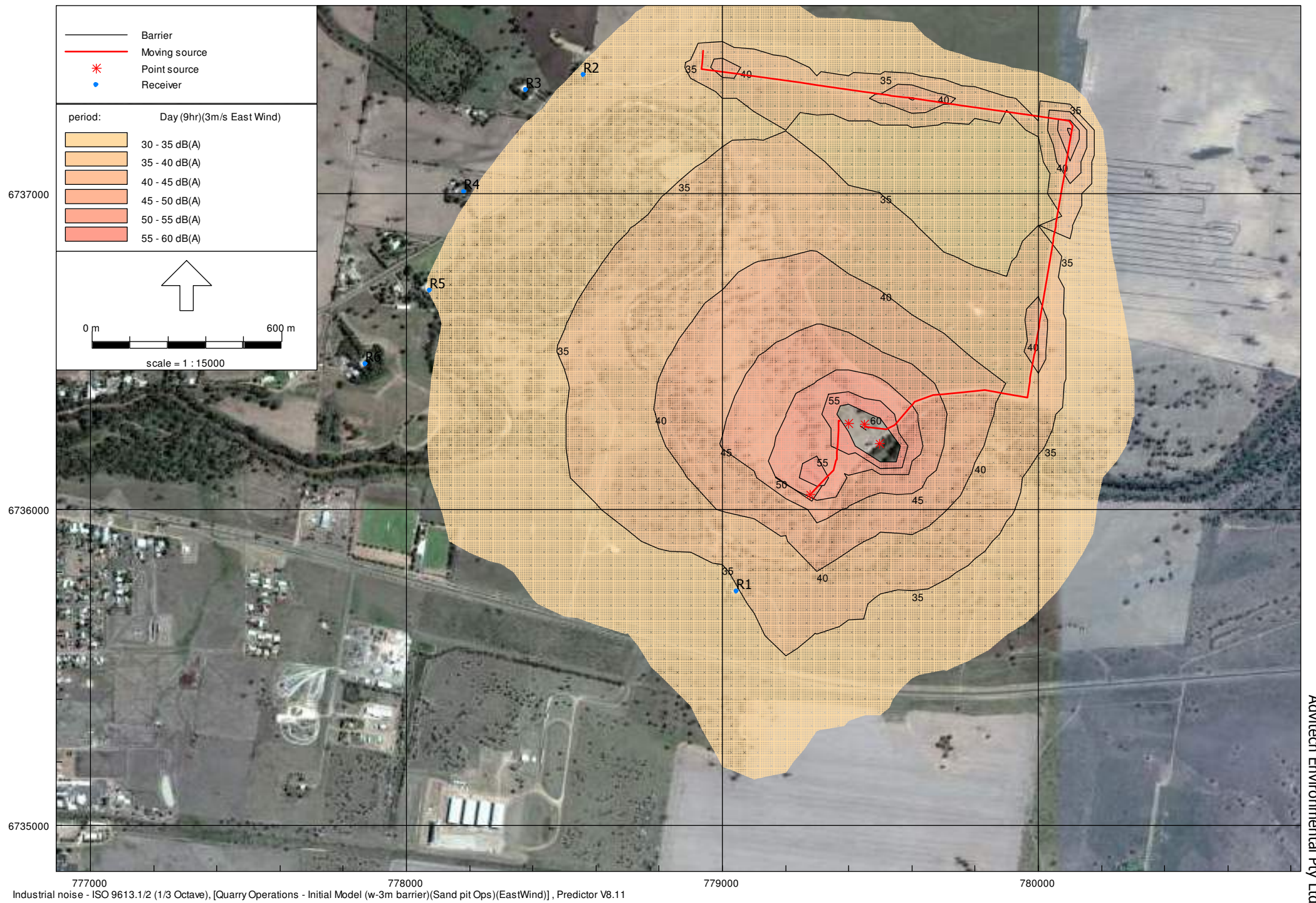












Appendix 5 – Contamination Assessment (SEPP 55)

SEPP 55

Contamination Assessment Report

for a

Proposed

Sand Quarry on Lot 5 DP 236547

Gwydirfield Road, Moree

**Prepared for: Johnstone Concrete and Quarries Pty Ltd
35 Drive In Road Moree NSW 2400
Contact: Mitchell Johnstone**

Prepared by: SMK Consultants
**39 Frome Street
Moree, NSW 2400**

February 2016

Introduction

SMK Consultants is acting on the behalf of Johnstone Concrete and Quarries Pty Ltd in lodging a Development Application for consent to expand their existing sand and gravel quarry operations at “Wandoona”, Lot 5 DP 236547, under the provisions of the Environmental Planning and Assessment Act 1979 (the Act) and Moree Plains Local Environmental Plan 2011 (the LEP).

As part of the assessment of the proposal, an investigation is required to assess the potential for contamination of the property in regard to State Environmental Planning Policy No 55 – Remediation of Land. The assessment involves determining whether contamination is present and whether that contamination poses a risk to the proposed development of the land or whether the land requires remediation.

Scope of Work

The proposal for the investigation was to initially carry out a ‘Preliminary Site Investigation’ to determine if any potential contamination existed. If contamination existed and was considered a risk to the intended land use, a detailed investigation would be required to then determine suitable remediation of the site.

The investigation is based on NSW Guidelines for investigation and assessment of contaminated land.

Site Details

The property is located 3.2 kilometres east of the Moree CBD. The Mehi River adjoins the lot along the southern boundary. The lot is presently utilised for the extraction of sand and gravel materials at designated pits. In addition to this, the areas unaffected by quarry operations continue to be used for rotational grazing (usually over a seasonal winter legume crop) or as cultivation country, dependent on seasonal variations. It is intended that farming practices will continue to occur during excavation of sand on large portions of the property which will be left unscathed.

Appendix 8 presents a topographical plan showing the proposed location. The land is zoned as RU1 – Primary Production. Land use is to remain the same. The area of the lot is 131.56 hectares. The property is known to experience inundation during a major flooding event for the Gwydir Valley.

Land Use

The site has been cleared considerably over multiple decades of grazing and cultivation practices occurring on the property. The vast proportion of trees throughout the lot are located in clumps along the river bank and are not intended to be affected by the proposed development. The land has been cultivated for an extended period of greater than 30-years.

No enterprises that are considered as potentially hazardous or users of hazardous material have been located on the land affected by this proposal for a period of 30-years or more. Land use over the past 30-years has included grazing and cultivation practices, along with the current sand and gravel extraction.

No present activity on the property was noted to be of concern in relation to contamination of the land.

Adjoining Land Use

The Site is located in an existing rural area and is bound by established farms and reserves. Houses are located on a few of these lots in a rural lifestyle setting. All these residences are some 750 metres or more away from the areas identified for extraction. Lots on the opposite side of the Mehi River include reserves which are used for grazing purposes. Activities carried out on the adjoining lands are similar to the present use of the subject land. On this basis, any contamination that may be present on the subject land could not be defined as resulting from onsite or offsite activity.

Investigation, Sampling and Analysis Plan

The object of the investigation was to determine whether contaminated areas existed on the property and whether these sites may impact on the proposed or future land use.

In accordance with EPA Guidelines, a Preliminary Site Investigation was undertaken. The investigation commenced with a review of historical land use and a review of aerial photography aimed at identifying potential sources of contamination. If potential source was identified, a field investigation would be required to determine a suitable sampling plan. If no dispersed or point source of contamination was found, the study would not require sampling. There was no point source or any other method of contamination observed through this process on the site.

Discussion and Recommendations

A review of land use and historical photography indicated that the property had been utilised for agricultural purposes, namely cultivation and grazing. No point sources or dispersed contamination from service chemicals or any additional type of activity was identified as a potential source of contamination on this land.

The investigation concluded that land use on this site in the past 30-years had not included potentially contaminating activity and therefore no identifiable risk is present to the proposal.

There are no further requirements for investigation of the property.

Limitations

This report is based on observation at the time of the investigation and history of the site provided by the property owner. The conclusions and recommendations are based on the scope of works adopted, the methodology presented in this report and the results of any laboratory analysis undertaken for this investigation. If contamination or suspected contaminants are encountered on the site, it is recommended that the site should be appropriately restricted and advice sought from a suitably qualified and experienced consultant/supervisor to assess the material to determine appropriate action for its management and removal prior to any further work on the site.

Appendix 6 – AHIMs Search Results

SMK Consultants

Date: 14 December 2015

P O Box 774

Moree New South Wales 2400

Attention: James Maxwell

Email: jmaxwell@smk.com.au

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 5, DP:DP236547 with a Buffer of 50 meters,
conducted by James Maxwell on 14 December 2015.**

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



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

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

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

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

Important information about your AHIMS search

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

Appendix 7 – Soil and Water Management Plan

Soil and Water Management Plan

Introduction

This Soil and Water Management Plan for the proposed increase in footprint of the Wandoona Quarry has been prepared in accordance with the Landcom document *Managing Urban Stormwater: Soils and Construction, Vol. 1, 4th eds.* (Landcom, 2004) (the 'Blue Book').

The SWMP incorporates:

For management purposes, the water within the development site has been divided into two classes.

"Clean" water - surface runoff from undisturbed catchments or relatively undisturbed by extraction, processing or related activities.

"Dirty" water - surface runoff from disturbed catchments such as the active extraction, sieving, stockpiling and loading areas which could produce significant concentrations of suspended sediment.

Soil and Water Management Principles

The principal objective of surface water management at the Wandoona Quarry is to reduce the potential for the transport of sediment off-site into the adjacent Mehi River and the flow-on impact of sedimentation on receiving waters. This is a standard objective of erosion and sedimentation designs and controls, and is achieved by implementing the following principles:

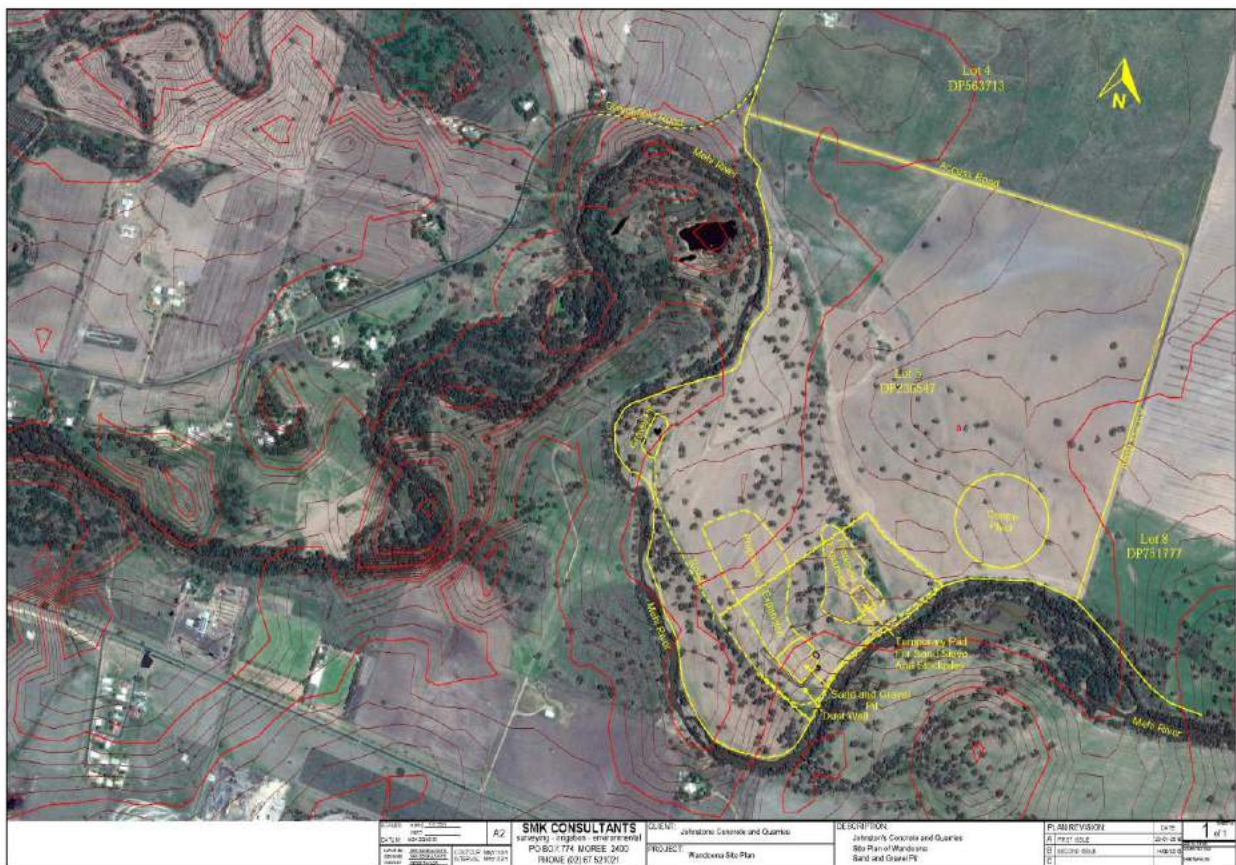
- Directing sediment-laden runoff into designated sediment control retention basins;
- Diverting 'clean water' runoff unaffected by the operations away from disturbed areas and off site; and
- Maintaining sediment control structures to ensure that the designed capacities are maintained for optimum settling of sediments.

Catchments of the development site

The proposed development is located adjacent to the Mehi River, which is a tributary of the Gwydir River and flows to the Barwon-Darling River system. The Mehi River is contained within the wider Gwydir catchment area. The Mehi River is typically utilised to supply irrigation water from Copeton Dam to irrigators west of Moree. The subject area drains into the Mehi River.

The existing site includes a sediment pond to capture direct runoff from the site and the proposed development will include an increase to the capacity of the sediment pond. If runoff from the site were to exceed the sediment pond capacity, the flow would have to travel approximately 1km along a slope of less than 0.5 % fall before it could enter the river. Water velocity would be less than 0.1 m/s which would enable deposition of the silt. The area between the sediment pond and the river is generally cropped and also contains areas of grass and other forbes. The grass and forbes would provide appropriate filtration of the sediment laden water to minimise potential silt impacts that may degrade water quality in the river. Cultivation of this area after the event would incorporate the silt into the topsoil. The quarry consists of a below ground

The following plan 1 presents an aerial image of the existing quarry site and the area identified for the extension of the quarry footprint to provide a 30-year resource of gravel for the applicant. The plan shows the contour lines within the subject area. All silt generated as a result of rainfall within the quarry area is captured and settled within active areas of the quarry or sediment ponds. It is therefore considered that there is minimal risk of sediment and silt entering the Mehi River.



Assessment of Constraints

Introduction

- on-site, i.e. relating to soils, landforms, ecology, pollutants and hydrology occurring on the site of the proposed or approved activities; or
- downstream, i.e. relating to aquatic ecosystem sensitivity and the social and aesthetic values of the community.

Based on the identified constraints and opportunities, best management practices (BMPs) have been developed for the site to minimise the potential degradation of soil and water resources and/or other aesthetic/environmental assets while maximising the achievement of outcomes in accordance with principles of Ecologically Sustainable Development (ESD). The recommended constraints to be addressed by the Blue Book are discussed in the sections below. These are in addition to the project-specific constraints discussed elsewhere in the EIS.

Riparian Lands

Waterfront Lands (formally known as Riparian Lands under the *Rivers and Foreshores Improvement Act 1948*) are those vegetated lands within 40 metres of waterbodies such as rivers, creeks, estuaries, lakes and wetlands. Development on riparian lands is constrained:

- to protect and enhance the social, economic, cultural, spiritual and heritage values of waterfront land for Aboriginal groups and the wider community; and
- to avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, salinity hazards and decline of native vegetation.

The approved extraction area is not within 40m of a river, creek, estuary, lake or wetland as defined by the Act. The access road comes within 40m of the Mehi River at points and any projected maintenance work will require an approval from DPI Water.

Erosion (Rainfall Erosivity & Soil Erodibility)

Rainfall Erosivity

The rainfall erosivity factor, R, is a measure of the ability of rainfall to cause erosion. It is the product of two components, namely:

- total energy; and
- maximum 30-minute intensity for each storm.

Soil Erodibility

Soil erodibility is a measure of the susceptibility of individual soil particles to detachment and transport by rainfall and runoff. Soil texture is the principal component affecting soil erodibility, but structure, organic matter and permeability also contribute.

Topsoil material within the site is removed as overburden and stockpiled as a buffer around the perimeter of the site. The soil contains a seed bed for many of the local native grasses and forbs which recolonise the topsoil in the absence of tree shading. The revegetation of this topsoil stabilises the stockpiles and minimises the potential erosion of this soil material. No raw soil remains within the quarry site.

Soil Characteristics

Blue Book classifications for the soil show that the soils are type F soils, which are generally fine-grained soils with less than 10 percent of the soil materials dispersible. Type F soils are slow settling in wet basins. The site can be inundated in extreme flood events.

Surface Water Runoff

The surface water runoff expected during average, wet and dry rainfall years has been calculated in the water balance for the site.

The following presents statistical annual rainfall quantities for the quarry site:

- Annual 10th percentile (dry year): 466.5 mm
- Annual 50th percentile (average year): 551.2 mm
- Annual 90th percentile (wet year): 809.0 mm

The quarry currently covers an area of approximately 1.3 Ha. The proposal involves a gradual expansion to extend this internal area by an additional 9 to 10 Ha of pit area. The pits will be below ground and therefore capture all internal runoff. This runoff will settle into the aggregate to be extracted and therefore would not need consideration in overall runoff management.

The average annual runoff for this area is in the order of 0.6 ML/Ha. This calculation is based on surface absorption of small falls of rain and wetting of the available surface soil profile. Based on this figure of runoff, the existing site would generate an average of 0.78 ML per annum. This would not increase as the area of above ground works would not be extended beyond the current requirements other than for temporary stockpiles of processed materials.

Summary

Based on the information provided above in relation to the proposed expansion of the Wandoona Quarry, and with the implementation of the recommended mitigation and control measures relating to soil and water management at the development site, it is anticipated that there would be minimal impact on surface water within the Mehi River and downstream of the development site as a result of the proposed operations. The key features of the proposed water management system are as follows.

- All clean water would be held within the quarry site
- Any build-up of water within the site would be utilised for dust mitigation measures
- The water would also provide some benefit to local fauna in the form of an alternative source of water in an area where limited surface water is available

Site Water Balance

Introduction

This section reviews site water requirements and available water storage against water availability to present a water balance for the Wandoona Quarry. The water balance is provided for the average rainfall year.

Inputs

Rainfall/Runoff

The water balance considers rainfall and runoff generated during low (annual 10th percentile), average (annual 50th percentile) and high (annual 90th percentile) rainfall years. The rainfall data has been obtained from the Bureau of Meteorology monitoring station at Moree Aero (station

053115), which is considered to be the most representative of the development site. Rainfall is as follows.

Annual 10th percentile (dry year): 466.5 mm

Annual 50th percentile (average year): 551.2 mm

Annual 90th percentile (wet year): 809.0 mm

Rainfall is summer dominant although rainfall is generally present in all months.

Water Access Licence

The site maintains a high security water access licence (WAL13284) in the amount of 18 ML per calendar year. This water allocation is accessed directly from the Mehi River via the Gwydir Regulated River Water Source.

Groundwater seepage

Some seepage is expected given the underlying sandy soils. This is estimated to be 11,250 litres per annum. Any water pooling in the active extraction area would be a result of runoff after a rainfall event, and this water would naturally disperse into the sandy topsoil material.

Outputs

Evaporation losses

This Surface Water Assessment has reviewed the existing and proposed sediment ponds. It is assumed that the only loss from the sediment pond would be evaporation, apart from some water for dust suppression which is discussed below. Evaporation losses have been calculated as the direct evaporation from the surface of the dams.

The nearest active BOM station to the development site is Moree Aero. This station does not collect evaporation data. Mean evaporation data was therefore obtained from the Moree BOM station (No. 053048), with the average yearly evaporation being 2,373 mm. The evaporation loss from the water storage dams has been calculated as follows:

Evaporation loss = Pond surface area x average yearly evaporation x 0.7.

The existing sediment pond has a surface area of 175m² and a depth of 3m, with an overall capacity of 0.525 ML. This is considered insufficient and will be increased as part of the proposed development. The proposed sediment pond will have a surface area of 400 m², with an increased capacity of 1.2 ML. A factor of 0.7 has been used to account for variations in the water level in the pond, and to account for the pond not always being full. Consideration is also given to the shallowness of the sedimentation pond.

The combined annual average evaporation from the on-site sediment pond is therefore estimated at 0.66 ML.

Washing/Sieving Plant

The sieving process would be the primary on-site water use. The washing/sieving plant is operated for approximately 51 days/year, with an estimated water usage of:

- 8,000L/hour
- 240,000L/day
- 1ML/month

The annual water usage for the washing sieving plant is therefore in the order of 12 -13 ML/year.

Groundwater absorption

Some groundwater absorption is expected from the sediment pond. This is estimated to be 3,000 litres per annum.

Dust Suppression

Dust suppression would be a significant on-site water use. This includes dust suppression on the access roads, hardstands and stockpile areas. All water used for dust suppression would be non-potable water sourced from the sediment dams or from the water allocation available from the Mehi River. The estimated water requirement for dust suppression is 40,000 litres per day (two loads) in dry conditions. Dust suppression will not be required at all times.

Should additional water be required for dust suppression during a dry period this water could be obtained from external sources.

Water Balance

The sediment pond will be primarily utilised to capture the wastewater from the washing/sieving plant to be recycled. The sediment pond will also be required to capture runoff from the plant's 50m x 50m operating pad.

To determine the runoff generated on the site, the following runoff coefficients were applied to the respective catchment areas:

Area	Runoff Coefficient
Operating Pad	
2500 m ²	0.8
Sediment Pond	
400 m ²	1.0

Based on rainfall in dry, average and wet periods the amount of runoff varies and this has been calculated as:

- 1,082,300 litres of runoff in a dry year
- 1,278,800 litres of runoff in an average year
- 2,064,800 litres of runoff in a wet year

The following table provides a preliminary water balance for the site based on average rainfall with available inputs and expected outputs.

Table 1: Preliminary Water Balance for Operation of Wandoona

Water use	Annual Volume (L)
Inputs	
Water Licence	18,000,000 litres available
Runoff in an average year	1,278,800 litres
Groundwater seepage	11,250 litres
Total	19,290,050 litres
Outputs	
Washing/ Sieving Plant Operations	12,240,000 litres
Road watering	1,440,000 litres
Groundwater absorption	3,000 litres
Evaporation	660,000 litres
Total	14,343,000 litres
Additional Outputs	
Available for irrigation and recycling	4,947,050 litres

All dirty water collected on site is directed to the sediment pond or quarry pits. As seen in the above table, the required water for operational purposes is less than the available water. However, any additional water collected in the sediment pond can be utilised for irrigation and recycling purposes.

Surface Water Monitoring Program

Introduction

The following parameters consider all facets of water control and monitoring associated with the continued use and expansion of the Wandoona Quarry.

Water quality

Sediment dams onsite collect water that flows in their direction from a rainfall event. No chemicals associated with vehicles extracting gravel are disposed of within these sediment dams. Groundwater bore GW965845 is located within the project areas. This bore is not included within the quarry footprint and will not be utilised for any quarry operational activities. Groundwater is not expected to be impacted upon from the expansion of the quarry.

Surface and groundwater impacts

The potential for impacts to surface and groundwater regimes is related to methods used to extract and process the resource and the size of the area to be disturbed. The present operation has not recorded any negative impacts on off-site water quality and has not intersected or extracted any groundwater.

Appendix 8 – Test of Significance

Threatened Species Assessment

1. Introduction

Endangered Ecological Communities and threatened species that have the potential to be impacted by the proposal have been assessed under the guidelines of Section 7.3 of the Biodiversity Conservation Act (2016) and this is provided below in the form of a Test of Significance. The Test of Significance includes the assessment of the development against five parameters to determine whether there is likely to be a significant effect on the threatened species recorded at or likely to occur at the site. The assessment has been conducted in accordance with the Threatened Species Test of Significance Guidelines (OEH 2018).

The proposed development entails the expansion of an existing sand and gravel pit at Wandoona Quarry. Two primary areas for sand extraction expansion have been identified on the plan (shown in Figure 2). The southern area extends west from the existing pit across the cultivation paddock. The northern area extends onto the slightly higher ground to the northeast of the sand sieve area. Both areas have been investigated for gravel material to a depth of 6m or more to ensure the extent of the resource.

Should the proposal be approved, the total footprint of the quarry would be extended to an area of 12.6 Ha. The proponent intends to conserve topsoil and overburden stripped from the footprint of the proposed extension to backfill the pit upon project completion to produce a stable final landform. A similar procedure will be followed for the existing quarry pit, as overburden has been stored around the perimeter of the pit. The entire footprint of the development will be rehabilitated for agricultural grazing purposes.

Wandoona Quarry is located approximately 5km north-east of Moree township. The quarry is located on the property "Wandoona" on Lot 5 in Deposited Plan 236547. An existing access road connects the existing development at Wandoona to Gwydirfield Road. This is a single lane unsealed road.

Habitat area within the southern area of the proposed extension (associated with the existing gravel pit) consists of bare ground which was previously cleared and cultivated agricultural land (classified as non-native vegetation in PCT mapping). A single mature River Red Gum (*Eucalyptus camaldulensis*), with some small-medium hollows, is present within the extension footprint.

Habitat area within the northern area of the extension, associated with the sieve plant, consists of an area of gravel which is, in parts, weed infested. Groundcover consists of weeds species, cultivated species, and grasses. Species include Spear thistle (*Cirsium vulgare*),

Watermelon (*Citrullus lanatus*), Button grass (*Dactyloctenium sphaerocephalus*), Black roly-poly (*Sclerolaena muricata*).

Both proposed extension areas are bordered in parts by remnant trees, and these will not be cleared or modified by the proposed works. However, where the boundary of the footprint is in close proximity to mature trees, the boundary should be situated so that it preserves the ground around mature trees, as outlined in Figure 1, to reduce the impact on these trees.

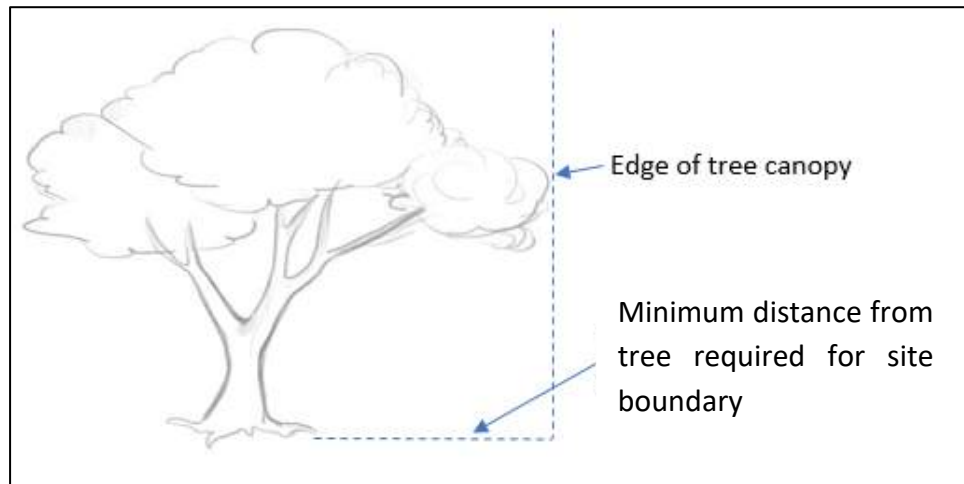


Figure 1: Side Track Minimum Distance from Trees

Where the boundary of the proposed development is located in close proximity to trees or shrubs, it is recommended that the boundary is clearly marked on site (e.g. by using tape) to minimise the risk of disturbance to vegetation adjacent to the site boundary.

Figure 2 Shows the layout of the proposed development site.



Figure 2: Layout of Existing and Proposed Developments at Wandoona

2. Habitat Assessment for Significant Species

A site inspection was carried out on 23rd March 2020 to inform this test of significance.

The availability of habitat on site was assessed using a number of factors including:

- Structural and floral diversity;
- Occurrence and extent of habitat types in the general vicinity;
- Continuity with similar habitat adjacent to the site, or connection with similar habitat off site by way of corridors;
- Key habitat features such as tree hollows, water bodies, crevices and rocky areas;
- Degree of disturbance and degradation; and
- Topographic features such as aspect and slope.

This information was used to evaluate the site as potential habitat for each of the threatened species considered and assign each species with a rating based on their likelihood to occur within the subject site. The 'likelihood of occurrence' categories are detailed in Table 1. The habitat assessment is provided in Appendix B.

Table 1: Likelihood of Occurrence Criteria

Likelihood Rating	Criteria
Known	The species was recorded within the study area during site surveys.
High	It is likely that a species would inhabit or utilise habitat within the subject site. Criteria for this category may include: <ul style="list-style-type: none"> • Species recently and/or regularly recorded in contiguous or nearby habitat; • High quality habitat types or resources present within study area; • Species is known or likely to maintain a resident population surrounding the study area; and • Species is known or likely to visit during migration or seasonal availability of resources.
Moderate	Potential habitat for a species occurs within the subject site. Criteria for this category may include: <ul style="list-style-type: none"> • Species previously recorded in contiguous habitat albeit not recently (>10 years); • Poor quality, depauperate or modified habitat types and/or resources present within study area; • Species has potential to utilise habitat during migration or seasonal availability of resources; and • Cryptic flora species with potential habitat available within the subject site that have not been seasonally targeted by surveys.
Low	It is unlikely that the species inhabits the area and would likely be considered a transient visitor if ever encountered. Criteria for this category may include:

Likelihood Rating	Criteria
	<ul style="list-style-type: none"> The subject site or study area lacks specific habitat types or resources required by the species; The subject site is beyond the current distribution of the species or is isolated from known populations; Non-cryptic flora species that were found to be absent during targeted surveys; and The subject site only contains common habitat which would not be considered important for the local survival of a threatened species.
Unlikely	The habitat within subject site and study area is unsuitable for the species.

Limitations

The effectiveness of a survey detecting a given species is influenced by a range of factors. For this type of survey, such limitations are generally related to the period of time in which the fieldwork was carried out during one season. Given that one half-day was spent on site, the detection of certain species may be limited by:

- Seasonal migration (particularly migratory birds);
- Seasonal flowering periods (some species are cryptic and are unlikely to be detected outside of the known flowering period);
- Seasonal availability of food such as blossoms;
- Weather conditions during the survey period (some species may go through cycles of activity related to specific weather conditions, for example some microchiropteran bats, reptiles and frogs can be inactive during cold and very hot weather); and
- Species lifecycle (cycles of activity related to breeding).

These limitations have been accounted for by applying the precautionary principle in all cases where the survey methodology may have given a false negative result. All species have been assessed based on presence of habitat and the likely significance of that habitat to support a viable local population.

The following definitions are used throughout this report to refer to locations in the proposal area:

- The 'subject site' describes all areas that would be directly impacted by the works. This includes the access routes, the footprint of the existing quarry and that of the proposed extension;
- The 'study area' includes the site and the areas adjacent that may be indirectly impacted by the proposed works. This includes the property described as Lot 5 in Deposited Plan 236547
- The 'search area' refers to a 10-kilometre area surrounding the proposal for the purpose of database searches.

3. Assessment of Potential Presence of Threatened Species

A search of the National Parks and Wildlife Atlas of NSW Wildlife (BioNet) identified species with recorded sightings within a 10 km radius of the proposed development site. The complete search result for listed species is presented in Appendix A.

The project site is located with the Northern Outwash subregion of the Brigalow Belt South Bioregion. A broader search for species, populations and communities that may occur within the locality of the development site was therefore conducted through investigating known and predicted species' distributions within the Brigalow Belt South Bioregion (Northern Outwash subregion). A copy of the search results for listed species is presented in Appendix B.

Species were considered with regards to their known distribution and habitat requirements, to assess whether the subject site is likely to serve as suitable habitat, and subsequently whether/how the development is likely to impact upon the species. Only species that have the potential to be present within the available habitat are listed in Table 2 and assessed in this test of significance.

The following species, populations and communities are considered in the Test of Significance for the proposed development.

Table 2: Results of BioNet Atlas Search

Scientific Name	Common Name	Legal Status	Records
<i>Circus assimilis</i>	Spotted Harrier	BC Act: V, P	9
<i>Hieraaetus morphnoides</i>	Little Eagle	BC Act: V, P	6
<i>Lophoictinia isura</i>	Square-tailed Kite	BC Act: V,P,3	2
<i>Falco subniger</i>	Black Falcon	BC Act: V, P	4
<i>Neophema pulchella</i>	Turquoise Parrot	BC Act: V,P,3	1
<i>Ninox connivens</i>	Barking Owl	BC Act: V,P,3	2
<i>Stagonopleura guttata</i>	Diamond Firetail	BC Act: V,P	2
<i>Phascolarctos cinereus</i>	Koala	BC Act: V,P EPBC Act: V	134
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	BC Act: V,P	5
<i>Chalinolobus picatus</i>	Little Pied Bat	BC Act: V,P	3

The above-mentioned species will be considered within the assessment of significance.

4. Test of Significance - Assessment of Criteria and Discussion

The following is to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

- a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

A viable local population of a threatened terrestrial flora or fauna species in this assessment is defined as a population that occurs within the study area and the connected habitat surrounding the proposed development.

Microchiropteran Bats

Yellow-bellied Sheath-tail Bat, Little Pied Bat

Both of these species may use the project area for foraging on occasion. However, given the lack of optimal foraging habitat within the subject site and the adjacent areas of native open woodland, it is unlikely that the subject site is regularly or heavily utilised by Little Pied Bat or Yellow-bellied Sheath-tail Bat. A single tree present within the proposed development footprint may offer roosting habitat. Given the presence of larger, and therefore less exposed, areas of open woodland in the immediate vicinity, the potential loss of this tree would not have a significant impact on the above-mentioned species.

The risk to these bat species from the development is therefore limited to the loss of sub-optimal foraging habitat. It is therefore considered that no viable local population of any threatened species would be placed at risk of extinction due to the proposed development.

Woodland Species

Turquoise Parrot, Diamond Firetail

Habitat loss and/or degradation as a result of clearing, increased weed invasion, under-shrubbing and “tidying up”, are all significant threats for these species. Woodland habitat will not be cleared or disturbed by the proposed development; thus the above-mentioned species are not at risk of any direct impact.

The risk to these woodland species is therefore limited to indirect impacts such as noise disturbance and potential habitat modification resulting from spread of weed species. Noise levels are not expected to change relative to recent years as a result of the proposed development, given the history of material extraction at the site. Parts of the subject site associated with the sieve plant are currently weed infested. In order to prevent a further degradation of habitat quality and a spread of these species into adjoining areas, it is

recommended that a Weed Management Plan for weed species that are listed under the *Biosecurity Act 2015* be prepared and implemented prior to the commencement of earthworks. This plan should be implemented throughout the project life cycle, through to completion. Provided that these measures are implemented, secondary impacts are not considered significant and are unlikely to place a viable population at risk of extinction.

Birds of Prey

Spotted Harrier, Little Eagle, Square-tailed Kite, Black Falcon, Barking Owl

These highly mobile species have relatively large home ranges (generally >200 Ha). It is therefore highly unlikely that the low-quality, modified vegetation present within the subject site is an important component of these species' home range. These birds are also highly dependent upon the presence of prey species. Ground cover is scarce within the proposed footprint extension, providing limited habitat for prey species, which further reduces the value of the habitat area for these species.

The proposed modification of habitat with poor structural and species diversity in an area adjacent to native open woodland vegetation is therefore not deemed to pose a risk to viable local populations of the above-mentioned species.

Mammals

Koala

The Koala population in the Moree area has been described as very small and highly disjunct from neighbouring populations in the Pilliga and Central Tablelands areas. A search of the National Parks and Wildlife Atlas of NSW Wildlife (BioNet) revealed no Koala records within 1 km of the subject site. The proposal will result in the clearing of a single mature River Red Gum, which is not contiguous with surrounding vegetation. River Red Gum is a feed tree species for Koala in the Northwest Slopes Koala Management Area under the Koala Habitat Protection (2019) SEPP. The removal of this tree is however not considered to constitute a significant direct impact to any potential Koala individuals/population in the area, given the presence of a contiguous riparian corridor of open woodland of River Red Gums to the west of the proposal area.

Indirect impacts to Koala habitat and/or individuals in the study area are considered negligible. As a result, there is no risk of a viable population being placed at risk of extinction.

- b) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**
- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The subject site does not support an endangered ecological community or critically endangered ecological community. Vegetation removal associated with the proposed project would be limited to non-native vegetation and a single mature River Red Gum. The development proposal is therefore considered unlikely to impact on the extent or composition of any of the listed endangered or critically endangered ecological communities.

c) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and,

No Endangered Ecological Community would be subject to vegetation removal or modification as part of the proposed development.

The proposed extent of vegetation removal and / or disturbance amounts to a total of approximately 10.6 Ha of degraded, modified habitat. The extent of removal of this low-quality habitat is considered minimal at a local and regional scale, given the widespread occurrence of similar habitat and the presence of higher quality native vegetation in the wider area.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The subject site does not currently support habitat deemed to be important for any threatened species or population, and it is adjacent to higher quality, contiguous vegetation to the north. The proposed footprint is already cleared, excepting for a single paddock tree, and is considered to contribute to fragmentation in its current state. Therefore habitat fragmentation and/or isolation will not be exacerbated as a result of the proposed works.

Fauna species which may periodically utilise the subject site would disperse into adjoining areas of similar quality habitat and/or into higher quality open remnant vegetation present north of the site. Potential threatened flora species, whilst unidentified and unlikely to occur in the proposal area, may be displaced in the short term, however, adjoining vegetation is considered suitable so that these species are not at risk of extinction or long-term fragmentation.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Vegetation within the subject site largely consists of weed species on the ground layer in the northern extension area, and a single River Red Gum in the southern area. The footprint of the proposal therefore largely consists of bare ground. In the context of the wider landscape, this vegetation is overall considered highly modified, degraded and provides low quality and widely available habitat. Species diversity is extremely limited, and the presence of non-native and weed species further lowers the importance of the habitat for flora and fauna.

The fact that the subject site is already cleared means that the proposal will not cause habitat fragmentation. No endangered ecological community will be removed, modified or fragmented as part of the proposed works.

The proposed project is therefore not considered to remove, modify, fragment or isolate habitat essential for the survival of a threatened species within the area.

d) whether the proposed development is likely to have an adverse effect on critical any declared area of outstanding biodiversity value (either directly or indirectly):

The development proposal is not located in or near an area of outstanding biodiversity value. It is therefore considered that no areas of outstanding biodiversity value will not be adversely affected (either directly or indirectly) by the proposed development.

e) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Invasion of Native plant communities by exotic perennial grasses is listed as a key threatening process. Exotic perennial grasses (e.g. Coolatai Grass) have the capacity to invade native plant communities, competing with an excluding native species. The invasion of these grasses also reduces the habitat value for many native fauna species.

Patches of Coolatai Grass may be present within vegetation on the subject site. Other invasive species, such as spear thistle and Black roly-poly, are present with the northern extension area. The risk posed to native plant communities is the risk of this and other exotic perennial grasses spreading into areas with better quality native groundcover as a result of the proposed works.

In order to prevent a further degradation of habitat quality within the subject site and a spread of these species into adjoining areas, it is recommended that a Weed Management Plan for weed species that are present onsite and are listed under the *Biosecurity Act 2015* is prepared and implemented prior to the commencement of earthworks. This plan should be implemented throughout the project life cycle, through to completion.

Provided these safeguards regarding weed management are implemented, the proposed works are unlikely to result in increased weed incursion, and therefore unlikely to increase the impact of this key threatening process.

No other actions associated with the proposed quarry expansion involve any actions that constitute a key threatening process.

5. Conclusion

Habitat assessment has been undertaken to identify and assess the potential impacts resulting from the proposed project at Wandoona Quarry. The proposal consists of the extension of the footprint of an existing quarry to a total area of 12.6 Ha, in conjunction with the rehabilitation of the footprint of the entire development (i.e. the existing quarry and the proposed extension). The quarry is located on Lot 5 in Deposited Plan 236547, approximately 5 kilometres north-east of the town of Moree. An existing access road links the quarry site with Gwydirfield Road.

The proposal was assessed using the Test of Significance in accordance with the BC Act for the site which determined that given the limited extent of vegetation removal from the site and the low quality of the vegetation to be removed, the project is not likely to significantly affect threatened species, ecological communities, or their habitats.

This assessment has determined that the potential adverse impacts of the proposed development on threatened species, populations or communities is considered minimal and no further investigation in the form of a Species Impact Statement is required.

6. References

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Appendix A: Bionet Threatened Species, Populations and Communities Search Results for a 10-kilometre radius from the Subject Site

Scientific Name	Common Name	Legal Status	Records
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	NSW: V,P	1
<i>Anseranas semipalmata</i>	Magpie Goose	NSW: V,P	2
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	NSW: E1,P	1
<i>Circus assimilis</i>	Spotted Harrier	NSW: V,P	1
<i>Hieraaetus morphnoides</i>	Little Eagle	NSW: V,P	2
<i>Lophoictinia isura</i>	Square-tailed Kite	NSW: V,P,3	2
<i>Phascolarctos cinereus</i>	Koala	BC Act: V,P EPBC Act: V	26
<i>Macropus dorsalis</i>	Black-striped Wallaby	NSW: E1,P	1
<i>Pseudomys gouldii</i>	Gould's Mouse	NSW: E4,P EPBC Act: X	1
<i>Desmodium campylocaulon</i>	Creeping Tick-trefoil	NSW: E1	25
<i>Digitaria porrecta</i>	Finger Panic Grass	NSW: E1	2

Appendix B: Bionet Threatened Species, Populations and Communities Search Results for Brigalow Belt South Bioregion (Northern Outwash IBRA Subregion)

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Aves					
<i>Alectura lathamii</i> Australian Brush-turkey	BC Act - E	Largely coastal distribution from Cape York south as far as the Illawarra in NSW. Occurs in forested and wooded areas of tropical and warm-temperate districts, particularly above 300 m to at least 1200 m altitude. Usually prefers dry rainforest that is found within the Semi-evergreen Vine Thicket.	P	Low The subject site is outside of the species' range and thus is therefore not considered important habitat.	No
<i>Anseranas semipalmata</i> Magpie Goose	BC Act - V	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter.	3	Unlikely There is no suitable habitat on the subject site.	No
<i>Ephippiorhynchus asiaticus</i> Black-necked Stork	BC Act - E	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.	1	Low The subject site is outside of the species' range (coastal habitat) and thus is therefore not considered important habitat.	No
<i>Circus assimilis</i> Spotted Harrier	BC Act - V	In New South Wales, this species is widespread from coast to inland, including the western slopes of the	9	Moderate	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		Great Dividing Range and farther west. It is sparsely scattered in, or largely absent from, much of the Upper Western region. Primarily inhabits woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Generally, the understorey is open with sparse eucalypt saplings, acacias and other shrubs, including heath.		This species may hunt within the subject site.	
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	BC Act - V	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.	3	Low The site is not considered important for this species due to the paucity of suitable habitat in surrounding areas.	No
<i>Hieraaetus morphnoides</i> Little Eagle	BC Act - V	The Little Eagle is found throughout the Australian mainland. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	6	Moderate This species may hunt throughout the subject site.	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
<i>Lophoictinia isura</i> Square-tailed Kite	BC Act - V	In NSW, the species is a regular resident in the north, north-east and along the major west-flowing river systems. Found in a variety of timbered habitats including dry woodlands and open forests. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km.	2	Moderate This species may hunt throughout the subject site.	Yes
<i>Falco hypoleucos</i> Grey Falcon	BC Act - E	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	P	Low This species is unlikely to occur within the subject site, as the climate in the locality is not best described as arid or semi-arid. Moree's climate is described as subtropical (BoM).	No
<i>Falco subniger</i> Black Falcon	BC Act - V	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres.	4	Moderate This species may hunt throughout the subject site.	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
<i>Ardeotis australis</i> Australian Bustard	BC Act - E	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Breeding now only occurs in the north-west region of NSW. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	3	Low The subject site is not considered important habitat for this species given the paucity of suitable habitat and the fact that the species is mainly found in the north-west corner of NSW.	No
<i>Burhinus grallarius</i> Bush Stone-curlew	BC Act - E	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch.	P	Low There is no suitable habitat for this species within the subject site and it is therefore not considered important for the species.	No
<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	BC Act - V	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak and Forest Sheoak are important foods. Inland populations feed on a wide range of sheoak. Belah is also utilised and may be a critical food source for some populations. Feeds almost exclusively on the seeds of several species of	9	Low There is no suitable habitat within the subject site for the species. No Sheoak trees were recorded in the vicinity of the site and it is therefore not considered	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites.		important habitat for the Glossy Black-Cockatoo.	
<i>Neophema pulchella</i> Turquoise Parrot	BC Act - V	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Nests in tree hollows, logs or posts, from August to December.	3	Moderate This species may forage within the subject site, given the presence of suitable habitat adjacent to the site.	Yes
<i>Ninox connivens</i> Barking Owl	BC Act - V	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.	2	Moderate This species may hunt throughout the subject site.	Yes
<i>Tyto longimembris</i> Eastern Grass Owl	BC Act - V	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative	1	Low The subject site consists of agricultural land and is unlikely to provide suitable habitat for this species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		growth. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation.			
<i>Climacteris picumnus victoriae</i> Brown Treecreeper (eastern subspecies)	BC Act - V	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches. Hollows in standing dead or live trees and tree stumps are essential for nesting.	1	Low The subject site is not considered important habitat for the species, due to a paucity of suitable habitat (woodland dominated by rough barked eucalypts).	No
<i>Chthonicola sagittata</i> Speckled Warbler	BC Act - V	The Speckled Warbler has a patchy distribution throughout the eastern half of NSW. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. The diet consists of seeds and insects,	1	Low The habitat within the subject site does not constitute 'typical' habitat for the species and consequently, it is unlikely to be important for the Speckled Warbler.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		with most foraging taking place on the ground around tussocks and under bushes and trees. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter.			
<i>Grantiella picta</i> Painted Honeyeater	BC Act - V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> .	30	Low The subject site is not considered important habitat for this specialist feeder. No mistletoe was recorded during the site visit.	No
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater	BC Act - V	The Black-chinned Honeyeater has two subspecies, with only the nominate (<i>gularis</i>) occurring in NSW where it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Feeding territories are large making the species locally nomadic. Recent studies	3	Low The subject site is not considered important habitat for the species, given the paucity of suitable of habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.			
<i>Pomatostomus temporalis temporalis</i> Grey-crowned Babbler (eastern subspecies)	BC Act - V	In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.	30	Low The subject site is not considered important habitat for the species, given the paucity of suitable of habitat.	No
<i>Daphoenositta chrysoptera</i> Varied Sittella	BC Act - V	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticated bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy.	7	Low The species is dependent on woodland/forest habitat. The single mature tree within the proposed quarry extension is not considered to constitute important habitat for the species.	No
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	BC Act - V	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Primarily	1	Low There is no woodland habitat within the subject site. The site is therefore not considered to be important habitat for this species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Most breeding activity occurs on the western slopes of the Great Dividing Range.			
<i>Melanodryas cucullata cucullata</i> Hooded Robin (south-eastern form)	BC Act - V	The south-eastern form (subspecies <i>cucullata</i>) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i> . Two other subspecies occur outside NSW. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	2	Low The subject site is not considered important habitat due to the limited structural diversity and the modified nature of the habitat onsite.	No
<i>Stagonopleura guttata</i> Diamond Firetail	BC Act - V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Prefers clearings or areas with open understoreys. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.	2	Moderate The species may forage within the subject site.	Yes
Mammalia					

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	BC Act - V	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares.	1	Low The species may travel through or rest within the site given its very large home range. However the proposed quarry extension site consists of a cultivated paddock, and it is therefore not considered important habitat for the species.	No
<i>Sminthopsis macroura</i> Stripe-faced Dunnart	BC Act - V	The species is rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford. Found in native dry grasslands and low dry shrublands, often along drainage lines where food and shelter resources tend to be better. Co-occupies areas with the more common Fat-tailed Dunnart, but prefers relatively ungrazed habitats with greater diversity and healthier understorey vegetation.	P	Low The subject site is not considered important habitat for the species given the species preference for ungrazed, native grasslands with a healthy species and structural diversity.	No
<i>Phascolarctos cinereus</i> Koala	BC Act - V	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	134	Moderate River Red Gum is listed as a feed tree species within the Western Slopes and Plains management area (NSW Dept. of Planning, Industry and the Environment 2019). There is one mature River Red Gum within the existing quarry	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
				footprint, thus this species may forage within the subject site. The species is therefore considered in this assessment.	
<i>Macropus dorsalis</i> Black-striped Wallaby	BC Act - E	From the Townsville area in Queensland to northern NSW where it occurs on both sides of the Great Divide. On the north west slopes of NSW it occurs in Brigalow remnants to south of Narrabri. Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the north west slopes, associated with dense vegetation, including brigalow, ooline and semi-evergreen vine thicket.	8	Low The open woodland within the study area adjacent to the subject site does not form dense vegetation. Given that this species is associated with dense vegetation, the subject site is not considered important habitat.	No
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	BC Act - V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	P	Low There is no suitable habitat, including foraging and roosting habitat, for the species on the subject site. Therefore the subject site is not considered important habitat for the species.	No
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheathtail-bat	BC Act - V	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower	5	Moderate This species may forage within the open areas of the subject site.	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.			
<i>Setirostris eleryi</i> Bristle-faced Free-tailed Bat	BC Act - E	In NSW, the species has been recently recorded from only three disjunct locations: thirteen individuals from Gundabooka National Park, south of Bourke; one individual from Dhinnia Dthinawan Nature Reserve (formerly Bebo State Forest), north of Warialda two individuals near Bonshaw. Appears to be extremely rare throughout its range. Nationally, it has been recorded from only 15 locations. Knowledge of the ecology of the Hairy-nosed Freetail Bat is limited, however evidence suggests that the species depends on hollows and tree fissures for roosting sites. In the Brigalow Belt South bioregion, the species mainly occurs in woodlands, forests and arid shrublands.	P	Low Given the rarity of the species and the lack of suitable habitat on the subject site, it is not considered important habitat for the species.	No
<i>Chalinolobus picatus</i> Little Pied Bat	BC Act - V	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Feeds on moths and possibly other flying invertebrates.	3	Moderate The species may forage on site, given the presence of open woodland in the vicinity of the subject site.	Yes
<i>Nyctophilus corbeni</i>	BC Act - V	Inhabits a variety of vegetation types, including mallee, bullock and box eucalypt dominated communities, but it is distinctly more common in	P	Low The subject site is not considered important habitat for the species	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Corben's Long-eared Bat		box/ironbark/cypress-pine vegetation. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground.		due to a paucity of suitable habitat.	
<i>Pseudomys gouldii</i> Gould's Mouse	BC Act - E	The species is presumed extinct in NSW. The species is reported to have preferred sandhills and plains, and to make burrows under bushes in loose soil.	1	Low The species is presumed extinct, and the subject site is therefore not considered important habitat.	No
Reptilia					
<i>Anomalopus mackayi</i> Five-clawed Worm-skink	BC Act – E	The species has a patchy distribution on the North West Slopes and Plains of north-east NSW. Occurs close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees.	1	Low The subject site is not considered important for this species given the lack of suitable habitat.	No
<i>Furina dunmalli</i> Dunmall's Snake	BC Act – Not listed	Preferred habitat is Brigalow forest and woodland with fallen timber and ground litter, growing on cracking clay soils and clay loam soils. Also occurs in eucalypt and <i>Callitris</i> woodland with fallen timber and ground litter.	P	Low While there is broadly suitable habitat adjacent to the subject site, the subject site itself consists of a cultivated paddock and is therefore not considered important habitat for the species.	No
<i>Hoplocephalus bitorquatus</i>	BC Act - V	A patchy distribution from north-east Queensland to the north-eastern quarter of NSW. In NSW it has	4	Low	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Pale-headed Snake		historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north west slopes, and from the north coast from Queensland to Sydney. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas.		There is no suitable habitat for the species within the subject site.	
Insecta					
<i>Jalmenus eubulus</i> Pale Imperial Hairstreak	BC Act – E	In NSW, the species is found only in brigalow-dominated open forests and woodlands in northern areas of the state. Only known to breed in old-growth forest or woodland and does not appear to colonise regrowth habitats following clearing or other major disturbance.	4	Low The subject site is not considered important for this species due to the lack of suitable habitat.	No
Flora					
<i>Tylophora linearis</i>	BC Act – V	Grows in dry scrubland that may have a eucalypt, <i>Callitris glaucophylla</i> and/or <i>Allocasuarina luehmannii</i> overtopping the scrub, in the Barraba, Mendooran, Temora and West Wyalong districts.	1	Low The subject site is outside of the species' known distribution. It is therefore not considered important habitat for the species.	No
<i>Lepidium aschersonii</i> Spiny Peppergrass	BC Act – V	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature	P	Low The subject site does not constitute suitable habitat for the species. Therefore the subject site	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Found on ridges of gilgai clays dominated by Brigalow (<i>Acacia harpophylla</i>), Belah (<i>Casuarina cristata</i>), Buloke (<i>Allocasuarina luehmanii</i>) and Grey Box (<i>Eucalyptus microcarpa</i>).		is not considered important habitat for the species.	
<i>Cyperus conicus</i>	BC Act – E	Occurs rarely in the Pilliga area of NSW and is also found across the tropics in Qld, WA and the NT, including central deserts north of Alice Springs. Grows in open woodland on sandy soil. In central Australia, the species grows near waterholes and on the banks of streams in sandy soils. Recorded from Callitris forest in the Pilliga area, growing in sandy soil with <i>Cyperus gracilis</i> , <i>C. squarrosus</i> and <i>C. fulvus</i> .	P	Low Within NSW, this species is not known to occur outside of the Pilliga forest. The subject site is therefore not considered important habitat for the species.	No
<i>Desmodium campylocaulon</i> Creeping Tick-trefoil	BC Act – E	Occurs chiefly in the Collarenebri and Moree districts in the north-western plains of NSW. Creeping Tick-Trefoil is confined to clay soils, usually with <i>Astrebla</i> and <i>Iseilema</i> species. In NSW <i>Desmodium campylocaulon</i> grows on cracking black soils in the Narrabri, Moree and Walgett local government areas. The species is said to be hardy, but grazed where sheep have regular access. Plants are strongly stoloniferous and well-cropped by cattle.	78	Low The habitat area of the subject site consists of a cultivated paddock, which was previously used as agricultural grazing land. It is considered unlikely that an endangered native species could occur within this habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
<i>Swainsona murrayana</i> Slender Darling Pea	BC Act – V	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with <i>Maireana</i> species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.	7	Low The habitat area of the subject site consists of a cultivated paddock, which was previously used as agricultural grazing land. It is considered unlikely that a threatened native species could occur within this habitat.	No
<i>Phyllanthus maderaspatensis</i>	BC Act – E	Recorded for the Brewarrina and Collarenebri districts in the north-western plains of NSW. Grows in floodplain areas on heavy soils and may rely on appropriate and intermittent rainfall and flooding events for its survival. The species is described as being a summer-growing annual and is thus dependent on seasonal conditions. Often associated with open grasslands and eucalypt woodlands in or near creek beds, and grassy flats and levees near watercourses.	1	Low It is unlikely that any listed plant species would be found in the area given the history of clearing, grazing and cultivation within the subject site. The site is therefore not considered important habitat for the species.	No
<i>Dichanthium setosum</i> Bluegrass	BC Act – V	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. Associated with heavy basaltic black	4	Low The habitat area of the subject site is considered as highly modified, having been cleared and	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.		cultivated. It is not considered important habitat for Bluegrass, despite its occurrence in moderately disturbed habitat areas.	
<i>Digitaria porrecta</i> Finger Panic Grass	BC Act – E	In NSW, the most frequently recorded associated tree species are <i>Eucalyptus albens</i> and <i>Acacia pendula</i> . Common associated grasses and forbs in NSW sites include <i>Austrostipa aristiglumis</i> , <i>Enteropogon acicularis</i> , <i>Cyperus bifax</i> , <i>Hibiscus trionum</i> and <i>Neptunia gracilis</i> . Common associated grasses and forbs in NSW sites include <i>Austrostipa aristiglumis</i> , <i>Enteropogon acicularis</i> , <i>Cyperus bifax</i> , <i>Hibiscus trionum</i> and <i>Neptunia gracilis</i> .	24	Low This species was not observed during the site assessment and none of the associated species listed were recorded within the subject site. It is unlikely that this listed plant species would be found in the subject site given its history of disturbance. The species is therefore not considered in this assessment.	No
<i>Homopholis belsonii</i> Belson's Panic	BC Act – E	Occurs on the northwest slopes and plains of NSW, mostly between Wee Waa, Goondiwindi and Glen Innes. It also occurs in Queensland, mainly in the Brigalow Belt South bioregion. Grows in dry woodland (e.g. Belah) often on poor soils, although sometimes found in basalt-enriched sites north of Warialda and in alluvial clay soils.	118	Low This species was not observed during the site assessment, nor is the preferred habitat of the species found within the subject site or study area. Given the site's history of disturbance, it is not considered likely to support this species and is therefore not	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
				considered important habitat for the species.	
<i>Polygala linariifolia</i> Native Milkwort	BC Act – E	North from Copeton Dam and the Warialda area to southern Queensland. The species has been recorded from the Inverell and Torrington districts growing in dark sandy loam on granite in shrubby forest of <i>Eucalyptus caleyi</i> , <i>Eucalyptus dealbata</i> and <i>Callitris</i> , and in yellow podsolic soil on granite in layered open forest.	P	Low This species is not recorded in the Moree locality, nor does the subject site contain suitable habitat for the species. It is therefore not considered important habitat for the species.	No
<i>Cadellia pentastylis</i> Ooline	BC Act – V	Occurs along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield. Also occurs in Queensland. Ooline is a medium-sized spreading tree usually about 10 m tall, and rarely to 25 m. It forms a closed or open canopy mixing with eucalypt and cypress pine species.	P	Low Ooline was not recorded within the subject site during the site assessment. The species is therefore not considered in this assessment.	No
Communities					
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	BC Act – EEC	The Brigalow community is a low woodland or forest community dominated by Brigalow (<i>Acacia harpophylla</i>), with pockets of Belah (<i>Casuarina cristata</i>) and Poplar Box (<i>Eucalyptus populnea subsp. bimbil</i>). Scattered remnants on the North West Slopes and Plains and Darling River Plains in NSW. This community has been extensively cleared for agriculture, with most surviving remnants along roadsides and paddock edges.	K	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
<i>Cadellia pentastylis</i> (Ooline) community in the Nandewar and Brigalow Belt South Bioregions	BC Act – EEC	The Ooline community is an unusual and distinctive forest community with the canopy dominated by the tree Ooline (<i>Cadellia pentastylis</i>). The understorey is made up of a range of shrubs, such as Wattles (<i>Acacia</i> spp.), and grasses. Extensively cleared and now known from only seven main locations on the North West Slopes in NSW, between Narrabri and the Queensland border, and also in Queensland.	K	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions	BC Act – EEC	This was previously an open forest community of flora and fauna that may now exist as woodland or as remnant trees. Carbeen Open Forest Community is a distinctive plant community on the riverine plains of the Meehi, Gwydir, MacIntyre and Barwon Rivers and in small remnants farther south. It is found on flats and gentle rises of alluvial or aeolian sandy soils derived from ancient watercourses (it also occurs on some clay alluvial soils but is mostly restricted to well-drained sandy sites)	K	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and	BC Act – EEC	Abiotic factors that help define this community are that it typically occurs on grey self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees. The vegetative community provides characteristic habitat features of value to particular fauna, including a grassy understorey with scattered fallen logs, areas of deep-cracking clay soils, patches of thick	P	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Mulga Lands Bioregions		regenerating Eucalyptus saplings, and large trees containing a diverse bark and foliage foraging resource and an abundance of small and large hollows.			
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions	BC Act – EEC	Inland Grey Box Woodland occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 mm pa and the mean maximum annual temperature is 22- 26°C. Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, <i>Eucalyptus microcarpa</i> (Inland Grey Box), is often found in association with <i>E. populnea</i> subsp. <i>bimbil</i> (Bimble or Poplar Box), <i>Callitris glaucophylla</i> (White Cypress Pine), <i>Brachychiton populneus</i> (Kurrajong), <i>Allocasuarina luehmannii</i> (Bulloak) or <i>E. melliodora</i> (Yellow Box), and sometimes with <i>E. albens</i> (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent.	K	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Myall Woodland in the Darling	BC Act – EEC	This ecological community is scattered across the eastern parts of the alluvial plains of the Murray-	K	Low	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Riverine Plains, Brigalow Belt South, Cobar Penepplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions		Darling river system. Typically, it occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 metres and invariably includes <i>Acacia pendula</i> (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs.		This EEC does not occur on the site, and the site is thus not considered important habitat.	
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	BC Act – EEC	A low, dense form of dry rainforest generally less than 10 m high, made up of vines and rainforest trees as well as some shrubs. This community often occurs on rocky hills, in deep, loam, high nutrient soils derived from basalt or other volcanic rocks, in areas which are sheltered from frequent fire.	P	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No
White Box Yellow Box Blakely's Red Gum Woodland	BC Act – EEC	White Box Yellow Box Blakely's Red Gum Woodland is an open woodland, in which the most obvious species are one or more of the following: White Box <i>Eucalyptus albens</i> , Yellow Box <i>E. melliodora</i> and Blakely's Red Gum <i>E. blakelyi</i> . Intact sites contain a high diversity of plant species, including the main	K	Low This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. Shrubs are generally sparse or absent, though they may be locally common. Remnants generally occur on fertile lower parts of the landscape where resources such as water and nutrients are abundant.			

Appendix 9 – Matters of National Environmental Significance

EPBC Protected Matters Assessment

Development Background

Overview

The proposed development entails the expansion of the existing quarry operations at Wandoona Quarry. The area currently utilised for below ground extraction is contained within the south-eastern section of the property. Two primary areas for sand extraction expansion have been identified on the plan. The southern area extends west from the existing pit across the cultivation paddock. The northern area extends onto the slightly higher ground to the northeast of the sand sieve area. Both areas have been investigated for gravel material to a depth of 6m or more to ensure the extent of the resource.

The landform will be rehabilitated for grazing purposes. The proponent intends to retain the overburden onsite for subsequent use during the site rehabilitation. Overburden would be used to shape the floor of the existing and proposed quarry pits and produce a stable final landform. As part of rehabilitation works, extraction faces will be left no steeper than a horizontal to vertical ratio of 3:1. Steep slopes may be rehabilitated to gentler slopes by replacing soil on site to fill quarry voids, and / or by planned excavation of steep slopes to achieve gentler gradients.

Operation of the quarry will involve the extraction of sand and gravel materials from the subject site, screening and washing the gravel onsite through portable equipment, and haulage of product from the site to Jonhstone's Concrete and Quarries (JCQ) ready mixed concrete plant located on Inverell Road, Moree.

An Operational Environmental Management Plan (OEMP) will be implemented for the duration of the project. A draft EMP has been prepared and this should be adopted and updated by site management for the specifics of the proposed activities. This will detail the following site-specific management measures which are designed to protect flora and fauna from adverse impacts:

- Soil management strategies;
- Noise and dust emission control measures;
- Sediment and erosion control measures;
- Rehabilitation measures; and
- Weed management strategies.

A single mature River Red Gum will be cleared as part of the proposed works.

Site Description

Wandoona Sand Quarry is located on the alluvial plains of the Mehi River, within the Northern Basalts Interim Biogeographic Regionalisation for Australia (IBRA) Subregion. The locality has been extensively cleared and developed for agricultural production. A corridor of remnant riparian vegetation occurs west of the proposed development and open woodland is present east of the proposal site within the property "Wandoona". The proposal footprint comprises an existing quarry, which will be expanded to a total footprint area of approximately 12.6 Ha.

Habitat area within the southern area of the proposed extension (associated with the existing gravel pit) consists of bare ground which was previously cleared and cultivated agricultural land (classified as non-native vegetation in PCT mapping). A single mature River Red Gum (*Eucalyptus camaldulensis*), with some small-medium hollows, is present within the extension footprint.

Habitat area within the northern area of the extension, associated with the sieve plant, consists of an area of gravel which is, in parts, weed infested. Groundcover consists of weeds species, cultivated species, and grasses. Species include Spear thistle (*Cirsium vulgare*), Watermelon (*Citrullus lanatus*), Button grass (*Dactyloctenium sphaerocephalus*), Black roly-poly (*Sclerolaena muricata*).

Remnant open woodland occurs both east (paddock) and west (riparian corridor) of the proposed development. River Red Gums are the dominant species in the vicinity of the proposal area. The majority of the Lot on which the quarry is located has been cleared for agricultural use. At present, the area consists of bare earth with sparsely distributed trees forming open woodland areas.

None of the species recorded during the site assessment are classified as threatened, and no endangered ecological communities were recorded within or adjacent to the proposed development footprint. Figure 1 presents the proposed development site at Wandoona.

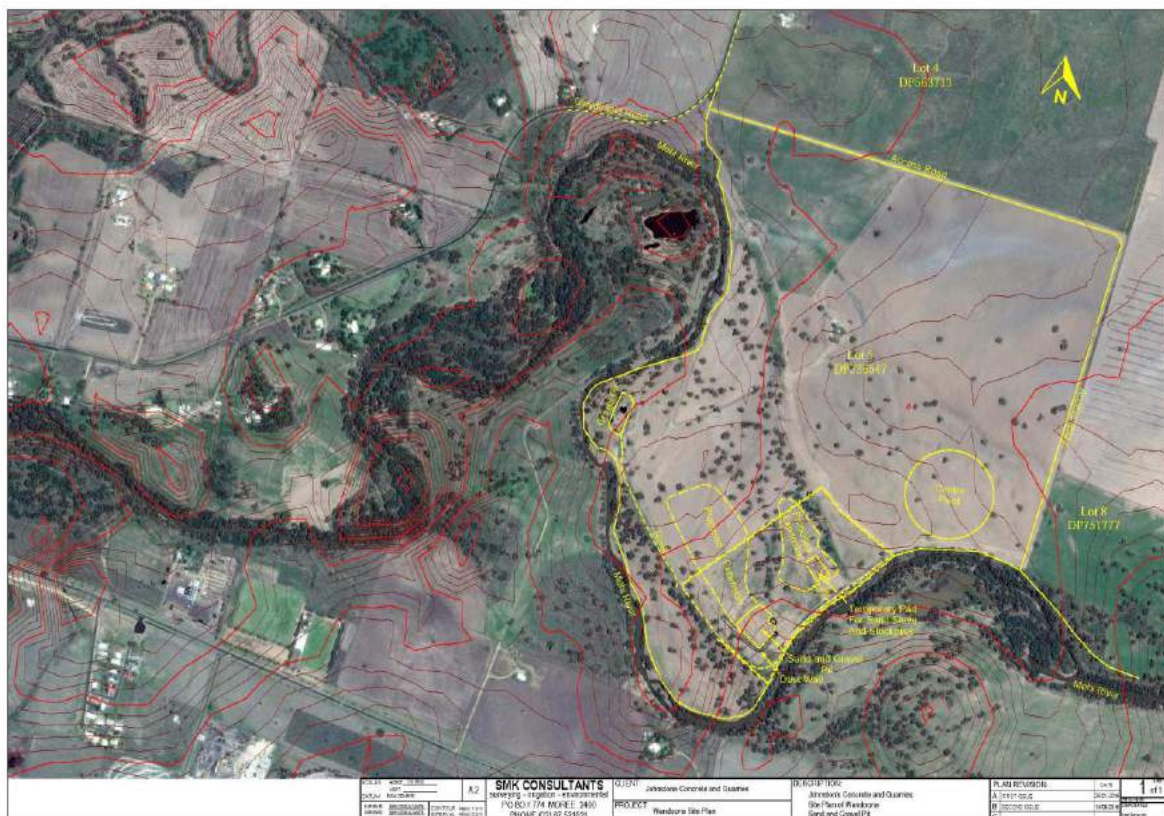


Figure 1: Proposed Development Site at Wandoona

Study Area Delineation

The potential impacts of the proposed development are predicted to be minimal as habitat values within the proposal footprint are low. The proposed works will be undertaken in accordance with best

practice methods to protect environmental values, which will include measures such as minimising the footprint of site disturbance and noise disturbance.

The proposed development will not pose an environmental risk to the locality as it will not act as a source of pollutants. A weed management program will be implemented, such that the site does not become a source of weed populations which may propagate out from the development site. Overall, the development is not predicted to interfere with habitat values adjacent to the site.

Therefore, it is considered that the extent of impact of the proposed development is limited to the footprint of disturbance on site and is principally associated with groundcover and soil disturbance for the purpose of extractive activities.

Matters of National Significance

The EPBC Act requires consideration of the effect of an action on the following 7 Matters of National Environmental Significance (MNES):

- World Heritage Properties
- National Heritage Places
- Ramsar wetlands of international importance
- Nationally threatened species and communities
- Migratory species protected under international agreements
- Nuclear actions, including uranium mining, and
- The Commonwealth marine environment.

The impact of an action on these matters is assessed under the criteria specified in: Matters of National Environmental Significance – Significant Impact Guidelines 1.1 (DoE 2013).

Consideration of EPBC Matters

A search was undertaken using the EPBC Protected Matters Search Tool (PMST) (DoEE 2018) to generate a list of World Heritage Properties, National Heritage Places, Ramsar wetlands and nationally threatened species, communities and migratory species protected under international agreements that may occur on or within a 5 kilometre radius of the proposed development (Figure 1).

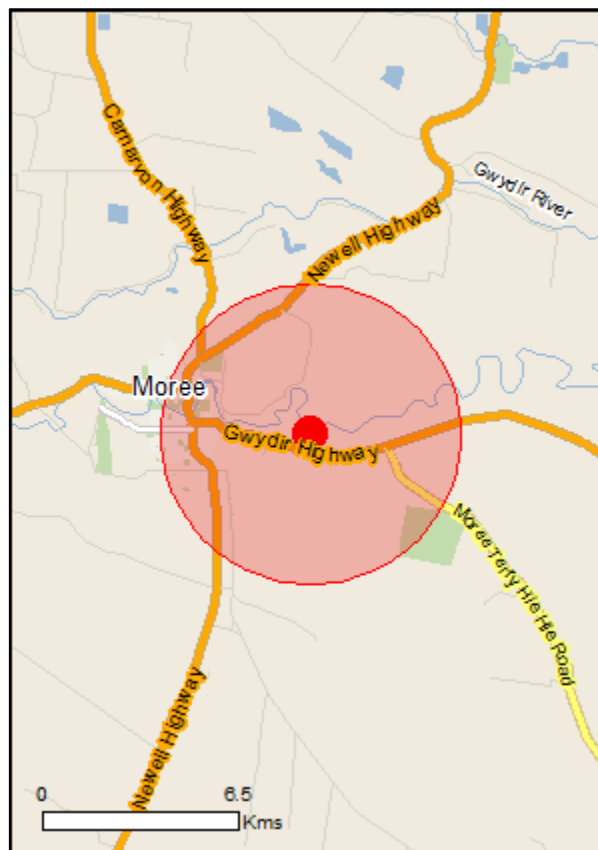


Figure 1: Region searched for MNES using the EPBC PMST

Results of Database Search

The EPBC PMST does not list any World Heritage Properties or National Heritage Places on or within the search area, therefore the proposal is not considered to impact on these matters. Further, the proposal does not involve nuclear actions or impact on the marine environment; consequently, these matters are also not relevant to this assessment.

Nationally threatened species and migratory species protected under international agreements have been initially defined within the search area outlined in Figure 1 using the PMST. These species are listed in Tables 1 and 2.

Table 1: Threatened flora and fauna species predicted or known to occur on the proposal area

Category	Scientific Name	Common Name	Legal Status
Birds	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered
	<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered; Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern)	Vulnerable
	<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable
	<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
	<i>Rostratula australis</i>	Australian Painted Snipe	Endangered as <i>Rostratula australis</i> ; Listed Marine as <i>Rostratula benghalensis</i> (sensu lato)
Mammals	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat, Large Pied Bat	Vulnerable
	<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat, South-eastern Long-eared Bat	Vulnerable
	<i>Phascolarctos cinereus</i> (combined populations of NSW, QLD & ACT)	Koala (combined populations of NSW, QLD & ACT)	Vulnerable
Fish	<i>Maccullochella peelii</i>	Murray Cod	Vulnerable
Reptiles	<i>Anomalopus mackayi</i>	Five-clawed Worm-skink, Long-legged Worm-skink	Vulnerable
Plants	<i>Cadellia pentastylis</i>	Ooline	Vulnerable
	<i>Dichanthium setosum</i>	Bluegrass	Vulnerable
	<i>Swainsona murrayana</i>	Slender Darling-pea, Slender Swainson, Murray Swainson-pea	Vulnerable

CAMBA = China Australia Migratory Bird Agreement; JAMBA = Japan Australia Migratory Bird Agreement; ROKAMBA = Republic of Korea Australia Migratory Bird Agreement; Bonn = Convention on the Conservation of Migratory Species of Wild Animals

Table 2: Migratory species predicted to occur on the proposal area

Category	Scientific Name	Common Name	Legal Status
Migratory Marine Birds	<i>Apus pacificus</i>	Fork-Tailed Swift	Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
Migratory Terrestrial Species	<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable; Listed Migratory (CAMBAS, JAMBA, ROKAMBA); Listed Migratory
	<i>Motacilla flava</i>	Yellow Wagtail	Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Listed Migratory (Bonn); Listed Marine
Migratory Wetland Species	<i>Actitis hypoleucos</i>	Common Sandpiper	Listed Migratory (Bonn, CAMBA, JAMBA); Listed Marine as <i>Actitis hypoleucos</i> Listed Migratory (ROKAMBA) as <i>Tringa hypoleucos</i>
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered; Listed Migratory (Bonn, JAMBA, ROKAMBA); Listed Marine
	<i>Calidris melanotos</i>	Pectoral Sandpiper	Critically Endangered; Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Listed Migratory (Bonn, JAMBA, ROKAMBA); Listed Marine

CAMBA = China Australia Migratory Bird Agreement; JAMBA = Japan Australia Migratory Bird Agreement; ROKAMBA = Republic of Korea Australia Migratory Bird Agreement; Bonn = Convention on the Conservation of Migratory Species of Wild Animals

The PMST also identified a range of threatened ecological communities which have the potential to be present within the study area. However, no threatened ecological communities were identified within the proposed development site during site inspection and therefore it is considered that the proposed development will not pose a risk to ecological communities protected under the EPBC Act.

The PMST identified two Ramsar wetlands downstream of the proposed development; Banrock station wetland complex, 1000 kilometres away, and the Coorong, and Lake Alexandrina and Albert wetland over 1100 km from Wandoona Quarry. The distance between the source and receptor is considerable, in particular when taking the small-scale nature of the proposed into account. Providing appropriate mitigation measures are implemented, the proposal has minimal potential for impact on these wetlands.

Assessment of Significance

Vulnerable Species

An action has, or will have, or is likely to have a significant impact on a vulnerable species if it does, will or is likely to:

- ***Lead to a long-term decrease in the size of an important population of species***

The proposed development will involve the establishment of a new quarry area as an extension to the existing development, extraction of raw material (sand and gravel), onsite processing (sieving and washing), loading onto haul trucks and transport offsite. Following project completion, the quarry footprint will be rehabilitated to agricultural grazing land.

Extractive activities will not have any significant impact on flora or fauna as the impact area consists mostly of bare ground, with some limited areas showing signs of weed infestation. A single mature tree is also present within the development footprint. It is predicated that remediation of the entire quarry footprint will enable future recolonisation of the site by native flora species, including vulnerable flora species, using the surrounding local populations as a source of seeds. Following recolonisation the site may once again be utilised as foraging habitat for vulnerable fauna species. The long-term impact of the proposed development upon threatened flora and fauna species is therefore considered to be a minor positive, as there would be a modest increase in habitat availability and quality relative to current conditions.

- ***Reduce the area of occupancy of an important population***

Overall, the total area to be disturbed by the quarry development will be small, and the longevity of the disturbance will be limited. The disturbance associated with the development is therefore not considered to pose a risk to the long-term survival of any threatened species or ecological community within the locality.

- ***Fragment an existing important population into two or more populations***

The area which will be impacted by the proposed works has been heavily cleared as a result of historic land clearing for agricultural grazing and cultivation activities. The overall habitat value of this land for threatened species is considered limited. None of the threatened species identified would breed or reside long-term within the subject site and are only predicted to utilise the study area during times of duress (i.e. when food cannot be found in more suitable habitats). Further modification of this land is therefore not considered to pose a threat to habitat availability for threatened species within the region.

- ***Adversely affect habitat critical to the survival of a species***

The groundcover to be impacted by the proposal is highly disturbed, as it is almost entirely cleared with the majority of the subject site consisting of bare ground, and a localised occurrence of weeds. In addition, with the exception of one mature tree, the site does not support habitat features (such as tree hollows, fallen timber, water bodies) which are critical for the survival of identified threatened species. Therefore, the site is not considered to be critical habitat for any of the listed vulnerable species. It is considered to be likely that threatened fauna species, if present in the region, would primarily utilise areas of remnant vegetation and surface water bodies which are present within the locality, in preference to the proposed development site.

Implementation of management plans during the construction period (including an Environmental Management Plan and a Weed Management Plan) will minimise the risk of any off-site impacts which may occur in association with the proposed development.

- ***Disrupt the breeding cycle of an important population***

There is one mature River Red Gum onsite which has at least one medium hollow. This individual is spatially isolated from a larger tract of native open woodland to the west. This tree would be removed as part of the proposed works. No other key habitat features, such as logs, leaf litter, water bodies, etc., are present within the subject site.

The area to be disturbed is relatively small (approximately 12.6 Ha including the existing development). Given the modified nature of this habitat through agricultural and extraction pressures and its proximity to similar and/or higher quality habitat, it is unlikely that the proposed works would constitute habitat important to the life cycle of identified threatened species (such as breeding habitat). The removal of a single paddock tree as part of the establishment of the extended quarry is considered a minor negative, and is not considered that it would have a significant impact on the breeding cycle of any potentially occurring local threatened species populations.

- ***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

The habitat modification associated with the proposed development is deemed to be minor and temporary in nature. As previously mentioned, habitat values are considered to be low as a result of recent extraction and agricultural activities on the proposed development site. Species are more likely to utilise either remnant or riparian / water-based habitat in the vicinity of the proposed development, rather than the development site itself. The development is therefore not predicted to result in a decline of vulnerable species populations within the region.

- ***Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat***

Weed seeds are carried onto and distributed by trucks coming onsite to haul extracted gravel. Plant machinery may also transport weed seeds upon entry and exit of works sites. Weed management strategies will be implemented through the Environmental Management Plan (EMP) to minimise the risk of weed establishment and proliferation as a result of extraction, haulage and remediation activities on site. Examples of weed management strategies include adoption of proper hygiene procedures to minimise the potential for seed transport onto and off the work site.

- ***Introduce disease that may cause the species to decline, or***

Extraction of sand and gravel at Wandoona is not considered a disease risk.

- ***Interfere substantially with the recovery of the species***

Ensuring the recovery of a species generally involves the protection and enhancement of existing populations and habitat, by preventing further clearing and modification of native vegetation communities and protecting water quality values.

The proposed development does not entail the large-scale clearance or modification of any trees or threatened communities. A single tree would be removed as part of the proposed works. As a result, any existing populations and habitat for flora and fauna will overall be maintained. The proposed project footprint extends over approximately 12.6 Hectares of previously disturbed habitat. Works on this already modified habitat will not have any significant impacts on existing flora and fauna populations or habitat.

The primary risk to soil and surrounding waters is soil erosion and run off from the disturbed area in the initial phase of the proposed works. Diversion banks will be established to form a controlled drainage area (CDA) around the site footprint, this ensuring that surface runoff containing high sediment loads is captured and retained within the impact footprint. The implementation of a CDA would either divert “clean” water (via non-scouring drains/banks) around disturbed areas or direct runoff (“dirty” water) from disturbed areas to detention structures. The risk of offsite discharge of sediment laden water is therefore considered as minimal.

Overall, the development is not considered to pose a risk to the recovery of vulnerable species within the region.

Critically Endangered and Endangered Species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- ***Lead to a long-term decrease in the size of a population***

Similar to vulnerable species, the proposed development site is not considered to constitute preferred habitat for endangered or critically endangered species. Works within this area are therefore not considered likely to result in a decrease in the size of endangered and / or critically endangered species which may be present within the region. It should be noted that no endangered or critically endangered flora species were observed on site during the site inspection.

- ***Reduce the area of occupancy of the species***

The habitat of the proposed development site is of limited value and is unlikely to be regularly or heavily utilised by identified species. Modification of the site as a result of the proposed development is therefore unlikely to reduce the area of occupancy of identified species.

- ***Fragment an existing population into two or more populations***

As outlined above, the development will not result in habitat fragmentation, and is therefore not considered to pose a risk of fragmenting populations of endangered or critically endangered species which may be present within the locality.

- ***Adversely affect habitat critical to the survival of a species***

There is no critical habitat for identified endangered and critically endangered species on the proposed development site. Further, implementation of management plans during the operational period (including an Environmental Management Plan) will minimise the risk of any off-site impacts which may occur in association with the proposed development.

- ***Disrupt the breeding cycle of a population***

The proposed development site does not contain suitable breeding habitat for endangered or critically endangered species. It is considered that these species would be more likely to utilise remnant and / or riparian habitats in the vicinity of Wandoona Quarry, rather than the proposed development site itself, to breed. Therefore, the proposed development is not considered to pose a risk to breeding cycles of populations of endangered or critically endangered species within the locality.

- ***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

The habitat values within the zone of impact of the proposed works are considered to be low as a result of historic clearing and previous agricultural activities. Species are more likely to utilise either remnant open woodland or riparian/water-based habitat adjacent to the proposed development, rather than the development site itself.

Therefore, modification of habitat on site is unlikely to result in the decline of any identified species.

- ***Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat***

Weed seeds are carried onto and distributed by trucks coming onsite to haul extracted gravel. Plant machinery may also transport weed seeds upon entry and exit of works sites. Weed management strategies will be implemented through the Environmental Management Plan (EMP) to minimise the risk of weed establishment and proliferation as a result of extraction, haulage and remediation activities on site. Examples of weed management strategies include adoption of proper hygiene procedures to minimise the potential for seed transport onto and off the work site.

- ***Introduce disease that may cause the species to decline, or***

Activities associated with sand and gravel extraction are not considered a disease risk.

- ***Interfere substantially with the recovery of the species***

Ensuring the recovery of a species generally involves the protection and enhancement of existing populations and habitat, by preventing further clearing and modification of native vegetation communities and protecting water quality values.

The proposed development does not entail the clearance or modification of threatened communities. The proposed project footprint extends over approximately 12.6 Hectares (including the existing development). This habitat area is dominated by bare earth, with a single mature tree and locally occurring weeds. Works on this already modified habitat, including the removal of a single mature River Red Gum, will not have significant impacts on existing flora and fauna populations or habitat. In the long-term, rehabilitation works should improve overall habitat quality and provide for a minor increase of habitat availability for flora and fauna.

Sediment and erosion control measures implemented throughout the project life cycle will minimise the risk of sediment laden run off from disturbed areas from entering the Mehi River. The risk of discharge of sediment laden water is therefore considered as minimal.

Overall, the development is not considered to pose a risk to the recovery of vulnerable species within the region.

Critically Endangered and Endangered Ecological Communities

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- ***Reduce the extent of an ecological community***
- ***Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines***
- ***Adversely affect habitat critical to the survival of an ecological community***
- ***Modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns***
- ***Cause substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting***
- ***Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:***
 - ***Assisting invasive species, that are harmful to the listed ecological community, to become established, or***
 - ***Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or***
- ***Interfere with the recovery of an ecological community***

The impacts of the proposed development will be limited to the proposed development footprint (as discussed above). This proposed expansion area consists of agricultural land which supports non-native vegetation over the majority of its habitat area. Therefore no habitat critical to the survival of an Endangered Ecological Community (EEC) will be directly impacted.

Indirect impacts to EECs in the region will be minimised through the implementation of environmental measures such as weed management and sediment and erosion control measures. Provided these measures are adequately implemented, the proposed development will not impact upon threatened ecological communities which may be present within the region. It is noted that no threatened ecological communities were identified within the site development footprint.

Listed Migratory Species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- ***Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for migratory species***

Important habitat for a migratory species is defined as habitat which is:

- Utilised by migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- Of critical importance to the species at particular life cycle stages, and/or
- Utilised by a migratory species which is at the limit of the species range, and/or
- Within an area where the species is declining.

The definition of an ecologically significant proportion of a migratory species varies depending on the characteristics of each species. Factors which should be considered in determining an ecologically significant proportion include the species' population status, genetic distinctiveness and species-specific behavioural patterns (such as site fidelity and dispersal rates).

Given its proximity to the Mehi River and its presence within the river floodplain, it is possible that migratory species utilise the proposed development site as minor foraging habitat or as a stopover site during migration. However, the importance of the site in providing such habitat to migratory species is relatively low. The development footprint consists of cleared agricultural land, supporting a single mature River Red Gum. This could provide roosting habitat, however its removal would not be considered significant at a local scale, given the presence of larger and contiguous areas of open woodland adjacent to the subject site.

In the event that migratory species are present within the locality of Wandoona Quarry, it is considered to be more likely that species will choose to forage in less disturbed habitats (such as riparian corridors along the Mehi River or remnant vegetation to the north and east of the subject site) in preference to foraging at the proposed development site.

Overall, the proposed development site is not considered to incorporate important habitat for migratory species, as the site is infrequently used by such species, and offers limited habitat features which could be utilised by these species during migration, when compared with surrounding available habitat.

- ***Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or***

Parts of the subject site around the sieve plant are currently weed infested. In order to prevent a further degradation of habitat quality and a spread of these species into adjoining areas, it is recommended that a Weed Management Plan for weed species that are listed under the *Biosecurity Act 2015* be prepared and implemented prior to the commencement of earthworks. The implementation of this plan should continue throughout the project life cycle, through to completion.

Provided these measures are implemented in an appropriate manner, the proposed development is unlikely to result in the establishment or spread of invasive species on the site.

- ***Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species***

The proposal is not considered a risk to the lifecycle of the listed migratory species.

Assessment of Significance Conclusions

In its current state, the subject site does not constitute important habitat for identified species. Remnant vegetation, including a riparian corridor bordering the Mehi River, is present adjacent to the proposal footprint. Such vegetation is likely to serve as significant remnant vegetation for a variety of threatened species and is considered to be the preferred habitat for vulnerable species over the proposed development site. The proposed development will not impact upon this habitat.

It is the conclusion of this assessment that there will be no significant long-term impacts on any listed ecological community, threatened or migratory species of national environmental significance as a consequence of the proposed development, providing:

- No vegetation is modified/impacted outside of the proposed development footprint;
- The design and management of the proposed works are carried out in accordance with best management practices and relevant guidelines;
- A Weed Management Plan is prepared and implemented prior to the initial earthworks, continuing throughout the project life cycle;
- An Environmental Management Plan is implemented throughout the project life cycle at Wandoona Quarry to ensure that works are conducted in accordance with environmental best practice and that off-site impacts are minimised.

Prepared by:

Marie Duffy

Marie Duffy BSc Hons., M.Sc.

Environment and Resource Consultant

References

DoE (2013) *Matters of National Environmental – Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment

DoEE Protected Matters Search Tool (accessed 2018). Department of the Environment and Energy Website: <http://www.environment.gov.au/epbc/protected-matters-search-tool>

Appendix 10 – Operational Environmental Management Plan



Johnstone Concrete & Quarries

JOHNSTONE CONCRETE AND QUARRIES

DRAFT OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

WANDOONA QUARRY

July 2016

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Document Verification

Johnstone Concrete and Quarries – Wandoona Quarry				
Document title:	Operational Environmental Management Plan			
Revision	Date	Prepared by	Reviewed by	Authorised by
Initial Release	04-06-2014	SMK Consultants	Peter Taylor SMK Consultants	Mitchell Johnstone (JCQ Director)
1	16-07-2015	SMK Consultants	Peter Taylor SMK Consultants	Mitchell Johnstone (JCQ Director)
2	5-11-2015	SMK Consultants	Brett Schoupp	Mitchell Johnstone
3	18-11-2015	SMK Consultants	Brett Schoupp	Mitchell Johnstone
DRAFT	20-06-2016	SMK Consultants		

Operational Environmental Management Plan		
Issue	Safeguards	Frequency
Scope and Objectives	The scope of this management plan is to outline an operational environmental management plan framework and outline tasks for management and staff to meet Company and statutory requirements for the extraction and operation of the Wandoona Sand and Gravel Quarry for Johnstone Concrete and Quarries.	
	The objective of this plan is to provide management and staff with sufficient detail of required tasks to operate the site in a proactive manner that would minimise the environmental impact of various activities on the site, in particular the extraction of sand and gravel from the site and operation of the processing plant.	
	This Environmental Management Plan incorporates all operational consent conditions issued by the Moree Plains Council together with all commitments made by the Proponent (except where modified by a condition of consent). A copy of the Consent is presented at the back of this OEMP.	
Potential Impacts	Operation of the facility will involve the extraction of an average 15,000 tonnes rock from the quarry, primary and secondary crushing, sieving and separating of gravel, stockpiling and blending of materials, loading and unloading of trucks, pre-coating of aggregate for bitumen road construction and dispatch of the stockpiled materials.	
	Potential impacts identified in the Environmental Assessment include noise from operations, dust generated from internal and external traffic and handling of gravel material, wind borne dust, and runoff containing silt.	
	Potential receptors of impacts from the facility include residents within a 2500m radius and agricultural properties adjoining the main haul road network.	
Roles and Responsibilities	Persons responsible for environmental management and decision making shall be delegated suitable authority to take action to achieve the objectives of this plan.	
	The Primary management and decision making role is delegated to the Company Manager, Mitch Johnstone.	
	The secondary management and decision making role is delegated to the Site Operations Manager, Site Supervisor/s on a daily or shift basis.	
	All staff employed on the site shall be inducted into their responsibilities under the plan and their responsibilities to manage the impact of their specific role on the site, these will be recorded as per the record sheet in Annexure 3.	On engagement or change of Role

Operational Environmental Management Plan		
Issue	Safeguards	Frequency
	Contractors or others hauling materials, predominantly sand and gravel, to or from the site shall be made aware of their responsibilities while traversing the site through the process of a site induction to be undertaken as per the Truck Operations Induction Procedure outlined in Annexure 1.	Upon engagement for hauling or delivery of materials
	A copy of the current OEMP document shall be available for inspection and perusal by staff and contractors at the site office and point of site induction. A copy is supplied to all staff involved with the operation.	
Hours of Operation	Hours of operation are between 7.00 am to 5.30 pm Monday to Friday.	
	Operations outside of these hours should be restricted to preparation for commencement of work but not including general maintenance, preparation of materials or operation of quarrying equipment.	
	If regular operations are to occur outside of these hours, permission should be obtained from Council and the NSW EPA under EPL 7379.	
Operational Triggers	Operation triggers will be observed as described under each trigger for site management to determine whether operational conditions are suitable to meet air and noise emission objectives with the aim on not exceeding offsite performance criteria set by NSW Legislation.	
Monitoring	The objective of monitoring is to quantify environmental impacts to determine whether objectives of this plan are being achieved and ensure regulatory compliance. Monitoring criteria for this site are discussed for each trigger below.	
	Any non-compliance with the conditions of consent or statutory instruments will be recorded and included in a report log for the site along with measures used to mitigate impacts.	
	An incident register will be maintained to record any incident and the method adopted to mitigate any environmental harm or non-compliance.	

Operational Environmental Management Plan		
Issue	Monitoring Requirements	Frequency
Surface Water		
Runoff Management	Inspect the site prior to any areas being disturbed to ensure that catch drains and sediment ponds are operational and that necessary sediment and erosion controls are in place.	Prior to work commencing.
	Confirm that erosion and sediment controls are maintained in accordance with design specifications to ensure that they are operating correctly. Corrective action to be instituted if necessary and follow up inspections undertaken to verify the outcome of the corrective action.	Weekly and within 24 hours of a significant rainfall event.
Control erosion and sediment	Progressively revegetate and maintain disturbed areas outside of the operation area in accordance with the remediation proposal approved within the consent conditions.	Continual
	Maintain sediment ponds and remove accumulated sediments to ensure adequate storage volumes are maintained.	
	Ensure operational work does not impact of remediated areas, however if it is necessary to disturb these areas, remediation is to follow in accordance with the approved proposal.	
Storage Capacity	Ensure that batters are not less than 3 horizontal to 1 vertical (3:1 H: V) in the sedimentation pond. Use water captured in sediment and storm detention ponds for dust suppression and road watering to maintain storage capacity in the detention system. Excess water from the sediment ponds is to be released through existing drain lines to the west.	As required
	Monitor depth of silt in sediment pond to ensure that adequate storage capacity is maintained for capture of first flush from site. Spread sediment removed from the sediment pond on regeneration or grass areas.	Annual
Noise		
Control Noise Emissions	Maintain equipment to manufacturers' specification. Operate equipment in accordance with the equipment operator's manual. Ensure that all guards and silencers are in place when equipment is being used. Trucks entering the site must be maintained in accordance with the manufacturer's specification to comply with relevant noise regulations. (Truck operator to provide details upon request by Management) Avoid unnecessary engine revving during operations. Maintain an adequate speed limit as sign posted (20 KPH) on the site for all vehicles in consideration of site conditions including road conditions, vehicle size, vehicle loads, frequency of vehicle trips and emission criteria for noise and dust.	Continual

Operational Environmental Management Plan																							
Issue	Monitoring Requirements		Frequency																				
	<p>Avoid the use of exhaust brakes on trucks while traversing the site.</p> <p>Maintain roads in smooth trafficable condition by removing corrugations and potholes to minimise empty trailer generated noise.</p>																						
Noise Criteria	<p>The operation of the site is restricted to the Day period in the NSW INP Amenity Criteria. The Day period is specified as 7am – 6pm Monday to Saturday, and 8am – 6pm on Sunday/ Public Holidays.</p> <p>The noise level criteria based on definitions provided in the NSW INP to be adopted for this site are as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th><th rowspan="2">Time of Day</th><th colspan="2">INP Recommended L_{Aeq} Noise Level dB(A)</th></tr> <tr> <th>Acceptable</th><th>Recommended Maximum</th></tr> </thead> <tbody> <tr> <td rowspan="3">Rural Residence</td><td>Day</td><td>50</td><td>55</td></tr> <tr> <td>Evening</td><td>45</td><td>50</td></tr> <tr> <td>Night</td><td>40</td><td>45</td></tr> <tr> <td>Passive Recreation Areas</td><td>All</td><td>50</td><td>55</td></tr> </tbody> </table> <p>These are noise levels to be adopted at the closest receptor point unless further information is presented to alter these levels.</p>		Location	Time of Day	INP Recommended L_{Aeq} Noise Level dB(A)		Acceptable	Recommended Maximum	Rural Residence	Day	50	55	Evening	45	50	Night	40	45	Passive Recreation Areas	All	50	55	
Location	Time of Day	INP Recommended L_{Aeq} Noise Level dB(A)																					
		Acceptable	Recommended Maximum																				
Rural Residence	Day	50	55																				
	Evening	45	50																				
	Night	40	45																				
Passive Recreation Areas	All	50	55																				
Monitoring	Noise monitoring to be undertaken under circumstances where a complaint is received about noise emissions. The monitoring is to include direct monitoring at the source of the complaint and monitoring of equipment if a particular source is identified.		When required																				
	Ensure all vehicles used on site comply with manufacturer standard emissions.		Continual																				
Operational Triggers	Under conditions of easterly wind, management is to monitor noise levels on the western boundary of the facility or directly at “sensitive receptors” if continual complaints are received. If noise criteria levels are exceeded, operations are to be modified to meet the noise criteria.		To be monitored as prevailing conditions determine																				
	Staff should be aware of noise emissions during early morning operations when minimal background noise is present. Under circumstances where minimal background noise is present, operators should carry out tasks in a manner that minimises noise emissions.																						
Noise Mitigation	If noise criteria levels are exceeded, a mitigation management plan is to be prepared to provide an active management process to identify the source of noise causing the exceedance and to take suitable measures to reduce the noise emission to an acceptable level.		Upon notification of continual noise exceedance issue																				

Operational Environmental Management Plan					
Issue	Monitoring Requirements				Frequency
Air Quality					
Dust					
Dust Emission Criteria	Pollutant	Averaging period	Maximum concentration	Criteria Source	
	Particles as PM10	1 day	50 µg/m ³	NEPM	
	Particles as PM2.5	1 day	25 µg/m ³	NEPM	
	Particles as PM2.5	1 year	8 µg/m ³	NEPM	
	Deposited dust	Annual	Max 4 g/m ²	NSW DECCW	
	Deposited dust	Annual	Max increase of 2 g/m ²	NSW DECCW	
Road and Traffic generated dust emissions	Minimise wind borne dust potential by selection of coarse pavement surfacing materials. Provide a specific location for trucks to stop and drop wheel dust along the entrance road. Use a water truck to dampen the main haul road on an as needed basis to control dust emissions. Ensure trucks remain on main haul roads.				Continual
Aggregate generated dust emissions	Minimise the exposure of aggregate between conveyor and stockpiles to avoid dust separation. Do not use any aggregate conveying equipment that disperses the aggregate stream allowing fine particles to be separated from bulk aggregate.				
	Maintain the water flow during the washing and separation process. Maintain the mist spray system to suppress dust in the secondary crusher, screening and separating process				
Monitoring	Visually monitor dust generation from work zones to ensure that excessive dust is not being produced. Inspect sites to ensure that adequate dust controls are being used, such as watering roads, pits and stockpiles.				Continual
	Monitoring equipment to be sited in accordance with AS/NZS 3580.1.1:2007 Methods for the sampling and analysis of ambient air-Guide to siting air monitoring equipment or applicable NSW standard.				
Operational Triggers					
Wind Direction and Speed	During winds from a northeast and east direction, management shall consider dust emissions that may result from site operations that may travel toward nearby rural residential areas.				
	Where wind speed reaches a velocity that causes wind borne dust during loading or unloading operations, the rate of operations are to be reduced to a level that does not exceed the				

Operational Environmental Management Plan		
Issue	Monitoring Requirements	Frequency
	capability of the road watering equipment to maintain the access and manoeuvring areas in a wet condition. A wet condition consists of sufficient water on the road to ensure that no visible road dust is observed from the passing of a truck.	
	Wind direction should be monitored using a simple wind sock or flag to determine wind direction.	
Water	Where insufficient water is available from local sources, management must import sufficient water to continue site operations.	
	If the supply of water is limited, operations are to be reduced to a level where dust can be managed by the supply of water available.	
Dust Mitigation	If dust criteria levels are exceeded, a mitigation management plan is to be prepared to provide an active management process to identify the source of dust causing the exceedance and to take suitable measures to suppress the dust emission to an acceptable level.	Upon notification of continual exceedance issue
Soil Management		
	Approximately 1m depth of topsoil and unsuitable clay overburden will be removed to allow access the sand and gravel material. (Approximately 10,000 m ³ of overburden to be accumulated on site.)	Commencement
	The initial topsoil and spoil material is to be stockpiled on the southern edge of the pit area in a peaked bank to form a noise and visual barrier between activity on the site and the closest neighbour.	Upon commencement
	As the pit face extends forward, topsoil and overburden removed from the pit area is to be stockpiled along the outside of the excavation to form a diversion bank to a maximum height of 0.5m above ground level.	Continuously
	Excess topsoil and overburden that would form a mound greater than 0.5m should be hauled and stockpiled at the original southern stockpile to minimise the potential for disturbance to flood flows across the site.	
	The edge of the pit area should be maintained so that all rainfall falling between the pit and the adjacent haul road (where applicable), flows toward the pit to ensure that any eroded sediment is captured in the pit.	
	The main sieve and stockpile area is to be incorporated within a diversion drain area which will minimise the release of sediments from this working area.	
	The diversion drain around the sieve and stockpile area is to direct runoff into the proposed sediment and water recirculation ponds.	

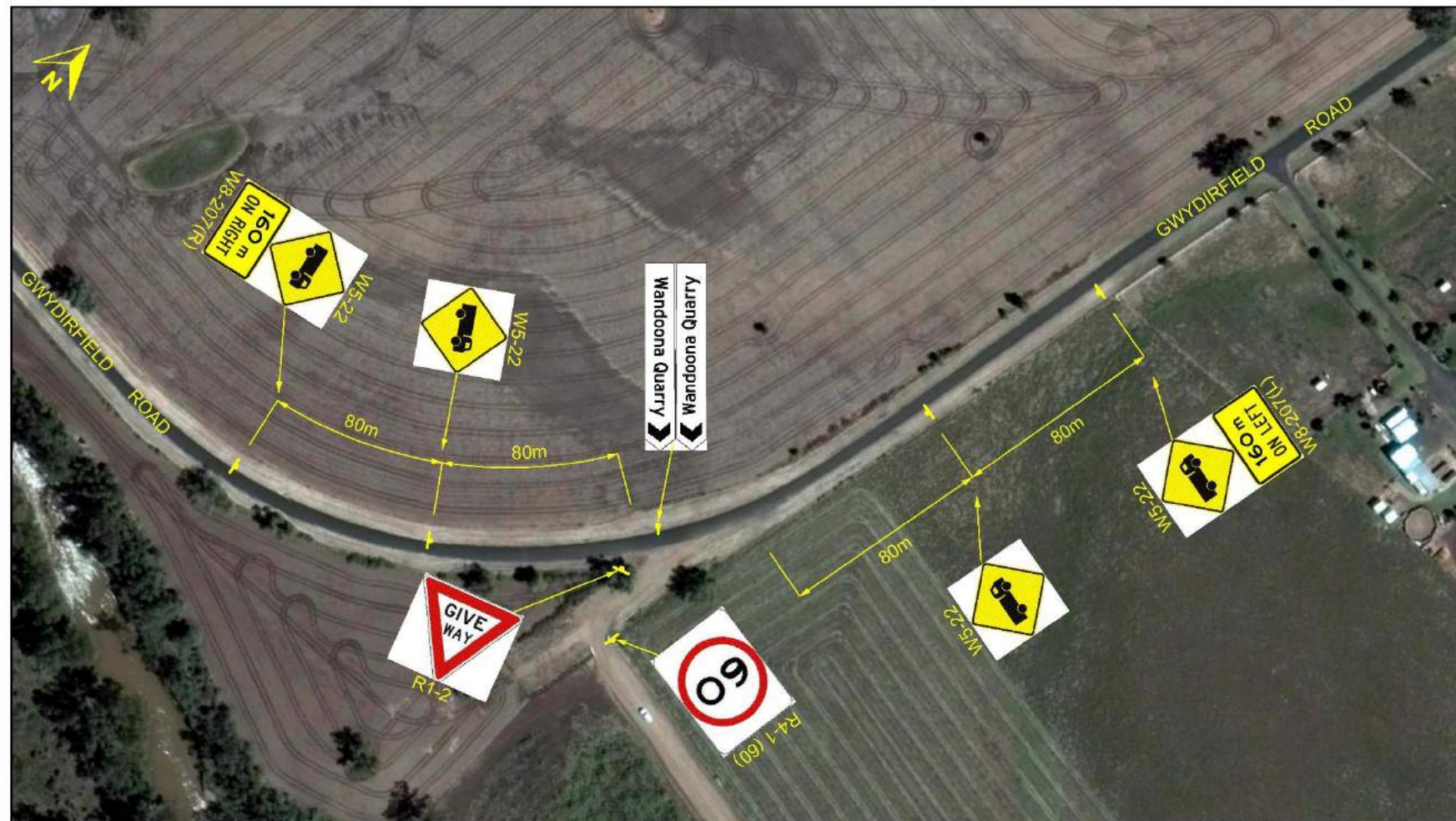
Operational Environmental Management Plan		
Issue	Monitoring Requirements	Frequency
Site Rehabilitation		
	The batters surrounding the depleted excavation area should be graded to 3H:1V to stabilise the slope and then topsoil is to be spread evenly over this surface.	
	Topsoil should include local ground cover including grasses to stabilise the batters.	
	Where the topsoil does not contain appropriate ground cover species, seeding is to be undertaken.	
	Selective herbicides are to be used to control weed species which may generate is disturbed areas.	
	Monitor the condition of extraction areas and ensure that batters meet appropriate standards (3H:1V).	Weekly
	Inspect disturbed areas that have the potential for wind and water erosion and confirm stability.	Weekly
	Monitor sedimentation ponds and drains for sediment build up.	As required
Rehabilitation Establishment and Controls		
	Monitor rehabilitated areas to ensure that pasture establishment is proceeding and that erosion controls are functioning as designed.	Monthly
	Final land form will involve grading of low banks to divert overland flow of surface waters as much as possible away from the final void so as to limit the amount of water that accumulates in the void.	
Aboriginal Heritage		
Artefacts	Report any Aboriginal objects discovered during operations to the Department of Environment. Cease work in the area the object came from pending advice from NSW NPWS in addition to an independent archaeologist.	As necessary
Hazard and Risk		
Fire Risks	<p>The company will ensure that vehicles and plant used in the quarry operation are fitted with effective exhaust systems to reduce the possibility of bushfire.</p> <p>All earthmoving machines and trucks used on site will be equipped with suitable fire extinguishers.</p> <p>Effective fire breaks shall be established and maintained around work areas and appropriate asset protection zones shall be established and maintained around buildings and plant storage areas.</p>	

Operational Environmental Management Plan		
Issue	Monitoring Requirements	Frequency
Fuel and Oil Spill	<p>Fuel and oil sufficient to refuel and service plant and machinery used in the quarry operations will be transported to the site on a day to day basis as required. This will ensure that should there be a spill the quantity involved will be small. Fuel will be removed from the site and returned to the JCQ plant on Inverell Road.</p> <p>Should any fuel or oil be spilt then contaminated soil will be moved to a bunded area for remediation in accordance with the requirements of the Contaminated Land Management Act.</p>	
Worker safety and training	<p>Develop and implement a site induction plan in conjunction with the OH&S to include adherence to the OEMP.</p> <p>Advise all staff and contractors onsite of their obligations under the OEMP.</p> <p>Ensure all workers, contractors and visitors receive appropriate site induction prior to commencing work or entering the worksite.</p>	
Pest and Weed Control	<p>Inspect the site on a regular basis to ensure that no pests, vermin or noxious weeds are present on site in sufficient numbers to pose an environmental hazard.</p> <p>All chemical use to be undertaken in accordance with Manufacturer's instructions.</p>	As required
Complaints		
	All complaints are to be dealt with by Site Management upon receipt of the complaint to record details of the complaint, the complainant, date of the problem, the cause of the complaint, the result of the impact and any changes made to operations or the OEMP as a result of the complaint.	
	Complaints shall be recorded with a standard methodology in accordance with EPL 7379 (Refer to Annexure 2: Complaints form).	
	Complaints are to be dealt with in a timely manner.	
	The complainant is to be provided feedback on any action taken to resolve the issue.	Within 1 business day
Complaints Contact	The company maintains an office number 02 6752 2154 and a mobile number 0427 540 212. The Post Office Box 941 Moree 2400 is alternatively available for public contact.	
	The term operating includes periods where aggregate is being extracted or despatched from the site and maintenance is being undertaken on the site.	
Modification to EMP	This OEMP can be modified by Johnstone Concrete and Quarry's Manager under circumstances where data is obtained to indicate that changes are required as a result of operational	

Operational Environmental Management Plan		
Issue	Monitoring Requirements	Frequency
	changes or operational control/limit changes that may on occasion be required as a result of site management decisions, policy changes or changes to consent conditions.	
	Copies of any modifications to be supplied promptly to Council for its consideration as to consistency with the approvals in place.	
Contingency Planning	If management identify a potential to exceed noise, dust or other emission criteria, corrective actions shall be taken to avoid the exceedance.	
	Where corrective action of site operations is not considered sufficient to reduce site emission to performance criteria, site management shall cease site operations until conditions change or can be managed to a level which would avoid exceedance of accepted criteria.	
	Records shall be maintained of such incidences (Appendix 1 – Incident Reporting Form). The records shall include but not limited to: Date, time, description of site activity, conditions causing potential or actual performance criteria exceedance, recorded data used to determine the exceedance level, person/s responsible for controlling action, duration of event and whether the activity was linked to a complaint or direction from authorities.	As required
Shutdown Protocol	Shutdown procedures will be initiated by management should any of the following events occur: <ul style="list-style-type: none"> • Onset of heavy rainfall events • Dust emissions exceed daily average of 50 µg at the nearest sensitive receiver • Noise emissions exceed 35 dB at the nearest sensitive receiver 	
	A review is to be undertaken as a result of a site shut-down to determine corrective actions that shall be put in place to correct the cause of the shutdown procedure.	As required

Annexure 1 OEMP: Truck Operations and Traffic Management Induction Procedure**Control Driver Behaviour, Noise and Dust Emissions**

Truck operators Regulations	It is the responsibility of the truck operator to conform to Johnstone Concrete and Quarries site policies for truck standards and operation within the boundary of the Facility and while under contract to collect and deliver material from the Quarry.
	Operate equipment in accordance with the equipment operator's manual.
	Trucks entering the site must be maintained in accordance with the manufacturer's specification to comply with relevant noise and emission regulations.
	Ensure that all guards and silencers are in place when equipment is being used.
	Truck operator to provide details of registration and truck road worthy certification upon request by Management
	Avoid unnecessary engine revving during operations.
	Do not exceed the speed limit of 40 km/h on the site for all heavy vehicles in accordance with internal speed signs.
	Avoid the use of exhaust brakes on trucks while traversing the site.
	Trucks may only enter and exit the site from the designated entrance road.
	Truck speed to be limited to 60 km/h on Gwydirfield road and take caution when approaching and keep left when passing other heavy vehicles, including school buses.
	Trucks to be separated by a minimum of 3 km or 5-minutes during hauling from the site.
	Trucks only to leave site with permission of Site Manager or weighbridge controller.
	All loads leaving the site are to be covered in order to prevent dust emissions from the material being carried during truck movements.
	Trucks to abide by traffic signs at the entrance to Wandoona from Gwydirfield road in accordance with the following traffic management plan and subsequent changes to the signs.
	Johnstone Concrete and Quarries has the right to request an Operator to remove his truck from the site if it is suspected that the truck or operator does not conform to manufacturers specifications or the operator does not abide by these regulations established for vehicle operation on this site and whilst under contract to this site.



CLIENT: Johnstone Concrete & Quarries		PROJECT: Traffic Management Plan		COMPUTER FILE: TRAFFIC CONTROL PLAN.mxd	SHEET No. 1 of 1 JOB No. M-160
SCALES: HORIZ 1 in 2000 VERT _____ DATUM: _____	A4	SMK CONSULTANTS surveying - irrigation - environmental PO BOX 774 MOREE 2400 PHONE (02) 67 521021	DESCRIPTION: Traffic Management Plan for the entrance to the quarry at "Wandoona", Gwydirfield Road, Moree		PLAN REVISION: A FIRST ISSUE 02-07-2015 B SIGN ADDED AT INTERSECTION 19-08-2015 C
SURVEYED: <u>SMK CONSULTANTS</u> DESIGNED: <u>JAMES LILLYMAN</u> CHECKED: <u>PETER TAYLOR</u>					

Annexure 2 OEMP: Incident Reporting Forms and Register Forms

[illegible]

Complaint Form

Date:

Time:

Name of person receiving the complaint:

Name of Complainant:

Address of Complainant:

Contact Details of Complainant:

Complaint detail:

Date and Time of Incident:

Wind direction and estimate wind speed at time of incident:

Possible cause of pollution/Pollution source:

Action to resolve complaint

Complaint acknowledged:

Date: Time:

Complainant Advised of any action :

Date: Time:

Person the complaint was referred to:

Annexure 3: Induction Record of Staff and Contractors

[illegible]

Appendix 11 – Submissions Recieved in Response to the Proposed Development

Enquiries to: Murray Amos
Direct Line: (02) 6757 3248
Email: Murray.Amos@mpsc.nsw.gov.au
Reference: DA2016/45 MDA:PC



08 November 2016

Johnstone Concrete & Quarries Pty Ltd
C/- PO Box 774
MOREE NSW 2400

Dear Sir/Madam,

Proposal: Extend total footprint to 12.6ha including roads and temporary infrastructure
Application No: DA2016/45
Address: "Wandoonah" Gwydirfield Road MOREE
LOT: 5 DP: 236547

The notification period for the above application has now been completed. During this period Council received a total of 4 objections. Submissions were also received from several state agencies.

Copies of the submissions are attached for your consideration. You are requested to provide Council with a written response to the matters raised in the submissions. This information is of assistance in carrying out the assessment of your application and therefore should be provided prior to the matter being reviewed by Council.

Please note that the matter will be reviewed at a meeting of Council.

Should you have any queries in relation to this matter please contact Council's Planning and Community Development Department on 02 6757 3248.

Yours faithfully


Murray Amos
SENIOR URBAN PLANNER
PLANNING AND COMMUNITY DEVELOPMENT

PO Box 420, Moree NSW 2400
Telephone 02) 6757 3222
Facsimile 02) 6752 3934
council@mpsc.nsw.gov.au
mpsc.nsw.gov.au

30th August 2016



B & J Jones
Homelea
MOREE NSW 2400

Phone: 02 67524531

Moree Plains Shire Council
PO Box 420
MOREE NSW 2400



To whom it may concern,

SUBMISSION RE DEVELOPMENT APPLICATION DA2016/45 EXTEND EXISTING QUARRY

My main objection to the Wandoonah quarry is what it has done to the quiet rural life style that me and my neighbours have enjoyed for many years, the low volume of traffic we were used to, is now a thing of the past. Since the Wandoonah quarry has opened it has turned into a rat race, the amount of trucks now using the road has changed the area completely.

At the first meeting I attended, I was able to express any reasons for not wanting the quarry to go ahead, but Council passed the project with certain restrictions. There was to be only one truck every hour, on many occasions I have counted one truck movement every five minutes and this has gone on for 2 and 3 weeks at a time. At a meeting I explained to Council that road trains were being used, and in front of Council, Brett Schoupp stood up and denied this was so, I have enclosed a picture of one of these trucks which has a gross weight of over 70 tonnes. Mr Schoupp and the Johnstone's also stated there was to be 15,000 tonnes per annum taken, I have seen more than that amount pass my gate in ten days.

I have been associated with Wandoonah for 66 years and lived on the adjoining property for 46 years and most of the projects (roads and quarries) which are in the impact statement are incorrect. I know this to be correct as my irrigation pump site is not far from where these so called gravel pits are supposed to be and I farmed a large portion of Wandoonah on many occasions and was in charge while John Houlahan was absent. Also John Houlahan employed me to clear box thornes off the whole of Wandoonah, this was mainly undertaken from 1970 up until about 1995.

Page 2

The only compromise I can suggest is to make Johnstone's stick to the original agreement, and send half the trucks the other way on the western road. The best idea would be to build a low level bridge over the Mehi River. Wal McDonald did that when he carted all the gravel for the Drive in Theatre and other contract's that he had at the same time. Another method would be to get an easement through Wee Bolla Bolla and cross the river at the Solling's crossing.

I have been a rate payer for nearly 50 years, I don't understand why when the rate payers are the backbone of any Council that we seem to get so little say when big business is involved.

Yours Sincerely,

A handwritten signature in cursive script, appearing to read 'Bernie Jones'.

Bernie Jones



11 AUG 2016
BY *S. Sutton*

Mr. G. E. Farrar
Tullaboobori
Inverell Rd
Moree NSW 2400
11th August, 2016

Mr A. Witherby
Planning & Building
Moree Plains Shire Council

Dear Mr Witherby,

Thankyou for seeing Mr Bernie Jones and I yesterday morning in relation to Johnston's proposals.

It is a very lengthy document and I have briefly "skimmed it" and thought I would individually mention a few matters which became evident to me.

I note on page 11 that I could be subjective to perhaps 5-10 days every few months of constant processing of materials for up to 8 hours a day by way of processing and stockpiling for sieving and separation. If this also requires water pumping then noise sources would be severe and it seems a drastic increase from the limit of 150 tonnes per day in the original consent.

Incidentally, has any sieving activity taken place so far? As regards water, there is no indication on the maps of a pump site, diesel generator or river pump. On the very few occasions when a water cart was filled, it was done across the river from my house and the motor used was attached to the truck. I would like the location to be advised.

I note that on page 14, that all materials will be weighed on the weigh bridge provided at Drive In road. However, we are aware that substantial quantities of material was delivered direct from the quarry to construction sites around Moree. As I said earlier, dust suppression by way of a water truck was rarely done. Clearly the convenience of the local residents is expected to give way to the demands of the applicant in allowing a substantial increase in the number of truck movements a day.

On page 15, mention is made of truck speeds and accompanying matters. The dust factor is of great concern to residents close to the road as is safety.

On page 16, water requirements are discussed and there is again mention of a diesel generator and 'electrically driven pump'. Again I am unaware of the existence or location. It is stated their water is available without the river flowing. I suspect the waterhole involved is the one I also use by way of riparian rights for watering livestock and domestic purposes so I have concerns if water is extracted when the hole is close to empty.

11th August, 2016

-2-

Mr. G. E. Farrar
Tullaboobori
Inverell Rd
Moree NSW 2400

Hours of operation on page 17 and 18 are reasonable but I would not agree that maintenance of plant and equipment should be allowed for the extended hours of 6am to 10pm. Exceptional circumstances for additional truck movements are only included for the convenience of the applicant.

Land use conflict on page 19 can be managed but past history has not directed that the applicant will be cooperative in the future.

The acoustic impact study shows I am substantially more affected in all conditions than other nearby residents. Things such as extending hours for various functions can only exacerbate the problem.

Pages 20, 21 and 22 cover the transport route and there will be much more discussion on this subject.

Pages 25 and 26 include flood impacts from structures. I personally would be concerned if it was found that the stockpiles of overburden caused the river height to be raised affecting my residence on the south side of the river. I have very little "freeboard" in the 1976 and 2012 floods.

On page 36 it is wrongly stated that the quarry had operated since 2012. I would have thought more like 2014 and referring to "minimal complaints" is laughable.

Contrary to page 46, there are definitely koalas in the area. We have seen koalas in the trees around our house on a number of occasions and they were also observed by Mr. Terry Livet, Coolibah Horticulture.

Page 51 assesses impacts on traffic, noise, air quality etc. It says receiver 1 (my house) is 370m south west of extractive operations. Page 19 states the recommended minimum buffer for rural dwellings is 500m. (so much for Council's consideration for ratepayers!). The table 7 shows clearly that in all conditions, I am substantially more affected than any other of the nearby residents.

Page 55 refers to dust management. It has generally been non-existent in the past!

Regards,



Geoff Farrar

31th August 2016

GS & JM Cubis
375 Gwydirfield Road
MOREE NSW 2400

Phone: 0427 008 704

Moree Plains Shire Council
PO Box 420
MOREE NSW 2400



To whom it may concern,

SUBMISSION RE DEVELOPMENT APPLICATION DA2016/45 EXTEND EXISTING QUARRY

We are writing to object to the extending of the existing quarry at "Wandoonah" Gwydirfield Road Moree LOT: 5 DP: 236547. When the initial development application was submitted, we were told that there would only be a handful of trucks from the quarry on the Gwydirfield Road a day. As we now have trucks starting at 6:00 am in the morning and going all day on many days, I am concerned that extending the quarry will only increase the traffic more.

This was a quiet rural subdivision and now we are losing the rural feel with these trucks using the road non stop. I have no problem with businesses being able to operate, and I feel that we were very considerate in having no objection to the initial development application, but now the extra traffic with all these trucks is just too much.

We are also concerned that the actual Gwydirfield Road is not up to appropriate standard for so many trucks, especially the road trains, which we were told would never be used in the initial DA application. When we have to pass these trucks all the time and there is barely enough room it is quite concerning for us. The other concern is who is going to cover the costs for maintaining the Gwydirfield Road, this is a lot of extra traffic that was not here before and trucks do so much damage to roads.

The only real alternative that we can see is as Johnstone's are the ones who benefit financially from this Quarry, I feel it should be up to them at their expense to put their own low level crossing in across the Mehi river so as not to interfere with the people of Gwydirfield, we have been here a lot longer.

I hope you will take into consideration our concerns regarding the proposed extending of the existing quarry. We are the ones who have to deal with this on a daily basis and I don't think it is really fair that we are just expected to put up with all these extra trucks using the Gwydirfield Road, we are the ones it affects every day.

Yours Sincerely,

Gary & Julie Cubis.



Mr. G. E. Farrar
Tullaboobori
20358 Gwydir Hwy.,
Moree NSW 2400
31st August, 2016

The Moree Plains Shire Council
PO Box 420
Moree NSW 2400

Letter of Objection to Application DA 2016/45 – Extension to Wandoona Quarry

I wish to object to the 600% increase in the size of the quarry on various grounds outlined below:

I want to start by briefly commenting on some aspects of the application. It repeats the fable of the original application in suggesting that the property had been the site of substantial quarrying for council and other developers. It was on a minute scale – to the extent that I, as a close resident for the past 49 years, was totally unaware that any activities of this nature had occurred. Similarly, Mr Bernie Jones, who has lived on Gwydirfield Road for nearly as long and had often undertaken pig catching, fishing etc. all over the area, dismisses the activities as negligible.

It seeks to expand the area available from 2ha to 12.6ha but states that it is not expected that the extraction will increase from the current level of 15,000 tonnes except in exceptional circumstances. It is now proposed to extract and process for up to 10 days straight every 2-3 months with the sieving plant processing 1,000 cubic metres a day or up to 10,000 cubic metres per 10 day period. It talks about “men” being employed in this operation but two paragraphs later suggests to it being a one man operation. More daily truck movements are required but, having regard to the total quantity being the start, this is purely for the economics of the applicant and the disadvantage of residents on Gwydirfield Road. Having regard to the material provided in the past to other projects such as the B-Pass, Solar Farm etc, I am sceptical that production has remained below 30,000 tonnes per year and I believe the EPA should have been involved.

When considering the application, I believe it is appropriate to consider the performance of the applicant in the past. It appears to me that the applicant has largely ignored the conditions and regulations applicable to the license to operate if it interferes with the task in hand.

They illegally opened a second pit about 1 kilometre to the west. On one Sunday soon after, they ran more than 100 truck movements along the Mehi River, largely within 40 metres of the bank and adjacent to my home on the opposite side. The movements, I believe, were designed to hide them from view and make them appear to be coming from the registered pit. The noise was extremely loud at my home.

Dust control has been essentially non-existent. The water truck was filled from the river opposite my residence and I doubt that the truck operated on more than a handful of occasions. Dust is a serious problem for my wife and her asthma has been considerably worse on occasions of activity at the quarry when the wind is northerly.

You could say that regulations were adhered to only to the extent that they did not interfere with the applicants operations. Truck movements exceeded the 16 truck limit on numerous occasions.

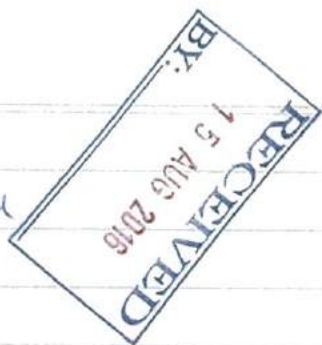
Matters of Particular Concern

1. The sieving plant has been relocated to a position closer to my residence. It must be returned to the original position.
 2. The applicant has obtained a water license to pump required supplies from the Mehi River. Apparently there will be a diesel motor providing power to the pump site and it will be situated outside the area of other plant and I am concerned by the noise potential. The application says water will be ordered on a regular basis, but NSW Water advise me that delivery would only occur when substantial orders have to be filled.
 3. I see no reason why an extension of hours should be permitted for maintenance purposes.
 4. It is unacceptable to expect to be granted extended hours for any purpose, particularly to talk of 24 hours operations.
 5. The proposed extension of quarrying to the west is in my eyeline from my residence and further affects my visual amenity and my right to peaceful enjoyment of my property. Work towards the north would have a lesser effect on my amenity.
 6. I am concerned that the extension west does not involve works closer to the river as it could have the potential, in a flood, to push water towards my residence which has never been flooded but water gets very close to the house.
-
7. The river pump has not been part of "existing infrastructure" as it was not installed (is it installed?) because the license for it was not issued until 28th May, 2015.
 8. The submission suggests that I have been "exposed to various random and irregular extractions of gravel for the past 20 years". That is absolute rubbish. As I said earlier, I was totally unaware of any activities (visual or otherwise) on the property prior to Johnstone's commencement of mining.

In conclusion, I would believe that the applicant should not be permitted to increase the size of its operations as its past performance and failure to adhere to the rules render it unsuitable and apparently incapable of performing the proposed activities in a regulated manner.


.....
Geoffrey E. Farrar

2 alt Bull
"Blueguns"
285 Guyrafield Road
Moree NSW 2400



14th August 2016
Moree Plains Shire Council
Moree NSW 2400

Re: Proposal: Extend Excavating Quarry
Application No: D.A. 2016/45
Address: 'Wendooanah' Guyrafield Rd Moree
Lot: 5DP: 236547

Dear Sir or Madam,

To whom this may concern.
Thank you for passing more information
regarding the quarry proposal.

My concerns are the same as the first
communication I had with your Department
regarding this matter.

The noise issue still applies, as motors
will be running all the time, traffic is also
a concern in this area, so far there are
days when the trucks are in a conveyer
in and out of this area.

The dust issue has not been dealt with
in fact, it has been ignored, the
watering of the area lasted about 2 weeks
& then stopped.

I am not wanting to stop a business,
but it will certainly affect the land
values of those living close to this quarry.

Also Guyrafield Road is not wide
enough for large traffic, the few heavy
transport we have at this time are assessed.

2.

As it is we have to go off the road when a large truck or bus is on the road, but up until now this has been minimal.

I have experienced my own asthma before, and as I have lived here for many years, and have no wish to move I would like the issues of concern to be dealt with, as I am an Asthmatic, the dust issue is a real concern.

I do not have a problem with Jensen's business running a business but would like the matter of management to be adhered to.

Thanking you for your time.
Yours Sincerely
H. Bell!

Pam Campbell

From: Andrew Scott <andrew.scott@dpi.nsw.gov.au>
Sent: Friday, September 16, 2016 1:18 PM
To: Pam Campbell
Cc: Murray Amos
Subject: Re: "Wandoonah" quarry extension.
Attachments: image002.png; image003.png; image004.png; image001.png

Hi Pam and Murray,

Thanks for forwarding a link.

Due to the history, location and size of the development NSW DPI Agriculture does not have any significant issues with the proposal.

It is requested that significant consideration be given to improving rehabilitation of the site to its preexisting land use land capability. All current and future extractive industries rely on all operators to conduct operations to a high standard to maintain a social licence to operate under the current regulatory framework, otherwise the regulatory framework for small operations will tighten.

Please make the proponent and SMK aware of our guideline "Agriculture issues for extractive industry development. While it is a comprehensive guideline proponents of small low impact developments would not be expected to address all the issues raised but should consider if they are relevant and address where necessary. Link: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/367763/Agriculture-issues-for-extractive-industry-development.pdf

Thank you,
Andy

Andrew Scott | Resource Management Northwest (Barwon) Region
| NSW Department of Primary Industries | NSW Agriculture
Tamworth Agricultural Institute |
4 Marsden Park Road | Calala | NSW 2340
T: 02 6763 1142 | M: 0427 245 313 |
E: andrew.scott@industry.nsw.gov.au
W: www.industry.nsw.gov.au | www.dpi.nsw.gov.au

"Plan- Resource -Grow"

Building thriving,sustainable Agriculture for tomorrow's communities

Primary Industries land use planning information and guidelines are available at:
<http://www.dpi.nsw.gov.au/agriculture/resources/lup>

On 6 September 2016 at 09:20, Pam Campbell <Pam.Campbell@mpsc.nsw.gov.au> wrote:

Hi Andrew,



Department
of Industry
Resources & Energy

22nd August 2016

Mr Murray Amos
Senior Urban Planner
Moree Plains Shire Council
Level 2, Max Centre
30 Heber Street
MOREE NSW 2400

Emailed: council@mpsc.nsw.gov.au

Your Reference: DA2016/45 MDA:PC
Our Reference (TRIM): OUT16/30032

Dear Mr Amos

Re: Wandoona Sand and Gravel Quarry – EIS Exhibition

Thank you for the opportunity to provide advice on the above matter. This is a response from NSW Department of Industry – Geological Survey of New South Wales (GSNSW).

GSNSW provided Secretary's Environmental Assessment Requirements to the Department of Planning & Environment on 2nd November 2015 (OUT15/30556) for the expansion of the Wandoona Quarry (EAR ID No.991). The Environmental Impact Statement does not adequately address the resource assessment requirements of the Division.

The EIS describes the resource as; *a substantial deposit of high quality sand and gravel materials that meets the requirements of the local building and civil construction industry*, being approximately 0.5m below ground level, extending to depths of 6 – 8m or more, indicating a lifespan of 30 years or more. It is acknowledged the proponent has a good understanding of the resource size and quality, however this has not been adequately described in the EIS.

It is desirable that the EIS contain a detailed map and cross-section/s of the site area indicating how this resource estimate was calculated. If it is based partly or wholly upon previous extraction then this should be explained in greater detail. If any drilling or trenching has been carried out then the locations of such data sources should be indicated on the map and logs of any drilling and/or trenching included as specified in Attachment A of the Division's requirements. It is also desirable that the EIS describe how the material quality is suitable for the intended purpose/s as raw and processed aggregate with the results of any testing of the material included.


Petroleum Exploration License (PEL) 6 exists over a broad regional area including the subject site. In this regard, landuse compatibility issues including provisions of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 have been addressed and GSNSW has no issues in regard to potential landuse conflict or resource sterilisation, however Council's consideration of Clause 15 – Resource Recovery would benefit from a more robust resource assessment.

NSW Department of Industry, Skills and Regional Development
RESOURCES & ENERGY DIVISION
PO Box 344 Hunter Region Mail Centre NSW 2310
Tel: 02 4931 6666 Fax: 02 4931 6726
ABN 51 734 124 190
www.industry.nsw.gov.au

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

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the GSNSW Land Use team at.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Cressida Gilmore', written in a cursive style.

Cressida Gilmore
Manager- Land Use



Department of Primary Industries Water

Contact Christie Jackson

Phone 02 6763 1426

Email christie.jackson@dpi.nsw.gov.au

Moree Plains Shire Council
PO Box 420
MOREE NSW 2400

Email: council@mpsc.nsw.gov.au

Attention: Murray Amos

Dear Mr Amos,

Referral of Designated Development DA 2016/45 Wandoona Quarry, Moree

I refer to your letter dated the 4 August 2016 seeking the Department of Primary Industries – Water's (DPI Water) comments on the Environmental Impact Statement (EIS) for the proposed expansion of Wandoona Quarry at Moree. A more detailed groundwater assessment against the Groundwater related Secretary's Environmental Assessment Requirements (SEARs), is included in Attachment A, for Council's information.

Water Use and Licencing

The EIS outlines the quarry requires 17ML of water per annum for sand washing, dust suppression and employee facilities. The proponent has a current high security surface water licence for 18ML. The proponent is required to order this water when required. However, it is unclear if the proponent has an adequate surface water supply or security of this supply. The EIS only addresses the Wandoona Sand Quarry when the water access licence is for the proponent's two quarries. There is no discussion in this EIS of the water use for the second quarry. The potential issue of reduced surface water entitlement due to announced Available Water Determinations (AWD) has not been addressed in the EIS.

Groundwater Management

- DPI Water has reviewed the EIS and considers there are annual volumes of proposed groundwater take by the activity that has not been accounted for by the proponent and is currently not licenced including:
 - Pumping from the water hole in the Mehi River during periods of no surface water flow.
 - Incidental groundwater inflow and evaporation from the current quarry and the proposed quarry expansion that are to be quarried down to the water table.

- The EIS does not adequately address the Secretary's Environmental Assessment Requirements (SEAR's) and of relevance the requirement to identify proposed surface and groundwater monitoring activities and methodologies. The proponent has not acknowledged it will have groundwater impacts and thus states that no groundwater monitoring is required. DPI Water believes that groundwater take is occurring and recommends the proponent work with DPI Water in developing an approved groundwater monitoring plan as a condition of approval.

Recommendations:

DPI Water recommends that prior to approval of the EIS, the proponent:

- 1 Estimates how much groundwater it has historically taken from the water hole in the Mehi River during periods of minimal or no surface water flow.
 - 2 Presents a revised water balance accounting for evaporation from the water table in its existing quarry and in the proposed expansion.
 - 3 Accounts for the ongoing groundwater take due to evaporation losses following completion of the project.
 - 4 Secures appropriate and adequate groundwater entitlements for the relevant groundwater source/s for all groundwater take based on the results of 1, 2 & 3 above.
 - 5 Works with DPI Water on getting an approved surface water and groundwater monitoring plan.
 - 6 It is recommended the proponent report groundwater and surface water monitoring results annually to DPI Water.
 - 7 Assess any potential cumulative impacts from their proposed activity on groundwater resources, and any proposed options to manage the cumulative impacts.
-
- 8 Assesses the impact of its activity against the Aquifer Interference Policy.

If you require clarification on any of the above please contact Christie Jackson on (02) 6763 1426 at the Tamworth office.

Yours sincerely,



Patrick Pahlow
A/ Manager Water Regulatory Operations
1 November 2016



DOC16/413217
DA2016/45

Mr Murray Amos
Senior Urban Planner
Planning and Building
Moree Plains Shire Council
council@mpsc.nsw.gov.au

Dear Mr Amos

RE: Wandoonah Quarry Extension Environmental Impact Statement

Thank you for your letter dated 4 August 2016 seeking comments from the Office of Environment and Heritage (OEH) regarding the proposed Wandoonah Quarry Extension proposal (DA2016/45).

OEH understands that the proposed extension would increase the footprint of the gravel quarry from 4.3 ha (including the existing quarry and access roads) to a total of 12.6 ha. The proposed expansion is to be located within areas that have been previously cleared and cultivated.

Flora and Fauna

The EIS contains minimal information regarding flora and fauna on the site. However, it does identify that the riverine corridor on the property will not be impacted. While data is not included in the EIS to substantiate the description of the impact area as "highly disturbed", a desktop assessment of aerial photography by OEH supports the description of the area having been cleared and cultivated, and therefore having low habitat value for native flora and fauna.

It is apparent that the property contains riparian vegetation and paddock trees within a largely cleared and cultivated understorey. Section 3.10 of the EIS indicates that these "river gum" and "river Sheoak" will remain undisturbed. Figure 2 of the EIS, while unclear, indicates that there may be some clearing of scattered paddock trees for the gravel pit expansion areas and a centre pivot. The numbers and species of trees to be cleared have not been identified.

Recommendation

1. If paddock trees are to be cleared, the proponent should offset the loss of those trees by enhancing the riparian vegetation along the Mehi River.

Aboriginal Cultural Heritage

Section 6.9.1 of the EIS states that due to historical disturbances and landscape features which would not be considered beneficial to potential archaeological sites no Aboriginal Cultural Heritage assessment is considered necessary. An Aboriginal Heritage Information Management System (AHIMS) search has been included with the EIS, with no Aboriginal sites or places recorded for

Wandoonah. The EIS states that the proposal has been assessed in accordance with Council's Procedural Practice: Assessment of Aboriginal Cultural Heritage.

OEH notes that a due diligence assessment has been conducted, but remains concerned regarding the potential for Aboriginal objects to occur at the site. We strongly advise that, due to the sensitivity of the Mehi River area, the proponent proceeds with caution.

Recommendation

2. A ground inspection of the site for Aboriginal heritage is conducted prior to works proceeding.

If you have any queries, please contact Liz Mazzer, Conservation Planning Officer, on 02 6883 5325 or email liz.mazzer@environment.nsw.gov.au.

Yours sincerely



STEVEN COX
Senior Team Leader, Planning
North West Region

Date: 2 September 2016

Contact officer: LIZ MAZZER
02 6883 5325



1 September 2016

SF2015/171139; WST15/00139/02

General Manager
Moree Plains Shire Council
PO Box 420
MOREE NSW 2400

Dear Sir

DA2016/45: Lot 5 DP 236547; 'Wandoonah' Gwydirfield Road, Moree; Extend existing quarry

Thank you for your letter dated 4 August 2016 referring DA2016/45 to Roads and Maritime Services for comment. Reference is made to Roads and Maritime's previous submission to the Department of Planning and Environment dated 30 October 2015 (copy enclosed). DA2016/45 has been referred to Roads and Maritime in accordance with Clause 16 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

The information submitted in support of the proposal is inadequate. The submitted documentation includes a statement that the current consent restricting haulage movements to 16 movements (eight trips) per day is considered impractical by the proponent, however, no details of proposed haulage operations under this application have been provided.

Roads and Maritime, at this time, withholds making comment. To enable Roads and Maritime to complete an assessment of the proposal, the following additional information is required:

- Quarry related haulage and traffic generation details, including a traffic impact study, and, assessment of the suitability of the Newell Highway (HW17) and Gwydirfield Road intersection to cater for increased traffic movements generated by the proposal. The additional information is to be in accordance with Roads and Maritime's submission dated 30 October 2015.

Please confirm with Roads and Maritime that the development application will not be determined until such time as Roads and Maritime has had an opportunity to comprehensively assess the development application following provision of additional information. Should you require further information please contact the undersigned on 02 6861 1453.

Yours faithfully

Andrew McIntyre
Manager Land Use Assessment
Western
Roads and Maritime Services

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Telephone: 1300 NSW RFS
e-mail: csc@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433



The General Manager
Moree Plains Shire Council
PO Box 420
MOREE NSW 2400

Your Ref: DA2016/45
Our Ref: D16/2581
DA16081003277 AB

ATTENTION: Murray Amos

7 September 2016

Dear Sir

**Designated Development for Extend Existing Quarry - "Wandoonah", 5//236547
-Gwydirfield Road, Moree**

I refer to your letter dated 4 August 2016 seeking advice regarding bush fire protection for the above Designated Development in accordance with Part 4 of the 'Environmental Planning and Assessment Act 1979'.

The Service has reviewed the plans and documents received for the proposal and subsequently raise no concerns or issues in relation to bush fire.

For any queries regarding this correspondence please contact Alan Bawden on 1300 NSW RFS.

Yours sincerely

A handwritten signature in blue ink, appearing to read "John Ball".

John Ball
Manager

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



SF2015/171139; WST15/00139

The Manager
Resource Assessments
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Ms Genevieve Seed

Dear Ms Seed

**EAR ID No.991: Lot 5 DP 236547; 'Wandoona' Gwydirfield Road, Moree
Expansion of Wandoona Quarry
Request for input into Secretary's Environmental Assessment Requirements (SEARs)**

Thank you for your email on 19 October 2015 requesting input into SEARs for the proposed expansion of Wandoona Quarry from Roads and Maritime Services.

Roads and Maritime notes development consent (DA2014/58) was granted by Moree Plains Shire Council for extraction of sand and gravel from the subject land in November 2014. The expansion of the quarry will increase its footprint and alter access arrangements but will not affect traffic volumes generated by existing operations.

Based on the information provided, in accordance with clause 16(2) of *State Environmental Planning Policy (Mining Petroleum Product and Extractive Industries) 2007*, DA2014/58 should have been referred to Roads and Maritime for comment. Unfortunately this did not occur and Roads and Maritime does not have any previous data regarding traffic generation or haulage routes associated with Wandoona Quarry.

Roads and Maritime has identified the following key issues which need to be included and addressed in the Environmental Impact Statement being prepared in support of the project:

- A traffic impact study prepared in accordance with the methodology set out in Section 2 of the *RTA's Guide to Traffic Generating Developments 2002* and including:
 - Road transport volumes and types broken down into origin and destination, travel routes and peak hours for extension construction and operation of the quarry. The study is to provide details of projected transport operations including peak and average volumes of traffic and tonnage to be transported. Volumes will need to also include input related traffic generation (e.g. fuel deliveries, potable water deliveries, maintenance, services; etc) and impacts of related traffic generation on public roads and other road users. The traffic study is to address internal traffic movements and parking facilities.

Roads and Maritime Services

- Any oversize and over-mass vehicles and loads expected for the construction and operation of the project.
 - Temporary and permanent staff numbers (including employees and contractors) during construction and operation of the project.
 - The impact and cumulative impacts of quarry related traffic and measures employed to ensure efficiency and safety on the public road network during construction and operation of the project.
 - Any mitigating measures required to address expected traffic generation.
 - Local climate conditions that may affect road safety during construction and operation of the project (e.g. dust, fog, wet weather, etc) and appropriate measures to mitigate the impacts of such conditions.
- Access locations and treatments, including the intersection of Gwydirfield Road and the Newell Highway (HW17), are to be identified and in accordance with *Austrorads Guide to Road Design* and Roads and Maritime Supplements.
 - Details of required infrastructure work to support any increased demand on the road network as a result of the project.

Roads and Maritime appreciates the opportunity to provide comment and requests a copy of the SEARs be forwarded to Roads and Maritime at the same time they are sent to the applicant.

Should you require further information please contact the Development Assessment Officer, Andrew McIntyre, on 02 6861 1453.

Yours faithfully



Susie Mackay
Network & Safety Manager
Western

20/10/15

Appendix 12 – Applicant’s Response to Received Submissions

SMK

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Gatton, Brisbane

25th July 2017
Our Ref: 15-229

Planning and Community Development
Moree Plains Shire Council
PO Box 420
Moree NSW 2400

Attention: Murray Amos

Dear Mr Amos,

RE: Response to Objections to DA2016/45 – Expansion of Wandoona Sand and Gravel Quarry

We appreciate the opportunity to respond to submissions in relation to the proposed footprint extension of Wandoona Quarry. This proposal will not constitute an increase in the production rate of the quarry, however, the increase in surface area impacted will rise to over 2Ha requiring that the operation become a designated development.

A number of submissions have been received from both state government departments and the general public.

A response to the issues raised by each of the various government departments is presented below, while a summary of the five private responses received are addressed as a group.

Office of Environment and Heritage

Recommendations

1. *"If paddock trees are to be cleared, the proponent should offset the loss of those trees by enhancing the riparian vegetation along the Mehi River."*

Comment: JCQ have proposed not to undertake the clearing of any mature trees onsite. Instead, planning the proposed pit expansion around these trees. However, JCQ would like to acknowledge OEH's recommendation and agree to commensurate and suitable enhancement of the onsite Mehi River riparian vegetation to offset any future clearing of the isolated paddock trees within the proposed pit expansion area.

2. *“A ground inspection of the site for Aboriginal heritage is conducted prior to works proceeding.”*

Comment: Several traverses of the property have been undertaken throughout the preparation of both the original SEE and latter EIS. However, a designated Indigenous Heritage ground survey of the Wandoona Quarry site was conducted by SMK Consultants in March of 2016. This survey included a grid search of the existing quarry site, proposed expansion pathway and surrounding areas. No items or sites of Aboriginal cultural heritage were identified at this time.

JCQ’s operational procedures acknowledge the potential for Aboriginal objects to occur onsite and incorporate a stop-works procedure in the event that suspected Aboriginal artefacts are identified. Full details are available in the site OEMP.

Department of Industry - Resource & Energy

As per the department’s request, a more robust Resource Assessment has been completed and is attached as Appendix A.

Roads & Maritime Services

A Traffic Impact Study has been completed to address the issues raised by RMS and is attached as Appendix B.

Department of Primary Industries - Water

DPI Water raise several concerns in relation to site water use/licensing and groundwater management.

Water Use and Licensing

“The EIS outlines the quarry requires 17 ML of water per annum for sand washing, dust suppression and employee facilities. The proponent has a current high security surface water licence for 18 ML. The proponent is required to order this water when required.

However, it is unclear if the proponent has an adequate surface water supply or security of this supply. The EIS only addresses the Wandoona Sand Quarry when the water access licence is for the proponent's two quarries. There is no discussion in this EIS of the water use for the second quarry. The potential issue of reduced surface water entitlement due to announced Available Water Determinations (AWD) has not been addressed in the EIS.”

Comment: There are two extraction pits on the Wandoona property (Lot 5 DP 236547), associated with the existing development. The site water balance and required water usage of 17 ML has been determined across the entire site, including both extraction pits and all other ancillary works.

JCQ have an 18 Unit High Security License for extraction from “River, Lake or Surface Water Runoff”, within the Gwydir Regulated River Water Source. Announced Available Water Determinations (AWD) for High Security Licenses in the Gwydir river valley have consistently remained at 100% over the past decade. Should announced AWD’s ever fall beneath the quarry’s operational requirements, works would be scaled back to a sustainable standard, in-line with the AWD, until a suitable alternative management strategy is developed.

It is noted that Water NSW manage the delivery of water to high security customers to ensure that supply remains available regardless of releases from Copeton dam. This is a matter of river operations that ensure that water supply is available for permanent irrigations, towns and industry. JCQ are included as one of the regular industrial users in the system which Water NSW maintain a supply to. The option of allowing JCQ to pump a small amount of water from a water hole is undertaken during dry periods which is similar to the objectives adopted by Water NSW for larger high security water users such as the Stahmann Farms Pecan nut farm.

Groundwater Management

1. DPI Water believes that JCQ are pumping from the waterhole in the Mehi River during periods of no surface flow.

Comment: JCQ do not install a pump to extract groundwater from the sand pit site. All water used on the site is obtained via the river pump which is plumbed directly to the sand sieving operation. If additional water is required for dust suppression, the water is piped from the sieve system into the water truck.

2. DPI Water are concerned about the quarry excavating down to the water table, resulting in groundwater inflow to the pits being evaporated.

Comment: The sand pit site is excavated to a depth of approximately 6m which is above the normal groundwater table. An issue arises on occasions when the groundwater rises as a result of seasonal high-level flows in the Mehi River which forms the southern boundary of the property. Under such circumstances the sand in the bottom of the pit becomes saturated and is inaccessible for extractions. Such an event may occur over a few days only and therefore only a minimal surface area is exposed to sunlight and evaporation. The operational policy involves shifting the excavation face to an upper level when the lower level becomes saturated. This ensures access is available to haul the sand from the pit. Where this occurs for an extended period, the surrounding sand generally collapses back into the water and back fills the deeper section.

3. DPI Water believes that groundwater take is occurring and wants JCQ to work with them to develop an approved groundwater monitoring plan as a condition of approval.

Comment: Sand that is extracted from the pit is generally moist. It is then washed through the sieving process which utilises water pumped under the high security licence. The water from this process is circulated through a pit. The pit collects sediments which can then be removed and disposed on cropping land. The pit is not fully sealed and therefore a filtration process occurs where some of the water pumped from the river soaks back through the walls and floor of the pit.

The sieving process involves complete immersion of the sand material to wash any clay fines from the sand to ensure that the product is suitably clean for use in concreting. The amount of water obtained from the pit is considered to be relatively minor.

In relation to monitoring of groundwater levels in the extraction pit, the water level controls the physical operation of the sand extraction. Once the sand extraction depth approaches the water table, sand extractions are limited as the haul truck cannot access the extraction point as it will get bogged. Extraction at this point ceases. The site operator (excavator driver) monitors the water level in the pit

when it is being operated every 2nd week or over more prolonged absences from the site. In lieu of a formal “Approved Groundwater Monitoring Plan”, it is suggested that a site operational policy is included in the Operational Environmental Management Plan. Each site operator could then be inducted to identify the actual water table if the excavations are approaching 6m or a seasonal event occurs where the water table rises. The action in this case would be to:

- Maintain a minimum of 0.5m of sand above the water table
- Backfill any sections that have been excavated below the water table in the event of a rise in the water table
- Ensure machinery does not get bogged during a rise in the water table.
- Do not access sand below the water table to ensure that the water table surface is not exposed to losses such as evaporation or inclusion of this water in the raw sand excavated from the site and hauled to the sieve.
- Place a control height marker to enable the site operator (excavator driver) to note the water table level prior to excavations commencing to ensure a record of water table depth is maintained.

Adoption of such a process and induction of site operators would avoid interference with the groundwater table. It would also avoid any extractions of groundwater and therefore any requirement to obtain a groundwater extraction entitlement when this is not necessary for this site. The process would also avoid impacts on the groundwater table as referred to under the Aquifer Interference Policy.

It is noted that the Proponent has not designed the extraction and sieving process to include the use of groundwater. Water use on this site is solely based on river extractions under their approved high security licence. The system in operation at present consists of pipes and pumps connected to the sieving plant for this to occur. The Proponent can therefore avoid any use, extraction or interference with the groundwater table during extraction and process of sand on this site.

Department of Primary Industries - Agriculture

DPI Agriculture acknowledges that it has no significant issues with the proposed development, but refer SMK Consultants and the Proponent to the guideline “Agriculture Issues for Extractive Industry Development”.

With regards to site remediation; JCQ own and operate several quarries within the Moree Plains Shire and are committed to providing ongoing site remediation works, with the goal of achieving minimal long-term impact to the landscape and its agricultural value. A draft Operations and Remediation Management Plan (ORMP) for the Wandoona Quarry has been included as Appendix C, for Councils consideration. This plan provides the remediation objectives and operational controls to be undertaken throughout both operational activities and following final cessation of works.

Non-government Stakeholders

Five submissions have been received from nearby stakeholders; B & J Jones, GS & JM Cubis, R. Bull and G. E. Farrar. The issues raised by these stakeholders are summarised and addressed below:

1. Traffic and Site Access

- a) Concerns have been raised regarding the condition of the Gwydirfield Road and its suitability for heavy traffic use.

Comment: The Gwydirfield Road is an approved area for A-double vehicles and a Traffic Impact Assessment consistent with Austroads guidelines has been completed for review by Council and RMS. The use of road trains improves the efficiency of the operation, resulting in fewer overall heavy vehicle movements and required days of operation.

- b) Two of the received submissions also raise the possibility of an alternate site access via a low-level crossing of the Mehi River.

Comment: This option was reviewed during the initial development application and after consultation with Council and NSW Office of Water, was discarded, in favour of the Gwydirfield Road site access.

- c) Onsite truck movements follow existing farm roads and therefore, fall within 40m of the Mehi River.

Comment: This issue has been reviewed by DPI Water, finding that this does not impact upon the river's condition, however, future road maintenance works may require DPI approval.

2. Noise

Respondents have expressed concerns related to the noise impacts of the quarry.

Comment: An independent Noise Impact Assessment was provided with the development's EIS. This assessment included all onsite infrastructure, including the river pump site, and concludes *"The acoustic impact of the proposed expansion of Wandoona Quarry operations is not predicted to exceed the adopted PSNL of 35dBA_{Leq} at the noise sensitive receivers during typical quarry operations. Minimal acoustic impact is predicted at Receiver 1 under worst case quarry operations."* Since the time of this assessment, JCQ have reviewed their stockpile/loading operations to mitigate the minimal impact to Receiver 1. JCQ are willing to assess further measures, if required.

3. Dust

Two respondents have claimed that dust suppression works have not been undertaken.

Comment: Onsite dust generation primarily occurs along the property's internal haul routes. JCQ assert that these routes are watered during quarry operations, but will continue to monitor the situation and address any further issues that arise.

4. Mapping

Respondents have claimed that the provided site plans are incorrect, or misleading.

Comment: The site plans provided by SMK Consultants include recent aerial imagery, clearly showing the correct location of all onsite infrastructure.

5. Flood Impact

G. E. Farrar has expressed concerns relating to the potential flood impacts resulting from overburden stockpiles related to future western expansion works.

Comment: A review of the site's topology and flood history was undertaken throughout preparation of the EIS. No levee banks are proposed by the development and stockpiles of material on site would have minimal impact on flood flows.

Among the responses received, claims have also been made, suggesting that JCQ have extracted and transported far greater quantities of material than the development has approval for. While JCQ deny these assertions, they are open to working together with Council and all other relevant stakeholders, to address any concerns raised.

We kindly ask that Moree Plains Shire Council consider the above as satisfying the concerns identified within the objections. Please do not hesitate to contact our office should you have any questions or require any further information.

Yours sincerely,

James Maxwell MEEnvMgt. B.Sc. MEIANZ

Environment and Resource Consultant

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Appendix 13 – Resource Assessment

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Wandoona Quarry Resource Assessment

Lot 5 DP 236547
Parish of Mia Mia
County of Courallie

Proponent: **Johnstone Concrete and Quarries Pty Ltd**
35 Drive Inn Road, MOREE NSW 2400

Prepared by: **SMK Consultants**
39 Frome Street, MOREE NSW 2400

March 2017

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Document Control



Project Reference: 15/229		
Proponent: Johnstone Concrete and Quarries Pty Ltd		
Wandoona Quarry Resource Assessment		
Report No. 15/229-R		
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Prepared by:	SMK Consultants P.O. Box 774 Moree NSW 2400 Contact: James Maxwell E: jmaxwell@smk.com.au Ph: 02 6752 1021	
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Revision History		
Revision No.	Date Issued	Reason/Comment
0	March 2017	Initial Issue

Table of Contents

1. Brief Description of the Development.....	1
1.1. Site Description.....	1
2. Location of Sand and Gravel Deposits.....	2
2.1. Northwest to Southeast Transect	3
2.2. South to North Transect.....	4
2.3. South-Southeast to North-Northwest Transect.....	6
2.4. Discussion and Conclusions.....	7
3. Quality of Sand Deposits	8
4. Conclusions.....	9
Appendix A: Bore Log Data	10
Appendix B: Sand Quality Analysis Report.....	16

1. Brief Description of the Development

Wandoona Quarry is operated by Johnstone Concrete and Quarries (JCQ). The quarry acts as a source of sand and gravel material for use in JCQ's concrete batching, landscaping materials and the construction of local civil projects undertaken within Moree Plains Shire. The proposed development is to expand the quarry's footprint to 8.3ha.

The objective of the development is to increase the lifespan of the quarry and to improve the efficiency of quarry operations. This will allow JCQ to continue to meet local and regional demand for raw materials and to support related operations such as concrete manufacture, thus increasing long-term job security for JCQ employees and contributing to the region's economy and capacity to undertake future developments as needed.

The current and proposed sites of extraction at Wandoona Quarry are highlighted in Figure 1.



Figure 1: Proposed site layout of Wandoona Quarry

1.1. Site Description

Wandoona Quarry is located atop of quarternary alluvial deposits, immediately adjacent to a region of quarternary colluvial deposits (Figure 2). Alluvial deposits of the area are characterized by alternating layers of clay, silt, sand and gravel, which have been deposited over time by flows and floods associated with the Mehi River. Colluvial deposits are unconsolidated sediments found downslope from hills, which form from hill erosion. Given the alluvial deposits will have different

parent material to the colluvium and have formed under different conditions, it is likely that the colluvial and alluvial deposits have quite distinct characteristics.

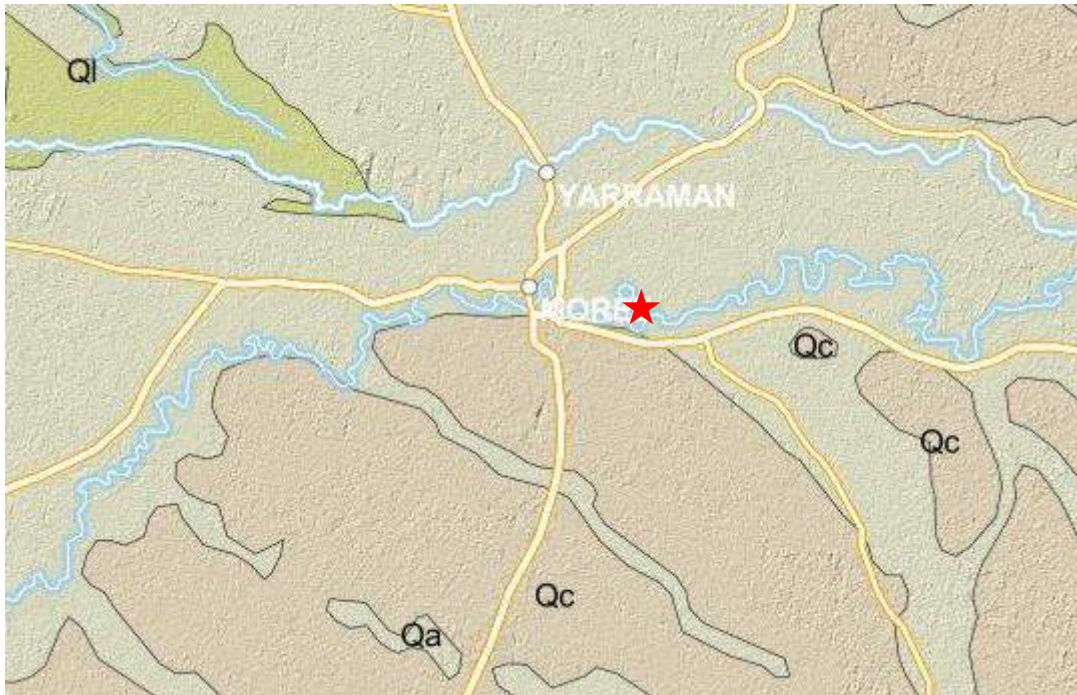


Figure 2: Geology of the region surrounding Moree, NSW. Wandoona Quarry is located on the eastern outskirts of Moree (as indicated by the star). Ql = quaternary lacustrine deposits; Qa = quaternary alluvial deposits; Qc = quaternary colluvial deposits. Source: Geological Survey of NSW, LPI NSW

The Mehi River is a meandering river. The location of meandering rivers changes over time, due to flow patterns alternately eroding the river channel in some areas, whilst depositing sediments in others. Consequently, alluvial deposits immediately adjacent to meandering rivers often have significant spatial variation (both horizontally and vertically) as depositional conditions of the surface (e.g. floodplain vs. creek bed) have altered over time.

Overall, given Wandoona Quarry's position, on the boundary of alluvial and colluvial deposits and adjacent to the Mehi River, it is likely that there is significant spatial variation in subsurface deposits.

2. Location of Sand and Gravel Deposits

Three cross-sections of subsurface deposits at and near Wandoona Quarry were constructed using the information from private bore logs from JCQ and six publicly available bore logs. Cross-sections were established by interpolating between these results along transects intersecting multiple bore locations.

The six publicly available bore logs showed considerable variation in subsurface deposits (detailed information is available in Appendix A). The three bores located at Wandoona each showed topsoil to a depth of 1m, underlain by a reasonably uniform sand deposit to a minimum depth of 17m. Given the similarity in results between the bores at Wandoona and their close proximity, the three bores have been treated as a singular location for the purposes of construction and analysis of cross-sections of subsurface deposits in the region.

The location of the bores, and the approximate location of each transect and related cross-section are shown in Figures 3 to 8.

2.1. Northwest to Southeast Transect



Figure 3: Northwest to southeast transect and bore locations.

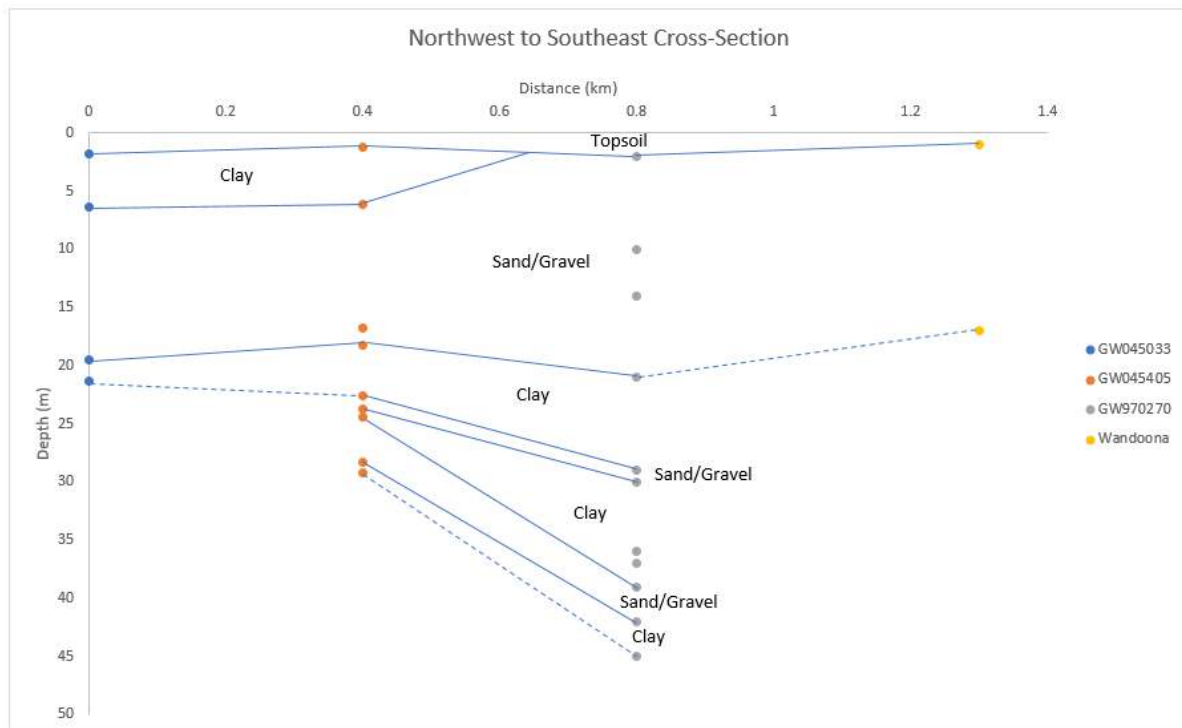


Figure 4: Cross-section of northwest to southeast transect. Dots indicate depth of distinct deposit layers. Deposits have been grouped together based on texture. Dotted lines indicate best estimation; the depth and inclination of the lowest observable deposit in each bore is unknown, and may be deeper than the bore.

Similarities in deposited layers are evident between bores along the northwest to southeast transect (Figure 3; Figure 4). This is because the primary influence on these deposits is likely to be alluvial, and the deposits are roughly located along the path of the river channel (and can therefore be considered to be perpendicularly equidistant from the centre of the primary river channel). Consequently, it is probable that all deposits formed under similar conditions, from the same parent material source.

The large sand/gravel deposit (which, on average, spans from 3m to 17m below ground level across sites) is likely to be the result of a period of high energy alluvial deposition (associated with a wet period and corresponding high flow volumes), which has subsequently given way to a lower energy environment with lower flows (as evidenced by the clay/loam topsoil).

The nature of the sand/gravel deposit varies between bores; for instance, in GW045405, coarse layers are dominated by gravel, whereas in GW970270 they are dominated by sand. These deposits have been grouped together as they are of similar thickness and depth, and therefore they are likely to have been deposited at the same time under a high energy depositional environment. However, it is important to note that there is horizontal and vertical variation in the texture, quality and grading within these deposits.

2.2. South to North Transect



Figure 5: South to north transect and bore locations.

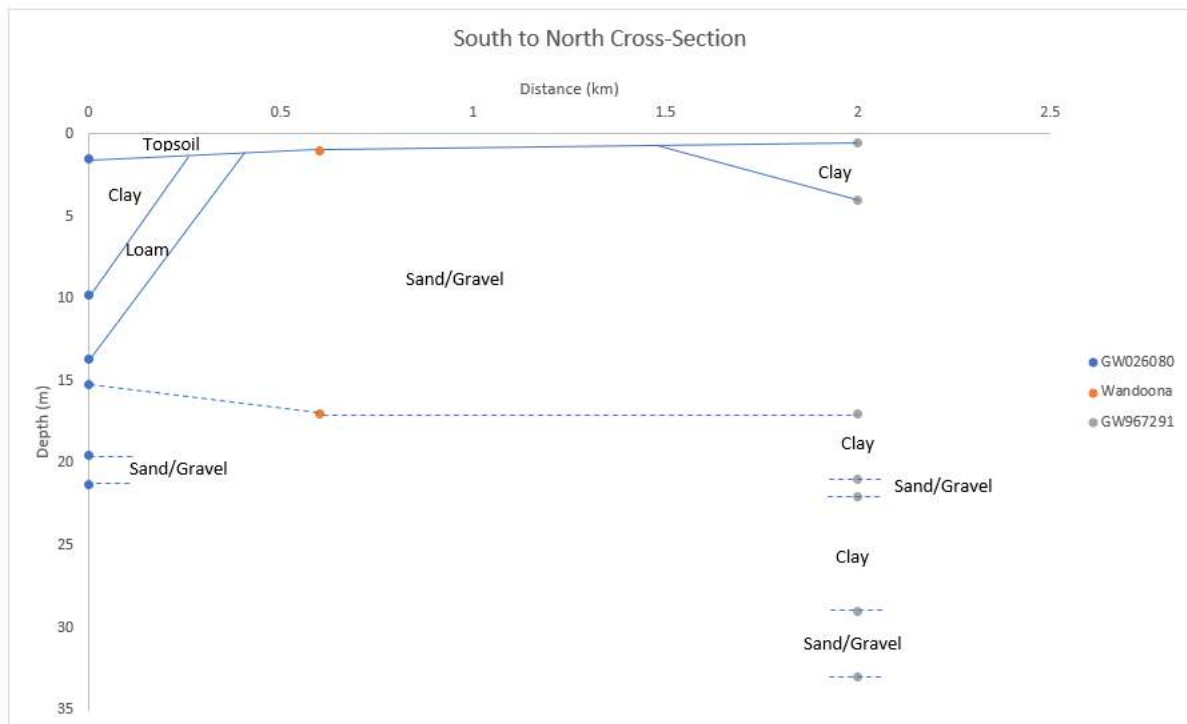


Figure 6: Cross-section of south to north transect. Dots indicate depth of distinct deposit layers. Deposits have been grouped together based on texture. Dotted lines indicate best estimation; the depth and inclination of the lowest observable deposit in each bore is unknown, and may be deeper than the bore. The inclination of deposits observed, without adjacent bores, is also unknown.

The south to north transect shows greater variation between deposits (Figure 5; Figure 6). In particular, GW026080 is significantly different from the deposits at Wandoona and GW967291. This variation can be explained by the intersection of the transect with both colluvial and alluvial deposits.

GW026080 is located immediately to the south of the Mehi River, in a region which borders on the edge of colluvial deposits (Figure 2). The Wandoona bores and site GW026080 are therefore likely to be located on either side of a geomorphological discontinuity in landscape formation processes, in that GW026080 deposits were formed via colluviation, whilst Wandoona and GW967291 were formed via alluviation. This explains the significant difference between deposits at GW026080 and Wandoona, despite being only approximately 600m apart.

2.3. South-Southeast to North-Northwest Transect



Figure 7: South-southeast to north-northwest transect and bore locations.

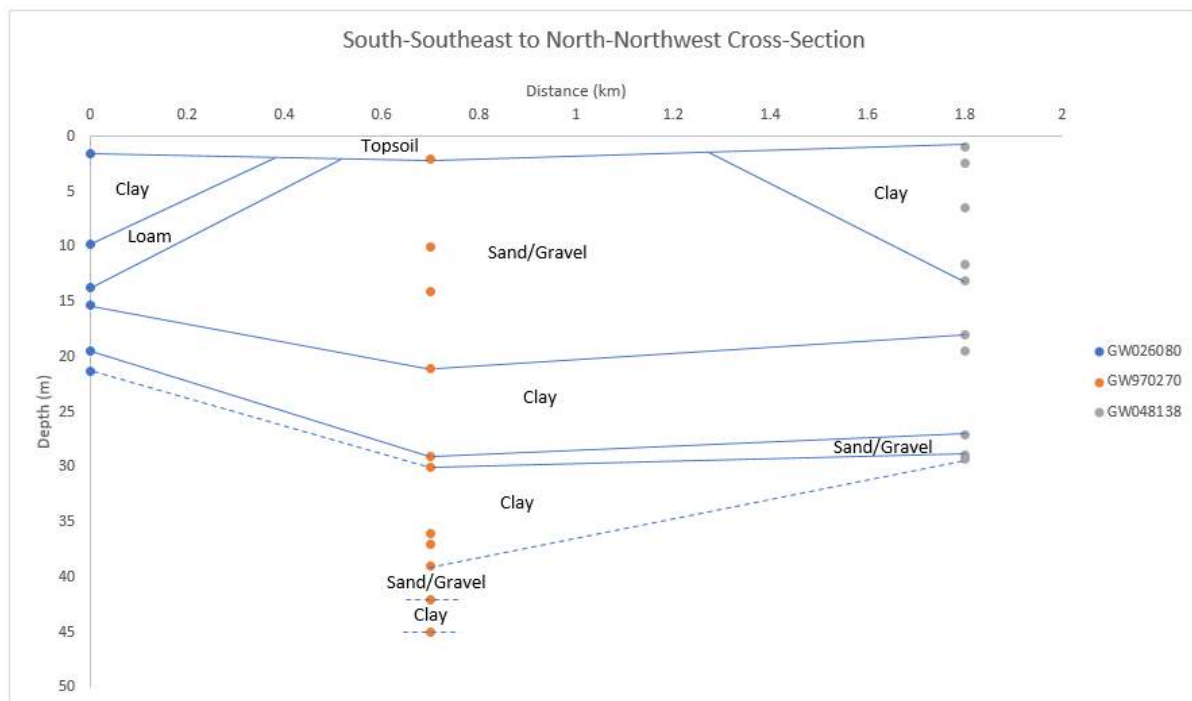


Figure 8: Cross-section of south-southeast to north-northwest transect. Dots indicate depth of distinct deposit layers. Deposits have been grouped together based on texture. Dotted lines indicate best estimation; the depth and inclination of the lowest observable deposit in each bore is unknown, and may be deeper than the bore. The inclination of deposits observed, without adjacent bores, is also unknown.

The south-southeast to north-northwest transect shows the greatest variation (Figure 7; Figure 8). Significant difference between GW026080 and GW970270 is to be expected, as one is formed via alluvial processes and one formed via colluvial processes (as discussed above). The results of bore GW048138, however, are more challenging to explain.

The clay horizon beneath the topsoil at GW048138 is not isolated; clay deposits atop of sand deposits are also seen in bores GW967291, GW045033 and GW045405. Whilst these bores are closer to the Mehi River, the bores are also located within 5km of the Gwydir River (to the north of Wandoona), and form part of the floodplain. It is therefore possible that the upper clay layer at these sites was deposited by the Gwydir (not the Mehi) River. This explains the presence of fine particle deposits along the north-western bore sites, which are not present in alluvial deposits south of the Mehi or at Wandoona Quarry – the remaining sites are further away from the Gwydir, and may not have been inundated with the same floodwaters.

However, the thickness of the upper clay horizon and relative thinness of the sand/gravel deposit below in bore GW048138 is unusual. The sediments of this bore are strikingly similar to those of GW026080, which suggest that some colluvial processes may have influenced the formation of GW048138 deposits. Alternatively, the variation could simply be due to variations in flow and depositional patterns at the site in comparison to other bore sites, as a result of geomorphological features (e.g. topography).

2.4. Discussion and Conclusions

In short, the distribution of subsurface deposits in the region surrounding Wandoona is highly spatially variable. Having a poor understanding of geomorphological processes occurring in the region limits the degree to which this spatial variability in the landscape can be predicted, thus undermining the accuracy of results based on interpolation between discrete data points. Consequently, the cross-sections in this report must be interpreted with caution, as they rely upon interpolation. Overall, it is difficult to predict the exact location and extent of sand available within the region beyond the boundaries of Wandoona.

However, relatively high sample density from the three cores located on Wandoona allows for more substantial conclusions to be drawn regarding the size and quality of available resources in the proposed excavation area. A large sand and gravel deposit is present (of average width of 16m), located approximately 1m below ground level. The similarity in deposits at all three bores located at Wandoona indicates that spatial variability over the short distances on site is minimal, which allows for the size and distribution of the resource within the extraction area to be reliably estimated. The proximity of the sand to the surface is such that it will not require extensive excavation to access. The quality of the deposits for commercial purposes is discussed below.

3. Quality of Sand Deposits

Sand extracted at Wandoona Quarry is primarily used for concrete batching. Evaluation of sand quality for use in concrete manufacture is guided by Australian Standards 2758.1: Concrete Aggregates (2009).

The Proponent has submitted sand to be tested according to Australian Standards for concrete aggregates. A comparison of acceptable sand quality thresholds (as outlined in AS 2758.1) and sand quality results from tests conducted by JCQ are shown in Table 1:

Table 1: Comparison of Wandoona Quarry sand to sand quality thresholds outlined in AS 2758.1.

Sample Description:		Wandoona Coarse Sand	
Location:		Johnstone Concrete & Quarries	
Laboratory Sample No:		177840	
Date Received:		5.5.16	
Test Method	Test	Spec.	Results
AS1141.11.1*	% Passing A.S. Sieve		
	9.5mm	100*1	
	6.7mm	-	
	4.75mm	90-100	100
	2.36mm	60-100	99
	1.18mm	30-100	82
	600 micron	15-100	54
	425 micron	-	34
	300 micron	5-50	19
	150 micron	0-20	5
AS1141.12	Material finer than 75 micron (%)	0-5	3
AS1141.5	Particle Density (Dry) t/m ³	Min. 2.1	2.54
	Particle Density (SSD) t/m ³		2.57
	Apparent Particle Density t/m ³		2.63
	Water Absorption (%)	Max. 2.0	1.3
AS1141.24	Sodium Sulphate Soundness (Total Weighted % Loss)	Max. 6	0.9
	Fraction tested :		
	-2.36mm+1.18mm (% Loss)		2.0
	-1.18mm+600 µm (% Loss)		0.8
	-600 µm +300 µm (% Loss)		0.6
AS1141.34	Organic impurities other than sugar The colour assessment was made visually using coloured reference glass	Not darker than std.	Pass

The sand is classed as non-reactive, with % expansion of <0.1 in 1M NaOH at 80°C over 21 days. The risk rating of the sand for specific applications and source rock quality is outlined in Table 2:

Table 2: Risk rating for specific applications and source rock quality.

Risk Rating for Application	Low	Mod	High	Comments (Assuming the sample is indicative of overall source rock quality)
Fine Aggregate in Concrete	✓			Low weak/secondary mineral count locked within the crystal fabric of the rock and unlikely to result in increased water demand in concrete.
Unbound Pavements	✓			Suitable high strength, hard and durable material
Graded Asphalt Aggregate	✓			Suitable high strength, hard and durable material
Risk Rating Source Rock	Low	Mod	High	
Alkali Silica Reactivity	✓			Presenting low risk of mild or slow ASR in concrete due to the finely siliceous nature of the meta-siltstone and strained quartzite
Weak/Secondary Mineral Impacts	✓			15% well consolidated graphitic, iron oxide and clay minerals set in a siliceous matrix and 3% available as persistent limonitic material. Not expected to significantly weaken aggregate
Durability	✓			Durable
Strength	✓			Of predicted high strength
Hardness	✓			Suitable
Free Silica Content	✓			71%
Sulfides	✓			No sulfides visible in hand specimen. Minor crystalline opaques may include pyrite
Light micaceous and organic particles	✓			Trace light micaceous phases and organic particles are detected as muscovite and charcoal respectively

Overall, the sand is considered to be of high quality and suitable for use as a fine aggregate in concrete.

A copy of detailed sand quality analysis is provided in Appendix B.

4. Conclusions

Wandoona Quarry is directly adjacent to the Mehi River atop of alluvial sediments, close to a deposit of colluvial sediments to the south. The sand deposits within the proposed excavation area are relatively uniform and therefore the size and quality of the deposit within Wandoona may be estimated with reasonable accuracy. However, the region surrounding Wandoona exhibits high spatial variability in deposits, such that estimating the exact distribution and size of the Wandoona sand deposit beyond property boundaries is difficult.

The quality of the sand deposit at Wandoona is considered to be high, with regards to concrete manufacture and other commercial engineering purposes, and complies with Australian Standard 2758.1.

Overall, it can be concluded that a sizeable deposit of high quality sand is located within the proposed extraction area at Wandoona Quarry.

Appendix A: Bore Log Data

NSW Office of Water Work Summary

GW026080

Licence: 90BL019354 Licence Status: CONVERTED

Authorised Purpose(s): STOCK, DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date: Final Depth: 21.30 m
Completion Date: 01/04/1967 Drilled Depth: 21.30 m

Contractor Name:
Driller:
Assistant Driller:

Property: STRATHMORE Standing Water Level (m):
GWMA: 003 - LOWER GWYDIR (DIS Salinity Description: Good
GRAVESEND)
GW Zone: - Yield (L/s):

Site Details

Site Chosen By:

County Parish Cadastre
Form A: COURA COURA 034 120
Licensed: COURALLIE MOREE Whole Lot #

Region: 90 - Barwon CMA Map: 8839-S
River Basin: 418 - GWYDIR RIVER Grid Zone: Scale:
Area/District:

Elevation: 0.00 m (A.H.D.) Northing: 6735711.0 Latitude: 29°26'37.4"S
Elevation Source: (Unknown) Easting: 779008.0 Longitude: 149°52'38.1"E

GS Map: - MGA Zone: 0 Coordinate Source: GD_PR_MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralsers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.30	21.30	152			Sealed on Bottom
1	1	Opening	Slots	19.50	21.30	152		1	

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
13.70	15.20	1.50	Unconsolidated						
19.50	21.30	1.80	Unconsolidated	16.70		1.01			

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.52	1.52	Soil	Soil	
1.52	9.75	8.23	Clay	Clay	
9.75	13.71	3.96	Loam	Loam	
13.71	15.24	1.53	Sand Gravel	Sand	
15.24	19.50	4.26	Clay Stony	Clay	
19.50	21.33	1.83	Sand Gravel Water Supply	Sand	

NSW Office of Water Work Summary

GW048138

Licence: 90BL106865

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Rotary
Owner Type: Private

Commenced Date:
Completion Date: 01/05/1977

Final Depth: 29.20 m
Drilled Depth: 29.30 m

Contractor Name:
Driller:
Assistant Driller:

Property: N/A
GWMA: 003 - LOWER GWYDIR (D/S GRAVESEND)
GW Zone: 001 - ALL GWYDIR

Standing Water Level (m):
Salinity Description: Good
Yield (L/s):

Site Details

Site Chosen By:

County
Form A: COURA
Licensed: COURALLIE

Parish
COURA 31
MIA MIA

Cadastre
3/251911
Whole Lot #

Region: 90 - Barwon
River Basin: 418 - GWYDIR RIVER
Area/District:

CMA Map: 8839-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6737453.0
Easting: 778377.0

Latitude: 29°27'41.4"S
Longitude: 149°52'13.1"E

GS Map: -

MGA Zone: 0

Coordinate Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralsers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Welded Steel	-1.20	29.20	140			Sealed on Bottom
1	1	Opening	Slots - Vertical	13.10	18.00	140		1	Oxy-Acetylene Slotted, A: 3.17mm
1	1	Opening	Slots - Vertical	27.10	28.90	140		2	Oxy-Acetylene Slotted, A: 3.17mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
13.10	18.00	4.90	Unconsolidated						
27.10	28.90	1.80	Unconsolidated						

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.91	0.91	Topsoil	Topsoil	
0.91	2.43	1.52	Clay	Clay	
2.43	6.40	3.97	Clay Sandy	Invalid Code	
6.40	11.58	5.18	Clay	Clay	
11.58	13.10	1.52	Clay Silty	Invalid Code	
13.10	17.98	4.88	Sand Gravel Water Supply	Sand	
17.98	19.50	1.52	Clay Gravel	Clay	
19.50	27.12	7.62	Clay Yellow	Clay	
27.12	28.95	1.83	Sand Water Supply	Sand	
28.95	29.25	0.30	Clay White	Clay	

NSW Office of Water Work Summary

GW967291

Licence: 90BL252955

Licence Status: CONVERTED

Authorised Purpose(s): STOCK, DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Rotary Mud
Owner Type: Private

Commenced Date:
Completion Date: 23/11/2005

Final Depth: 33.00 m
Drilled Depth: 33.00 m

Contractor Name: Mannion Drilling Pty Ltd
Driller: Jason Roger Mannion
Assistant Driller:

Property: TANDARRA MOREE 2400
GWMA: -
GW Zone: -

Standing Water Level: 13.000
Salinity:
Yield: 3.000

Site Details

Site Chosen By:

Region: 90 - Barwon	County Form A: COURA Licensed: COURALLIE	Parish COURA,31 MIA, MIA
River Basin: 410 - GWYDIR RIVER Area/District:	CMA Map: 8839-S Grid Zone:	Cadastral 101094393 Whole Lot 3/563713 Scale:
Elevation: 0.00 m (A.H.D.) Elevation Source: Unknown	Northing: 6737673.0 Easting: 779144.0	Latitude: 29°27'33.6"S Longitude: 149°52'41.3"E
GS Map: -	MOA Zone: 0	Coordinate Source: Map Interpretation

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure

Cemented: S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	33.00	179			Rotary Mud
1		Annulus	Waterworn/Rounded	0.00	33.00				Graded
1	1	Casing	Pvc Class B	0.00	33.00	152			Sealed on Bottom, Suspended in Clamps, Grued
1	1	Opening	Slots - Horizontal	28.00	33.00	152		1	Casing - Machine Slotted, PVC Class B, SL: 65.0mm, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	O.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
29.00	33.00	4.00	Unknown	13.00		3.00		01:00:00	

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.50	0.50	topsoil	Topsoil	
0.50	4.00	3.50	clAY	Clay	
4.00	17.00	13.00	gravel	Gravel	
17.00	21.00	4.00	clay	Clay	
21.00	22.00	1.00	gravel	Gravel	
22.00	29.00	7.00	clay	Clay	
29.00	33.00	4.00	gravel and sand	Gravel	

NSW Office of Water Work Summary

GW970270

Licence: 90WA819154	Licence Status: CURRENT
Authorised Purpose(s): DOMESTIC STOCK Intended Purpose(s): STOCK, DOMESTIC	
Work Type: Bore	
Work Status: Supply Obtained	
Construct Method: Rotary Mud	
Owner Type: Private	
Commenced Date:	
Completion Date: 13/08/2012	Final Depth: 42.00 m Drilled Depth: 45.00 m
Contractor Name: JOHN CARRIGAN PTY LTD	
Driller: John Carrigan	
Assistant Driller:	
Property: LONGPOINT MOREE 2400 NSW	Standing Water Level: 9.200
GWMA:	Salinity:
GW Zone:	Yield: 5.000

Site Details

Site Chosen By:

Region: 90 - Barwon	County Form A: COURA Licensed:	Parish COURA,34 Cadastre 681072832
River Basin: 418 - GWYDIR RIVER Area/District:	CMA Map: 8839-5 Grid Zone:	Scale:
Elevation: 0.00 m (A.H.D.) Elevation Source: Unknown	Northing: 6736302.0 Easting: 778672.0	Latitude: 29°28'18.5"S Longitude: 149°52'25.1"E
GS Map: -	MGA Zone: 0	Coordinate Source: GPS - Global Positioning System

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralsers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	12.00	300			Rotary Mud
1		Hole	Hole	12.00	45.00	200			Rotary Mud
1		Annulus	Waterworn/Rounded	9.00	42.00	200	160		Graded, Q 1.000m3
1		Backfill	Drilled Cuttings	42.00	45.00	200			
1	1	Casing	Pvc Class 9	0.00	12.00	160	146		Glued
1	1	Opening	Slots - Horizontal	12.00	18.00	160		1	Mechanically Slotted, PVC Class 9, Glued, A: 1.00mm
1	1	Opening	Slots - Horizontal	18.00	24.00	160		1	Mechanically Slotted, PVC Class 12, Glued, A: 1.00mm
1	1	Casing	Pvc Class 9	24.00	36.00	160	146		Sealed, Glued
1	1	Opening	Screen - Wedge Wire	36.00	42.00	160		1	Stainless Steel 304, Other, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
12.00	20.00	8.00	Unknown	9.20		1.00			
39.00	42.00	3.00	Unknown			4.00		03.00.00	

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.00	2.00	Loam	Loam	
2.00	10.00	8.00	Sand	Sand	
10.00	14.00	4.00	Sand/Clay	Sand	
14.00	21.00	7.00	Sand, to Gravel	Sand	
21.00	29.00	8.00	Clay, brown	Clay	
29.00	30.00	1.00	Sand	Sand	
30.00	36.00	6.00	Clay, brown	Clay	
36.00	37.00	1.00	Sandy Clay	Sandy Clay	
37.00	39.00	2.00	Clay	Clay	
39.00	42.00	3.00	Sand, water bearing	Sand	
42.00	45.00	3.00	Clay, blue	Clay	

NSW Office of Water Work Summary

GW045033

Licence: 90BL104840

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date:

Final Depth: 21.30 m
Drilled Depth: 21.30 m

Contractor Name:

Driller:

Assistant Driller:

Property: N/A
GWMA: 003 - LOWER GWYDIR (D/S
GRAVESEND)
GW Zone: 001 - ALL GWYDIR

Standing Water Level (m):
Salinity Description:

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: COURA
Licensed: COURALLIE

Parish
COURA 031
MIA MIA

Cadastre
L9 (2)
Whole Lot //

Region: 90 - Barwon
River Basin: 415 - GWYDIR RIVER
Area/District:

CMA Map: 8639-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6736721.0
Easting: 778035.0

Latitude: 29°28'05.4"S
Longitude: 149°52'01.1"E

GS Map: -

MGA Zone: 0

Coordinate Source: GD, PR, MAP

Construction

Negative depths indicate Above Ground Level. C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure
Cemented: S-Sump; CE-Centralsers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Welded Steel	-0.30	21.30	168			Seated on Bottom

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
8.50	19.50	11.00	Unconsolidated	8.50					

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.83	1.83	Topsoil	Topsoil	
1.83	6.40	4.57	Clay	Clay	
6.40	19.51	13.11	Gravel Sand Water Supply	Gravel	
19.51	21.34	1.83	Clay	Clay	

NSW Office of Water Work Summary

GW045405

Licence: 90BL104843

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore

Work Status:

Construct Method: Rotary

Owner Type: Private

Commenced Date:
Completion Date: 01/06/1976

Final Depth: 29.30 m
Drilled Depth: 29.30 m

Contractor Name:

Driller:

Assistant Driller:

Property: N/A
GWMA: 003 - LOWER GWYDIR (D/S
GRAVESEND)
GW Zone: 001 - ALL GWYDIR

Standing Water Level (m):
Salinity Description: Good

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: COURA
Licensed: COURALLIE

Parish
COURA.031
MIA MIA

Cadastre
L10 (3)
Whole Lot //

Region: 90 - Barwon

CMA Map: 6639-S

River Basin: 418 - GWYDIR RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6736528.0
Easting: 778381.0

Latitude: 29°28'11.4"S
Longitude: 149°52'14.1"E

GS Map: -

MGA Zone: 0

Coordinate Source: GD, PR, MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; C/E-Centralsers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	0.00	0.00	140			
1	1	Opening	Slots - Vertical	16.60	18.30	140		1	A: 3.00mm
1	1	Opening	Slots - Vertical	22.60	23.60	140		2	A: 3.00mm
1	1	Opening	Slots - Vertical	24.40	26.40	140		3	A: 3.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
16.60	18.30	1.50	Unconsolidated						
22.60	23.60	1.20	Unconsolidated						
24.40	26.40	4.00	Unconsolidated						

Geologists Log

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.21	1.21	Topsoil	Topsoil	
1.21	6.09	4.88	Clay	Clay	
6.09	16.76	10.67	Gravel Dry	Gravel	
16.76	18.29	1.53	Gravel Water Bearing	Gravel	
18.29	22.56	4.27	Clay Water Supply	Clay	
22.56	23.78	1.22	Gravel Water Bearing	Gravel	
23.78	24.39	0.61	Clay Water Supply	Clay	
24.39	26.35	3.96	Gravel Water Bearing	Gravel	
26.35	29.26	0.91	Clay Water Supply	Clay	

Appendix B: Sand Quality Analysis Report

Build something great™
Report Template - Revision 1, April 2014 - Authorised by K. Ali
Page 1 of 1



**Boral Construction Materials
Materials Technical Services**

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

TEST REPORT

CLIENT: Boral Cement – (TECHNICAL)
PROJECT: Testing of Fine Aggregates ex Johnstone Concrete & Quarries
TEST METHOD: AS1141 – Methods for Sampling and Testing Aggregates
SPECIFICATION: AS2758.1- Concrete Aggregates – Date: 7th November 2014

FILE NO: 50/16
REQUEST NO: 67446

Sample Description:		Wandoona Coarse Sand	
Location:		Johnstone Concrete & Quarries	
Laboratory Sample No:		177840	
Date Received:		5.5.16	
Test Method	Test	Spec.	Results
AS1141.11.1*	% Passing A.S. Sieve		
	9.5mm	100*1	
	6.7mm	-	
	4.75mm	90-100	100
	2.36mm	60-100	99
	1.18mm	30-100	82
	600 micron	15-100	54
	425 micron	-	34
	300 micron	5-50	19
	150 micron	0-20	5
AS1141.12	Material finer than 75 micron (%)	0-5	3
AS1141.5	Particle Density (Dry) t/m ³	Min. 2.1	2.54
	Particle Density (SSD) t/m ³		2.57
	Apparent Particle Density t/m ³		2.63
	Water Absorption (%)	Max. 2.0	1.3
AS1141.24	Sodium Sulphate Soundness (Total Weighted % Loss)	Max. 6	0.9
	Fraction tested :		
	-2.36mm+1.18mm (% Loss)		2.0
	-1.18mm+600 µm (% Loss)		0.8
	-600 µm +300 µm (% Loss)		0.6
AS1141.34	Organic impurities other than sugar The colour assessment was made visually using coloured reference glass	Not darker than std.	Pass

Note: Replacement for Report No: 146690

*Sample washed over 75 micron sieve as per AS1141.11.1 Clause 5.6.

*1 As per Fine Aggregate – Recommended Gradings (Table B2), AS2758.1

Material sampled by Johnstone Concrete & Quarries

C. Jones, T. Song, File.

Kamal Ali



Approved Signatory

Date 22.6.16

Serial No.

147644

Accredited for compliance with ISO/IEC 17025

NATA Accredited Laboratory

Number: 547

Build something great™

Page 1 of 1

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**Boral Construction Materials
Materials Technical Services**Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

TEST REPORTCLIENT: Boral Cement - Technical
Clunies Ross Street Prospect NSW 2148

FILE No: 50 / 16

PROJECT: Testing of Fine Aggregate from Johnstone Concrete & Quarries to
AS 2758.1 - Concrete Aggregates - 7th November 2014
Specification

REQUEST No: 67446

TEST PROCEDURE:

AS 1012.20 – Determination of Chloride and Sulfate in Hardened Concrete and Concrete Aggregates

AS 1141.13 – Material Finer than 2 micron

AS 1141.31 – Determination of Light Particles

AS 1141.35 – Detection of Sugar

Laboratory Sample No.:	177840
Date Received:	5.5.16
Sample Description:	Wandoona Coarse Sand
Field No.:	3

TEST RESULTS:

Chloride as Cl ⁻ (%)	< 0.001
Sulfate as SO ₃ (%)	0.01
Material Finer than 2 micron (µm) (%)	Not Applicable
Light Particles (%)	Nil
Sugar	Not Detected

Sample submitted by the Client.

Chris Jones, Tony Song, Mat.File, File.



Approved Signatory

Date 27.5.16

Serial No.

147645

S.Krishnamoorthy

Accredited for compliance with ISO/IEC 17025

NATA Accredited Laboratory

Number: 547

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Page 1 of 1

Report Template - Rev. (2) Feb. 2014 Authorised by M.A.


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TEST REPORT**Client:** BORAL CEMENT - (TECHNICAL)**Address:** CLUNIES ROSS STEET PROSPECT, NSW 2148**Date Received:** May 2016**Project:** Testing of Coarse and Fine Aggregates from Johnstone Concrete & Quarries.**Test Method:** Accelerated Mortar Bar Test for AAR Assessment - RMS T363**File N°:** 50/16**Req N°:** 67446**Date Rec :** 05/05/2016

LAB SAMPLE N°	SAMPLE DESCRIPTION	LOCATION
177840	Wandoona Coarse Sand	Johnstone Concrete & Quarries.
N/A	Boral GP/SL Cement	Berrima

RESULTS:**Flow:** 12% **W/C Ratio:** 0.40

Age (Days)	Expansion % (Average of 3 specimens)
3	0.018
7	0.028
10	0.048
14	0.085
17	0.116
21	0.152

Aggregate Reactivity Classification:

Mortar Bar Expansion (%) in 1M NaOH (80°C)		Classification
10 days	21 days	
< 0.10*	< 0.10*	Non Reactive
< 0.10*	≥ 0.10*	Slowly Reactive
≥ 0.10*	>> 0.10*	Reactive

*0.15% for naturally occurring Fine Aggregates

Notes: N/A

Chris Jones, Tony Song, Mat. File, File



Approved Signatory

Safwan Fawal

Date 17/2016 Serial No. 147646

Accredited for compliance with ISO/IEC 17025

NATA Accredited Laboratory

Number: 547



Title: Petrographic Inspection Report - 177840
Prepared for: Boral Resources (N.S.W) Pty Ltd
Client Ref: 5591522

Date Sampled: 05/05/2016
Sample Type: Wandoona Coarse Sand
Source: Johnstone Concrete and Quarries
Sample ID: 177840

Date of Inspection: 01/06/2016
Report Issued: 17/06/2016
Project/ File Ref.: P2016.0054.002

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A handwritten signature in black ink, appearing to be "Luke Ryan".

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Sand Identity

Name: Lithic Quartzose Sand

Depositional Setting: Natural Alluvial to Riverine Sand

Introduction

This report provides the results of a general petrographic assessment of sand sample which was submitted to the Groundwork Plus petrographic laboratory and describes the method and standards used to assess the sample. The thin section was prepared and analysed by Groundwork Plus with instructions from the client to conduct petrographic testing to ASTM C295 and recommend further testing if significant deleterious characteristics are identified pursuant to Clause 16.3 of this standard. The sand was sampled by the client and reduced using the riffle box method at Groundwork Plus petrographic facility. The provided modal mineral percentages relate to the supplied sample which is understood to be representative of stockpiles on site. Assessment regarding the Alkali-Silica Reactivity (ASR) potential of the aggregate has been advised by AS1141.65-2008 and is communicated pursuant to Clause 9. Communication of findings are advised by AS 1726-1993 Geotechnical Site Investigations.

Method

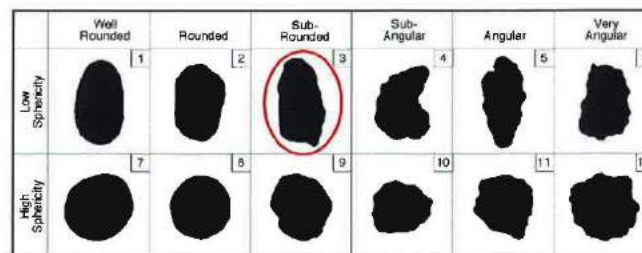
The petrographic assessment of the slide was carried out using a Nikon polarising microscope equipped with a digital camera at the Groundwork Plus petrographic laboratory. A photograph of the hand specimen and thin section photomicrographs showing grain sizes and any particular aspects of the minerals were included as part of the report (**Plates 1, 2, and 3**). Modal analysis was conducted on the sample using JMicroVision image analysis software on 200 points (**Table 2 – Modal Analysis of Minerals**).

The petrology assessment for Alkali Silica Reactivity was based on:

- ASTM C 295 Standard Guide for Petrographic Examination of Aggregates for Concrete
- AS2758.1 – 1998 Aggregates and rock for engineering purposes part 1: Concrete aggregates (Appendix B)
- AS1141 Standard Guide for the Method for sampling and testing aggregates
- Alkali Aggregate Reaction - Guidelines on Minimising the Risk of Damage to Concrete Structure in Australia - Cement and Concrete Association of Australia and Standards Australia (HB 79-1996)
- The accepted definition of free silica is set out in the Queensland Department of Transport and Main Roads Test Method Q188, and tested pursuant to the AS1141.65-2008 Methods for sampling and testing aggregates – Alkali aggregates reactivity – Qualitative petrological screening for potential alkali-silica reaction and AS1141.26 Secondary Minerals.

Interpretation

- The supplied sand is identified as a natural coarse grained **Lithic Quartzose Sand**.
- In hand specimen, the supplied sample is described as brown coarse grained quartzose sand accompanied by grey lithics. The sample is well graded, is sub-rounded in form, and chemically immature in mineralogy suggesting a relatively young and under-processed sand which remains close to its source rock. Lithic grains show slight weathering as oxide staining while residual clays are present which colour the sand. Trace light micaceous phases are observed as muscovite flakes and trace organic particles as charcoal. No sulfides were detected in hand sample. Magnetic lithic grains are detected.
- Petrographic analysis confirms the sand is quartzose (50%) in composition with accompanying meta-sediment and acid-intermediate lithic grains (41%). These represent a meta-sedimentary source rock dominated by iron oxide stained meta-siltstone. Subordinate feldspar grains (4%), hornblende (1%) and minor epidote. The sand is coloured by a thin dust which inhabits grain embayments and rare particles as persistent limonite (2%) and fine clay.
- The sample contains 71% free silica in the form of composite and single quartz grains. Of this 21% is regarded as potentially mildly reactive as quartzite or microcrystalline quartz. Accordingly, low risk of slow or mild Alkali Silica Reactivity (ASR) in concrete is attributed to this sand.
- The sand is composed principally of robust singular quartz and composite lithic grains (96%). 18% secondary phases are observed as weathering and alteration products hosted by well consolidated and robust lithic grains (15%) with the remaining 3% liberated as limonitic grain accretions and rare independent fine particles.
- Sand represented by this sample is predicted to be suitable for use as a fine component in Unbound Pavement and Graded Asphalt Aggregate, and Fine Aggregate in Concrete.
- For engineering purposes the sand may be summarised as:
 - Well graded and sub-rounded, coarse Lithic-Quartzose Sand.
 - Dominated by moderately clean, non-porous and robust quartzose and meta-sedimentary lithic grains (96%).
 - Hard, strong and predicted to be durable.
 - Containing 18% secondary phases, 15% of which are well-consolidated within the matrix of robust lithic grains. Remaining 3% available as limonitic accretions and clay fines.
 - Containing 71% free silica in the form of free and composite quartz crystals. Of this 21% is regarded as potentially mildly reactive in concrete as strained quartzite or microcrystalline quartz.
 - Regarded as presenting low risk of slow or mild ASR in concrete.



Modified from Frazer 1953 and identifying the sand as sub-rounded and of low sphericity

Table 1 – Risk Rating for Specific Applications and Source Rock Quality

Risk Rating for Application	Low	Mod	High	Comments (Assuming the sample is indicative of overall source rock quality)
Fine Aggregate in Concrete	✓			Low weak/secondary mineral count locked within the crystal fabric of the rock and unlikely to result in increased water demand in concrete.
Unbound Pavements	✓			Suitable high strength, hard and durable material
Graded Asphalt Aggregate	✓			Suitable high strength, hard and durable material
Risk Rating Source Rock	Low	Mod	High	
Alkali Silica Reactivity	✓			Presenting low risk of mild or slow ASR in concrete due to the finely siliceous nature of the meta-siltstone and strained quartzite
Weak/Secondary Mineral Impacts	✓			15% well consolidated graphitic, iron oxide and clay minerals set in a siliceous matrix and 3% available as persistent limonitic material. Not expected to significantly weaken aggregate
Durability	✓			Durable
Strength	✓			Of predicted high strength
Hardness	✓			Suitable
Free Silica Content	✓			71%
Sulfides	✓			No sulfides visible in hand specimen. Minor crystalline opaques may include pyrite
Light micaceous and organic particles	✓			Trace light micaceous phases and organic particles are detected as muscovite and charcoal respectively

*Low risk means a low probability of causing source rock related issues in regard to material performance in any particular applications. Risk is recommended to be considered in conjunction with a sampling frequency protocol for production of any particular product.

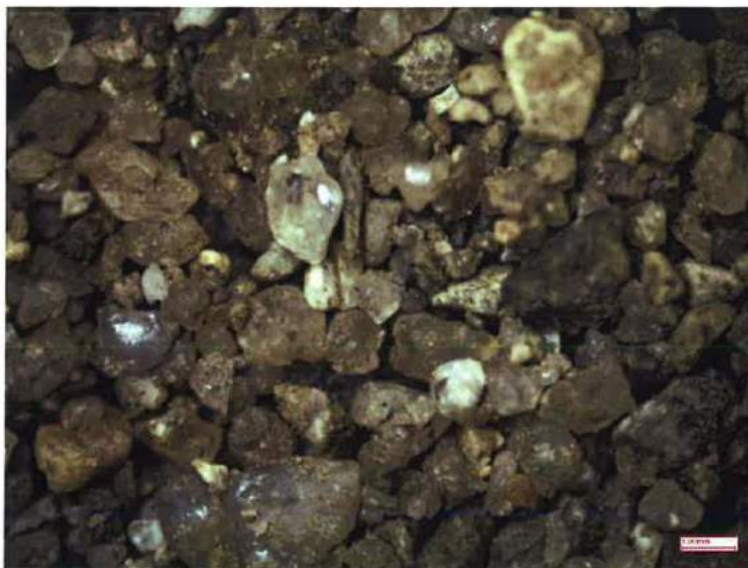


Plate 1: Enhanced binocular microscope image of the sand illustrating the subrounded, quartzose nature and moderate sorting of the sand. Lithic grains are represented by coarser dark and well-rounded grains.

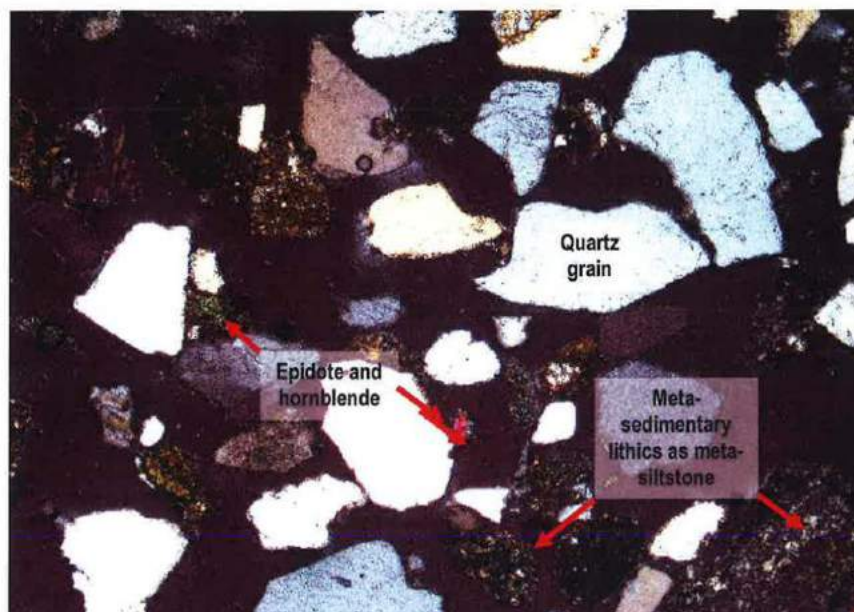


Plate 2: Microphotograph displaying representative grain assembly of the sand including abundant quartz grains accompanied by generally coarser siliceous meta-sediment lithics, feldspars and minor limonitic material. Image shown in cross polarised light.



Plate 3: Microphotograph utilising plane polarised light to distinguish brown semi-opaque limonitic material from opaque graphitic and clear silicate phases. Iron oxide commonly accompanies a siliceous cement in lithic grains which consolidate constituent grains.

Thin Section Description

Petrographic analysis reveals that the sand is composed of abundant sub-rounded, mildly to moderately strained and clear quartz grains accompanied by meta-sediment lithic grains (0.2 – 2.0 mm). The meta-sediment is graduated in grain size and ranges from siliceous meta-siltstone to quartzite which preserves the protolith's clay and silt matrix as a limonitic and siliceous cement. Sub-angular feldspars are among the free grains and exhibit slight weathering as clay propagations locked within the fabric of the crystal. Available clays have augmented the limonitic fines which coat the sand and persist in grain embayments giving the sand its brown colour. Minor and heavily altered volcanic lithic grains are also detected as composite intermediate grains overwritten with secondary epidote and haematic staining. Minor organic particles are detected as well-rounded and fine 0.1mm grains

Lithic grains comprise well-consolidated or completely recrystallised silty siliceous sediments grading towards coarser grained meta-wackestone to quartzite style of indurated rock composed of silt sized to 0.2 mm quartz grains. Finely recrystallised siltstone is composed primarily of microcrystalline quartz with diffuse iron oxide staining. In larger grains staining is seen to emanate from veins hosting opaques and recrystallised quartz. Opaque carbonaceous material has rendered many of the lithic grains dark grey and occurs as wisps of diffuse graphite derived from organic rich sediment.

Collectively the sand represents a robust and durable fine aggregate well suited to use in Concrete, Graded Asphalts and Unbound Pavements. The available grain size diversity may readily be benefitted to produce suitably graded material in these roles. As a alluvial to sand deposit continued geomorphic interpretation may be valuable in delineating the quality sand represented by this sample, from any prohibitively silty or clay rich deposits which frequently accompany sand in riverine settings as fine grained and humic lenses. From this interpretation, an effective extractive strategy can be maintained which takes into account the evolution of the river and the resulting variable characteristics of deposited sand. A mode based on a count of 200 widely spaced points is listed in **Table 2 - Modal Analysis of Minerals**.

Table 2 – Modal Analysis of Minerals

ROBUST GRAINS	MODE (PER CENT)	COMMENTS
Quartz	50	Occurring as singular clear unstrained to mildly strained grains
Meta-sedimentary lithic grains	33	Occurring as fine grained to microcrystalline quartz (21%) in meta-siltstone with sub-opaque iron oxide and carbonaceous cement staining and well consolidated clays (12%)
Igneous lithic grains	8	Including acid to intermediate igneous grains with pervasive obscuring iron oxide and haematic staining, epidote alteration and weathered clays (2%) partially concealing quartzo-feldspathic matrixes (5%) and fine magnetite crystals (1%). Commonly magnetic and the coarser among the sand's grains
Feldspars	4	Including plagioclase and K-feldspar as free slightly weathered grains
Hornblende	1	Relatively fine fragments
Epidote	Trace	Liberated from altered igneous lithic grains
Zircon	Trace	Hosted by quartz crystals
LIBERATED SECONDARY PHASES		
Limonitic material	2	Fine sub-opaque clayey grain coatings inhabiting grain embayments and occurring as limonitic particles. Associated with weathered meta-sediment and giving the sample its colour
Clay	1	Weathering product of K-feldspar in grains and lithics occurring as rare fines
Organic particles	Minor	Occurring as fine rounded charcoal and rare root fragments
Sericite	Trace	Alteration product of plagioclase
Total	100	Balance accounted for by minor and trace minerals

Summary

Sand represented by this sample is predicted to be suitable for use as a fine component in Unbound Pavement and Graded Asphalt Aggregate, and Fine Aggregate in Concrete.

For engineering purposes the sand may be summarised as:

- Well graded and sub-rounded, coarse **Lithic-Quartzose Sand**.
- Dominated by moderately clean, non-porous and robust quartzose and meta-sedimentary lithic grains (96%).
- Hard, strong and predicted to be durable.
- Containing 18% secondary phases, 15% of which are well-consolidated within the matrix of robust lithic grains. Remaining 3% available as limonitic accretions and clay fines.
- Containing 71% free silica in the form of free and composite quartz crystals. Of this 21% is regarded as potentially mildly reactive in concrete as strained quartzite or microcrystalline quartz.
- Regarded as presenting low risk of slow or mild ASR in concrete.

Free Silica Content

71% free silica content.

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Samples are disposed of after 3 months from the date of report. Thin sections will remain on site indefinitely.

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Appendix 14 – Traffic Impact Assessment

SMK

CONSULTANTS

surveying – irrigation – environmental - planning



Johnstone
Concrete & Quarries



Quality
ISO 9001
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TRAFFIC IMPACT ASSESSMENT

Quarry Expansion Wandoona Quarry

Lot 5 DP 236547
Parish of Mia Mia
County of Courallie

Proponent: **Johnstone Concrete and Quarries Pty Ltd**
35 Drive In Road, MOREE NSW 2400

Prepared by: **SMK Consultants**
39 Frome Street, MOREE NSW 2400

May 2017

The publication of this document has been developed by SMK Consultants.

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SMK

SMK Consultants Pty Ltd
Document Control

Project Reference: 216076		
Proponent: Johnstone Concrete and Quarries Pty Ltd		
Proposed Quarry Expansion		
Report No. 216076-TA		
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Revision History		
Revision No.	Date Issued	Reason/Comment
0	May 2017	Initial Issue

Executive Summary

Wandoona Quarry is operated by Johnstone Concrete and Quarries (JCQ), and provides a source of sand and gravel for concrete batching, landscaping materials and civil projects within the Moree Plains Shire. The proposed development involves an extension of the quarry's footprint from 2 Ha to 8.3ha which will increase the quarry's lifespan.

The quarry serves as a supply of raw materials for JCQ's commercial premises at 35 Drive-Inn Road, Moree. Traffic generated by the quarry travels between Wandoona and Drive-Inn Road, along the northern end of Gwydirfield Road, onto the Newell Highway Moree Bypass and then onto the Gwydir Highway to the main JCQ Depot. A return trip between premises takes approximately one hour (inclusive of load/unload time). The quarry currently operates on an average of 3-4 days per fortnight to replenish stockpiles of sand and a minor amount of clayey gravel at Drive-Inn Road.

Under current consent conditions, the Quarry is limited to a maximum of 16 heavy vehicle movements per day. The Quarry has an annual limit of 29,000 cubic metres of sand. Subject to demand, the monthly extraction rate varies from 1250 to 4000 tonnes. Assuming extraction of 2,500 tonne per month, this equates to 100 single trailer loads or 25 truck trips per week. These loads are transported by 2 truck movements per hour for 8 hours per day (maximum 8 trips per day), generating an AADT of 8.4 trucks from the quarry site (two way trips).

This development proposal involves changes to the current truck movement limits. The application involves the use of road trains in addition to other trucks for hauling of materials along the same route. The use of road trains will enable 2 road trains operating for 10 hours per day (10-trips per truck per day) for 2-3 days per month, to transport a total of 45 loads to replace smaller trucks. This improves efficiency of JCQ's operations by reducing road hours to 45/month and reduces periods of road disturbance by quarry traffic.

In periods of no quarry activity, the AADT of Gwydirfield Road is 77.7. In current periods of peak quarry activity, the AADT of Gwydirfield Road would potentially increase to 93.7 or higher, assuming 16 truck trips per day to and from the quarry.

Under this proposal the AADT over a 12-month period will be in the order of 80.7 (AADT of 3 trucks per day from the quarry). The use of road trains to extract an average of 1250 tonne per month and a maximum of 29,000 cubic metre per annum will reduce the overall number of trucks along Gwydirfield road that are generated by the quarry operation.

The potential impact of this traffic on the Newell and Gwydir Highways is minimal as the quarry traffic represents less than 5% of the total current AADT for both highways.

Therefore, it is concluded that the proposal will not negatively impact upon the safety or amenity of key roads within the Moree Plains Local Government Area.

Contents

Executive Summary	v
1 Brief description of the development	1
1.1 Objective of the Development	1
1.2 Application and study process	1
2 Introduction.....	1
2.1 Background.....	1
2.2 Scope of report.....	1
2.3 The key issues and objectives of a traffic impact study.....	1
3 General Data Collection / Existing Conditions	2
3.1 Description of the Site and Proposed Activity	2
3.2 Site location.....	2
3.3 Site Access	4
3.4 Existing Traffic Generation from Wandoona	6
3.5 Traffic Flows	7
3.6 Traffic Safety.....	9
3.7 Parking Supply and Demand	10
3.8 Modal Split	10
3.9 Public Transport	10
3.10 Pedestrian Network	11
4 Proposed Development.....	12
4.1 The Development.....	12
4.2 Access	13
4.3 Circulation	14
4.4 Parking.....	15
5 Impact of Proposed Development	16
5.1 Traffic generation during design periods.....	16
5.2 Traffic generation upon completion	17
5.3 Traffic Distribution and Assignments	17
5.4 Impact on Traffic Safety	18
5.5 Impact of Generated Traffic.....	1
5.6 Public Transport	2
5.7 Recommended Works.....	2

1 Brief description of the development

Wandoona Quarry is operated by Johnstone Concrete and Quarries (JCQ). The Quarry provides a source of sand and gravel material for use in JCQ's concrete batching, landscaping materials and the construction of local civil projects undertaken within Moree Plains Shire. The proposed development application aims to expand the Quarry's footprint to increase the quarry's lifespan.

No changes in on-site operations are required. Some changes are required to vary current limits on truck movements to enable a reduction in overall truck trips which will improve the efficiency of the site operations and reduce the monthly average number of trucks required to move materials from the site. The development does not include any new construction works.

1.1 Objective of the Development

The objective of the development is to increase the lifespan of the quarry and to improve the efficiency of quarry operations. This will allow JCQ to continue to meet local and regional demand for raw materials and to support related operations such as concrete production, increasing long-term job security for JCQ employees and contributing to the region's economy and capacity to undertake future developments as needed.

1.2 Application and study process

SMK Consultants has prepared this traffic impact study in accordance with the methodology set out in Section 2 of the RTA's Guide to Traffic Generating Developments 2002.

2 Introduction

2.1 Background

JCQ currently operates Wandoona Quarry, which produces up to 29,000 tonnes of raw materials annually for use in concrete batching, landscaping materials and for local civil projects. 'Wandoona' is located approximately 4 kilometres east of Moree. Wandoona Quarry supplies raw materials to JCQ's main premises in Moree, located at 35 Drive-Inn Road, where concrete is manufactured and from which most of JCQ's local business is conducted.

The quarry operates under an existing Council approval which limits annual extractions to 29,000 cubic metres and 16-truck movements per day to and from the quarry.

2.2 Scope of report

This report considers the impacts to traffic along Gwydirfield Road, the Newell Highway and the Gwydir Highway as a result of ongoing operations of Wandoona Quarry.

2.3 The key issues and objectives of a traffic impact study

The objective of the traffic impact study is to determine if any works are required in relation to potential traffic impacts resulting from the operation of Wandoona Quarry.

3 General Data Collection / Existing Conditions

3.1 Description of the Site and Proposed Activity

The property is known as 'Wandoona', which is owned by JCQ. The land is zoned as RU1 Primary Production under the Moree Plains Local Environment Plan 2011 (the LEP). The property has an existing quarry covering an area of 1.3 Ha which has approval to expand to a maximum area of 2 Ha. The remainder of the property not currently used for quarry activities is used as agricultural land (cultivation and grazing).

Extraction of materials on the site involves mainly sand and a clayey gravel material. The sand is excavated and wet processed through a sieve. The sieve separates the natural river gravel material into various sizes with the main product being raw washed sand for use in concrete batching by JCQ. A small deposit of clayey ridge gravel is also available on the site. This gravel is excavated and loaded directly onto trucks.

These two activities will continue in the same format. No changes are proposed to the processing of materials on the site. The proposal does not intend to increase annual production or extraction from the site beyond the current limit of 29,000 cubic metres.

Current approval on the site has a limit of 2 Ha for the extraction and disturbance area. This application involves obtaining permission to extend this footprint over an area of up to 8 Ha or more which would extend the life of the quarry.

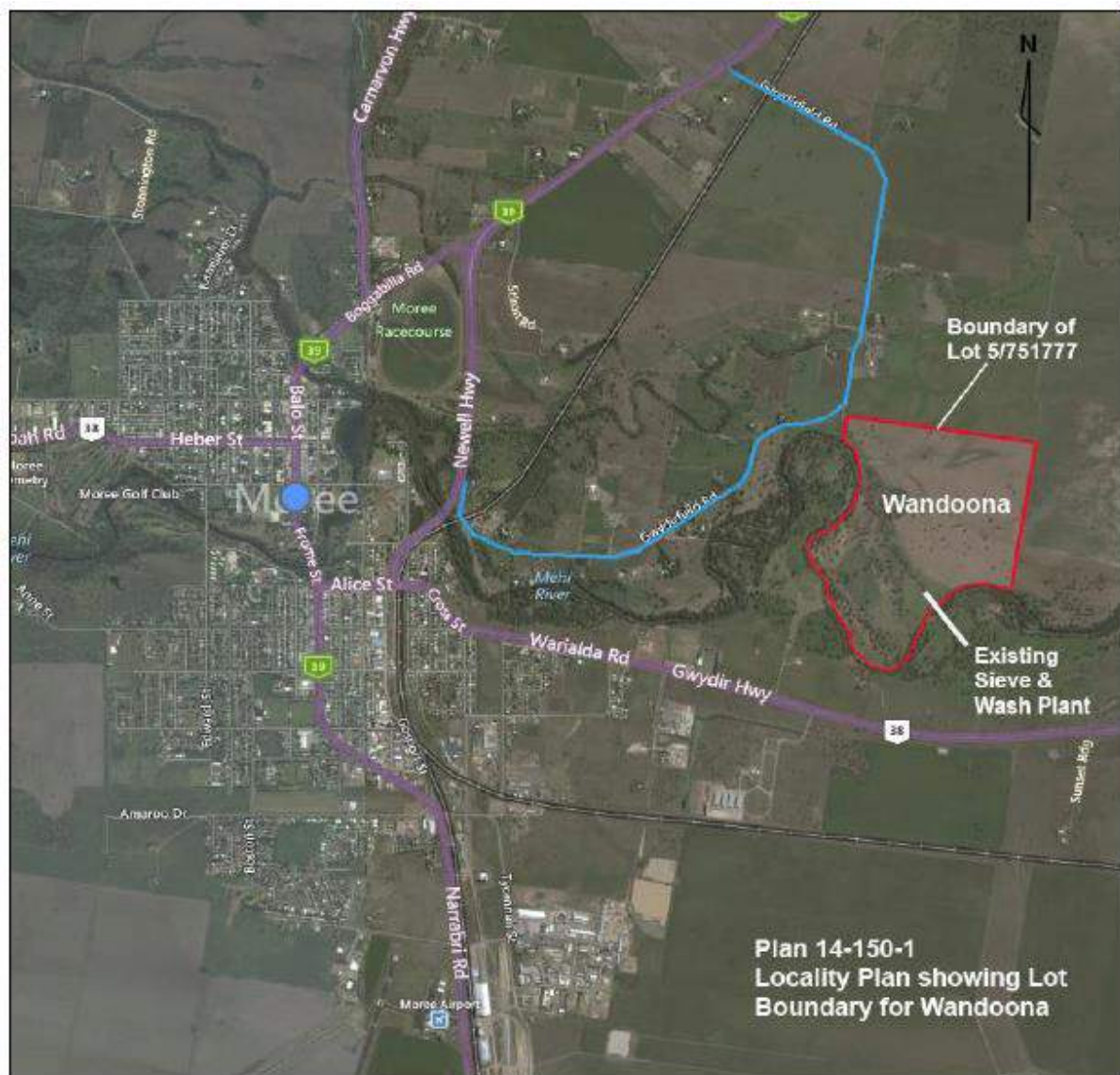
The current approval also limits the number of truck trips per day to a limit of 16-heavy vehicle movements. The Proponent wishes to extend this number of trips to allow an average peak daily movement of 20-truck trips for normal haulage operations. Additionally, the quarry materials available on site are supplied to MPSC and RMS for larger civil projects with requirements for minimum daily deliveries of material that would generate up to a potential 40-truck trip (2-way) per day if approval was granted.

Gwydirfield road is an approved route for GML Type 1 A-double trucks which is a road train. The proponent along with several other local residents use road trains on Gwydirfield road. Use of road trains will result in an overall reduction in heavy vehicle movements from the site when averaged over time as a result of the carrying capacity. The provision to use road trains on Gwydirfield road is included in this assessment.

3.2 Site location

The quarry is located approximately 4 kilometres east of Moree, in north-west New South Wales. The development site is located on lot 5 DP 236547, Parish of Mia Mia, County of Courallie and is located within the Moree Plains Shire. A locality plan is included as Figure 1, presents an aerial photograph showing the property boundary in relation to Moree.

Figure 1: Locality Plan showing Wandoona property boundary.



3.2.1 Current land use characteristics (zoning) of the proposed site and land use in the vicinity

The adjoining properties are all similarly zoned and have historically been utilised for dryland farming and rural residential development. The area to the west is known as Gwydirfield. This area supports mainly hobby farmers and some small mixed farming enterprises producing grain and hay. Numerous residents utilise the area for home industries including truck facilities and engineering works associated with agricultural contracting. The area is accessed by numerous trucks on a daily basis, including road trains.

The area to the east of Wandoona consists of larger farms growing dryland cereal crops and irrigated cotton. The area to the south includes sporting fields and rural blocks which adjoin the eastern edge of Moree's Inverell road Industrial precinct.

The township of Moree is located approximately 4km southwest of Wandoona. Moree is a large Shire in northern New South Wales, with a population of approximately 14,053 as of the 2015 ABS data. Moree functions as a major agricultural centre for the region with a town

population of approximately 9,000 people. The main industries of the town involve secondary supportive industries related to primary production, such as retail, construction and professionals (e.g. consultants, lawyers, agronomists), in addition to key industries such as education and health care.

3.3 Site Access

Gwydirfield Road

Traffic enters/exits “Wandoona” from Gwydirfield Road. Gwydirfield Road is a bitumen sealed road. Traffic generated from the Quarry enters and exits the site exclusively from the north.

The quarry approval currently restricts haulage operations from the quarry to 16 heavy vehicle movements per day. There are other sources of heavy vehicles along Gwydirfield Road generating an AADT of 18.3 according to Council data.

The existing development approval included conditions requiring appropriate upgrades of the original farm intersection into Wandoona. These works were completed under a Construction Certificate and Occupation Certificate issued by Council. The approval conditions included the preparation of a Dilapidation Report for Council’s records. This report was extended to cover the whole of Gwydirfield road utilised by trucks associated with Wandoona.

The section of Gwydirfield Road used as an access route by Wandoona Quarry is located in an area approved for GML Type 1 A-doubles. (Road trains) Truck traffic on this road is generally seasonal. The current quarry operation generates between 33 and 66 trucks per month to remove between 1250 and 2500 tonne of material from the site. Daily truck numbers vary significantly. The normal operation will involve two single trailer trucks and an occasional road train, making a maximum of 8 trips in total. The primary consumer of this material is the JCQ concrete works located on Inverell Road. JCQ also deliver materials to other projects which will generate additional truck traffic to supply these other projects of a scale in the order of 4,000 tonne or more. The project sizes vary considerably as they are mainly Council or RMS projects associated with road and other civil works. Some of these projects include minimum daily delivery schedules which on occasion are in excess of the current truck limit from Wandoona. This results in the necessity to stockpile materials prior to delivery dates at the JCQ depot and then double shift the materials to meet the requirements. Such operations result in an increase in truck traffic along Shire roads and highways.

The entrance intersection to Wandoona from Gwydirfield road was approved by Moree Plains Council. Vehicles exiting ‘Wandoona’ have a sight distance of 400m to the north and 350m to the west. This is shown in the following photographs. This site distances meet guideline requirements.

Figure 2: Gwydirfield Road (Northerly Aspect).



Figure 3: Gwydirfield Road (Westerly Aspect).



JCQ has imposed a local speed limit of 60 km/h for their trucks as part of the Operational Plan submitted. The approved speed limit on Gwydirfield road between the Wandoona entrance and approximately 725m north along Gwydirfield road is 80 km/h. The remaining 1.75 km to the Newell Highway intersection has a 100 km/h speed limit. JCQ trucks have imposed their speed limit for community satisfaction and safety purposes in addition to the presence of two floodway dips, two corners and a stop sign for a railway crossing.

Newell Highway Intersection

The Newell Highway intersection has been built by RMS with a right hand turning lane that has been surveyed and checked to be suitable for trucks including road trains. Traffic

generated by Wandoona turns right into Gwydirfield road from the Moree side. Minimal if any JCQ trucks enter the road from the north as there is no left turn lane.

This section of the highway has a 110 km/h speed limit. This intersection is further discussed in section 5.4.2 of this report. In general terms, the intersection provides acceptable lengths and widths for the intersection geometry required under Austroad standards with minor variations to the length.

3.4 Existing Traffic Generation from Wandoona

The site currently experiences irregular traffic generation. At present, the Quarry extracts a minimum of 15,000 tonnes of raw materials per annum for concrete batching purposes. The existing Council approval allows for a maximum annual extraction of 29,000 cubic metres. The current average extraction rate is 300 tonnes per week allowing for a 50-week annual operation period. If demand increases for new local markets and development, the maximum weekly extraction rate at present would be approximately 2400 tonne using 8-road train trips per day over a 6-day period.

Current operations are such that the quarry is operational every second week. The quarry extracts, processes and transports two weeks' worth of raw materials to JCQ's premises at Drive-Inn Road, where the materials are stockpiled. The quarry then closes its operations until the stockpiles are exhausted, at which point quarry activities resume.

The process of material transport from the Quarry to Drive-Inn Road is as follows. Trucks remove 8- loads per day from the Quarry to be delivered to JCQ's premises at Drive-Inn Road. The materials are removed using a mixture of truck configurations which have an average carrying capacity in the order of 37.5 tonne. (1 x B-double configuration) A total of 30 loads are required to move 1,125 tonnes every two weeks, meaning transport of materials takes just under four days to complete. Truck turnaround time from the Quarry to Drive-Inn Road and back is approximately one hour. Traffic generation under active transport conditions (4 days/fortnight) is therefore considered to be 2 truck movements/hour for 8 hours per day, with no traffic generation between these periods other than light traffic for the onsite machinery operators.

3.4.1 Road hierarchy; including the identification of the classified road network

Trucks exiting Wandoona Quarry follow a predetermined route to reach their destination at 35 Drive-Inn Road, Moree 2400. The route is as follows:

1. Gwydirfield Road
2. Newell Highway
3. Gwydir Highway
4. Drive-Inn Road

Upon unloading at JCQ's premises at Drive-Inn Road, trucks then return to Wandoona Quarry, following the reverse route.

3.4.2 Inventory of road widths, road conditions, traffic management and parking control

The Newell and Gwydir Highways are national highways capable of handling B-Triples. Standard lane width is a minimum of 3.5m.

Gwydirfield Road and Drive-Inn Road are two lane sealed roads, located in an Approved Area for GML Type 1 A-double trucks (road train). The two roads have a formation width of approximately 7m.

3.4.3 Current and proposed roadworks, traffic management works and bikeways

There are no current roadworks, traffic management works or bikeways, apart from routine maintenance.

3.5 Traffic Flows

The development is not expected to significantly impact existing traffic flows. This assessment involves an existing activity (extraction of quarry materials from Wandoona gravel pit) which has an existing approval. Potential exists to increase Wandoona truck traffic on Gwydirfield road from approximately 2-trucks per hour to 4-trucks per hour in order to improve transport efficiencies resulting in additional periods when there is no quarry traffic on the road. This has the potential to improve local traffic conditions and it would not alter Average annual daily traffic (AADT) numbers.

3.5.1 Selection of Key Streets

Key streets include Gwydirfield Road, the Newell and Gwydir Highways.

Gwydirfield Road passes through an area of small scale farming enterprises to the north of the Quarry, zoned RU1 under the Moree Plains Shire Local Environment Plan 2011. This route has a small number residences located close to the road; however, the density of residences is very low, and the road primarily passes through farmland.

The Newell Highway and Gwydir Highway are both National highways which experience high traffic volume from both small and large vehicles.

3.5.2 AADT on key streets

Moree Plains Council placed road counters on either side of the entrance to Wandoona for a period of 10-days in 2015. Results of AADT measurements for Gwydirfield Road is shown in Table 1. The measurement period coincides with JCQ ceasing operations of other sand quarries and were therefore involved in moving equipment and machinery to start up the Wandoona site. JCQ generated average daily traffic of approximately 1-truck and one light vehicle. JCQ truck numbers were not specifically recorded as they involved delivery of machinery. JCQ trucks and other vehicles utilised the northern entrance to Gwydirfield road and therefore would be recorded as southbound and north bound traffic. Some of the Wandoona truck traffic included farm trucks for delivery of cattle, machinery, grain and other commodities.

The data presented in Table 1 represents general traffic composition for the northern section of Gwydirfield road. The data indicates that approximately half of the heavy traffic and one third of the total traffic originated from the southern entry to Gwydirfield road. (Through traffic)

Table 1: AADT of Gwydirfield Road. Measurements taken 27/11/2015 to 7/12/2015. Data provided by Moree Plains Shire Council.

	Northbound	Southbound	Total
AADT	44.95	33.87	86.7
Heavy Vehicle AADT	9.19	4.73	15.3
% Heavy Vehicles of Total AADT	20.51	13.97	17.66

AADT = total volume of vehicle traffic of a highway or road for a year divided by 365 days.

Table 2 represents traffic conditions (without quarry generated traffic) and AADT traffic based JCQ generating 30-two-way truck trips every 2-weeks. (Average of 2-trucks and 1-light vehicle per day.)

Table 2: Calculated Total AADT of Gwydirfield Road under different traffic scenarios, calculated from data in Table 1.

	No Quarry Operations	Peak Quarry Operations
Total AADT	80.7	90.7
Total Heavy Vehicle AADT	13.3	19.3
% Heavy Vehicles of Total AADT	11.5	21.3

AADT involves averaging of vehicle numbers over a time period and therefore does not represent peak flows. The proposed peak daily traffic generated by Wandoona extractions would involve an average of 20 x 2-way truck trips over a 10-hour period. Total daily vehicle movements for this period would therefore be in the order of 100.7 including 33.3 heavy vehicles of which one third is existing (pre-JCQ Wandoona extraction) traffic.

In between transport periods, Wandoona is not expected to generate any significant traffic other than occasional small vehicles (e.g. Utes) entering/leaving the site as required for site inspections, or to carry out maintenance such as machinery repairs or farm related work.

Traffic data for the Newell highway north of Moree identified a current average daily traffic count of 1937 vehicles consisting of 1317 light vehicles and 620 heavy vehicles passing RMS traffic cameras at Goondiwindi. This appears to be an ongoing average for vehicles passing through or feeding on to the Newell highway from within the Moree Plains Shire. Noticeable peak periods are present during various harvest periods and weekly deliveries made by Interstate trucks.

3.5.3 Estimate of the speed of traffic on the road to which vehicular access is proposed

The speed limit of Gwydirfield Road at Wandoona's access intersection is 80km/h. JCQ further decrease this to a self-imposed speed limit of 60 km/h for all heavy vehicles.

The intersection of the Newell highway is a right-hand turn onto a 300m long section of road to a stop sign at a railway level crossing. Truck speed over this distance is significantly limited allowing for acceleration from the highway through to stopping over a distance of 300m. Practical truck speed is generally less than 50 km/h over this first northern section of Gwydirfield road. Trucks can then increase to a speed of 60 km/h before needing to negotiate two corners and two floodway dips before turning off Gwydirfield road in to Wandoona. The Wandoona entrance gates requires a 90 degree turn and therefore truck speed is generally reduced to less than 20 km/h over the last 50m of Gwydirfield road.

The Newell Highway has a light vehicle speed limit of 110 km/h and a 100 km/h or lower restriction of heavy vehicles.

3.5.4 Current traffic generation of site

At present, approximately 30 loads are transported from Wandoona every two weeks. This translates to 2 truck movements per hour for 8 hours per day (maximum 16 movements per day), for up to four days per fortnight.

Maximum allowable traffic triggered for larger projects or maximum annual quarry material removal of 29,000 cubic metres, would involve 1740 standard semi-loads or 870 road train movements per year. This equates to an AADT of 2.4 road trains.

3.5.5 Daily and peak period heavy vehicle flows and percentages

Quarry traffic is mainly generated for 4 days every fortnight. During these days, traffic is generated at even intervals of 2 truck movements/hour for 8 hours.

The proportion of quarry traffic on Gwydirfield Road under peak quarry activity is outlined in Table 3:

Table 3: Proportion of quarry related traffic as % of AADT on Gwydirfield Road

	Annual Average Traffic for Quarry Operations	Peak Daily during haulage periods
Quarry Traffic as % of Total AADT	4.4	22
Quarry Traffic as % of Heavy Vehicle AADT	21	145

Under peak traffic conditions, one fifth of total road traffic will be generated by the quarry. Allowing for 20-truck trips per day for peak gravel haulage periods, this represents an increase of 45% in heavy vehicle AADT for the short period that truck traffic occurs.

In relation to the Newell Highway's current heavy traffic AADT at Goondiwindi, the increase of 20-trucks from Gwydirfield road onto the Newell Highway will result in a 3% increase in daily heavy vehicle traffic and a 1% increase in overall traffic.

It should be considered that the quarry will not increase annual extractions. On this basis, the truck traffic assessed in the above calculations is considered as existing traffic as this development is already approved. The above calculations therefore assess the project on the basis of a greenfield site.

3.5.6 The adaptation of appropriate computer models or techniques for assessing levels of traffic congestion and queuing conditions

Modelling is not required as there is little or no risk of traffic queuing or congestion based on the limited number of trucks using the site. Traffic frequency is predicted to be in the order of 2 trucks per hour. Under worst case conditions, this may be assessed as 4-trucks per hour. The frequency of trucks is dependent on the number of trucks owned by the proponent and the timing for loading and unloading in addition to travel time to and from the delivery point.

3.6 Traffic Safety

3.6.1 Accident history of road network in the area

There have been three reported accidents on the Gwydirfield Road and Newell Highway haul route since 2011, mainly;

- One in 2015 on Gwydirfield Road north of the quarry,
- One in 2013 at the intersection of Gwydirfield Road with the Newell Highway, and
- One in 2015 along the Moree Bypass.

Low crash numbers and spatial separation of these crashes indicates there are no areas of safety concern on these roads.

High crash rates occur between the intersection of the Newell Highway and Gwydir Highway, and the intersection of Gwydir Highway with Tycannah Street, with 6 reported crashes from 2011 to present. After Tycannah Street, there are no reported crashes on the Gwydir Highway or Drive Inn Road.

In summary, Gwydir Highway between the Newell Highway and Tycannah Street is the only region of the haul route which may be of concern to traffic safety.

3.7 Parking Supply and Demand

3.7.1 On-Street Parking Provision

Not Applicable.

3.7.2 Off-Street Parking Provision

During hours of operation, the quarry requires two staff on site. Staff will park on site. The small number of staff vehicles, and the extensive size of the quarry, are such that ample room for parking is available on site, and designated parking areas on site are not necessary. Staff generally park at a servicing point for the machinery used onsite. No trucks are required to park onsite.

3.7.3 Current Parking Demand, Including Utilisation by time of day and Turnover Rates

Not Applicable.

3.7.4 Short Term Pick Up and Set Down Areas

Not Applicable.

3.8 Modal Split

Not Applicable: no traffic modelling required.

3.9 Public Transport

Not applicable: No public transport present or involved/required in the project.

3.9.1 Rail station locations

Not applicable: rail network not present.

3.9.2 Bus routes and bus stop locations; Pedestrian access to bus stops; Constraints and conflicts

A school bus services Gwydirfield road. The bus picks up students from 8am and then returns in the afternoon at approximately 3.30pm on school days. Bus stops consist of normal driveways to each of the drop off points along the road. The bus generally uses driveways to stop on the side of the road.

The JCQ operational plan includes truck speed restrictions and consideration of other road users. All truck operators are aware of the school bus times and appropriate caution is adopted. No conflict or incident requiring modification to driver behaviour has occurred during site operations to date.

JCQ trucks pass 11-houses between Wandoona and the highway. If all residences have school age children, the bus would have the potential to stop at 4-locations to service these houses.

3.9.3 Rail and bus service frequencies, ideally separated into Monday to Friday, Saturday and Sunday, for both peak and off-peak times

There is no railway service that would potentially conflict with the transport route. A school bus traverses Gwydirfield road twice daily during school days. The potential risks associated with the school bus and quarry traffic is considered minimal as a result of the low speeds of both the bus and trucks. Sufficient sight distances are available to identify the bus at an acceptable distance to enable truck operators to take appropriate precautions, including stoppage if required. The bus may encounter one truck on each trip as a maximum as it takes an estimated 5-minutes to traverse the section of road used by quarry traffic.

3.9.4 Commuter parking provision

No commuters are involved in the project. Local residents create light vehicle traffic peaks from 8am to 9am and again in the afternoon between 4.30pm and 5.30pm. The traffic peaks may involve 10-light vehicles over an hour. Traffic density or congestion in this area of rural and rural residential development has not been an issue to date or expected to be in the future.

3.10 Pedestrian Network

3.10.1 Identify major pedestrian routes

Gwydirfield road is occasionally utilised for early morning walkers. The road has no other pedestrian traffic.

The Newell Highway has no provisions for pedestrians and the use of the road by pedestrians is generally discouraged. No pathways are present.

3.10.2 Pedestrian flows and potential conflicts with vehicles, particularly where such conflicts cause capacity constraint on either vehicular or pedestrian movement (Survey)

Not applicable due to a lack of regular pedestrian flow.

3.10.3 Pedestrian infrastructure

No pedestrian infrastructure is present along the haul route other than within the short section of Gwydir Highway from the Moree Bypass through to Yulunga Street. This pedestrian path is well clear of the highway corridor.

If pedestrian traffic is present along other parts of the haul route, the verge area of the road is considered to be sufficiently extensive to enable pedestrians to safely stand at least 2m off the side of the road.

3.10.4 Proposed developments in the vicinity

There are no current proposals for traffic generating developments in the region which may have a cumulative impact upon traffic flows in conjunction with the proposed development at Wandoona.

4 Proposed Development

4.1 The Development

4.1.1 Plan reference, if plans not contained in study report

The development plans are contained in the Environmental Impact Statement.

4.1.2 Nature of development

Wandoona Quarry is classified as being an extractive industry.

4.1.3 Gross floor areas of each component of development

Not Applicable.

4.1.4 Projected number of employees/users/residents

It is expected that only 1-2 staff will be present at Wandoona during site operations. The purpose of Wandoona Quarry is to supply raw materials for activities such as concrete manufacturing, which occurs on other premises (35 Drive Inn Road, Moree). As such, the majority of JCQ staff are based at other premises which are supplied by the quarry.

4.1.5 Hours and days of operations

Operating hours will be between 7am and 5pm on weekdays and 7am and 3pm on Saturdays. Operation events or projects will be variable, as JCQ staff are only present onsite to haul material from the site on demand as needed. It is expected staff would be present at the Quarry for an average of two days per week. In between projects, the site would remain closed with no activity other than occasional site inspections for assessment of gravel reserves or minor maintenance repairs such as fencing.

Timing of vehicular movements at the site are outlined in detail in Table 4.

Table 4: Timing of vehicular movements at Wandoona Quarry.

Activity	Monday to Friday	Saturday	Sunday	Public Holiday
Arrival and loading of trucks to haul product	7.00am to 5.00pm	7.00am to 3.00pm	Nil	Nil
Light vehicle traffic associated with employees, or light service vehicles entering or leaving the site	24 hours a day			
Maintenance of plant and equipment including repairs/alterations to processing equipment and unloaded test runs	6.00am to 10.00pm	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 5.00pm
Operation of associated equipment within the confines of the excavated quarry area	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 2.00pm	7.00am to 2.00pm
Operation of loaders, excavators, trucks, screening & washing equipment within the property	7.00am to 5.00pm	7.00am to 5.00pm	7.00am to 2.00pm	7.00am to 2.00pm
Exceptional circumstances – all crushing, screening, loading and product haulage activities within and from the site to enable manufacture and delivery to high priority RTA or Shire Projects. Haulage outside normal operating hours is to be limited to four (4) trucks only.	24 hours in emergencies, only with written notification to Moree Plains Shire Council.			Nil

4.1.6 Staging and timing of development

The purpose of the development application is to allow for expansion of current quarry excavation activities to cover a larger area. This does not require the construction or implementation of any significant infrastructure; nor are significant changes in operational procedure required. Therefore, staging of the development is not applicable. Expansion of the quarry site will begin immediately upon receiving development approval, and will continue as needed for JCQ operations.

4.1.7 Selection of appropriate design vehicles for determining access and circulation requirements

The quarry will be accessed by a range of vehicles up to road trains. The road train will be the largest vehicle used on the site. The use of road trains will enable a reduction in overall vehicle movements due to the larger carrying capacity.

4.2 Access

4.2.1 Driveway location, including review of alternative locations

The Driveway to “Wandoona” is located off Gwydirfield Road. No appropriate alternate access exists.

4.2.2 Sight distance of driveways and comparisons with stopping and desirable minimum sight distances

Vehicles exiting ‘Wandoona’ have sight distance onto Gwydirfield Road of 400m to the north and 350m to the west. This is considered sufficient on the basis of limited truck speeds of 60 km/h.

The distances can be compared to required sight distances of 111.1m required for a 5 second Minimum Gap Sight Distance on a road with 80km/hr speed limit.

4.2.3 Service vehicle access

Service vehicles will have the same site access as all other vehicles on site.

4.2.4 Analysis of projected queuing at entrances

Due to low traffic densities on rural roads such as Gwydirfield Road, no queueing is expected at the site entrance. No queueing has occurred to date.

4.2.5 Current access to site and comparison with proposed access

The location of the driveway connecting Wandoona to Gwydirfield Road is to remain the same. A stock grid has been installed to avoid issues of stock access to the site during operations.

The original Council approval issued for quarrying on this site involved an upgrade of this intersection to required standards.

Upon entering the property, trucks will use an existing graded gravel road leading to the quarry site. The road has sufficient width for dual lanes.

4.2.6 Provision for access to, and by, public transport

Not applicable: no public access or transport present.

4.3 Circulation

4.3.1 Proposed pattern of circulation

Trucks will enter/exit the quarry from/towards the northern end of Gwydirfield Road. This route minimises the number of residences/residential areas quarry traffic passes through while en-route.

The haulage route between Wandoona and Drive Inn Road is outlined in Figure 4.

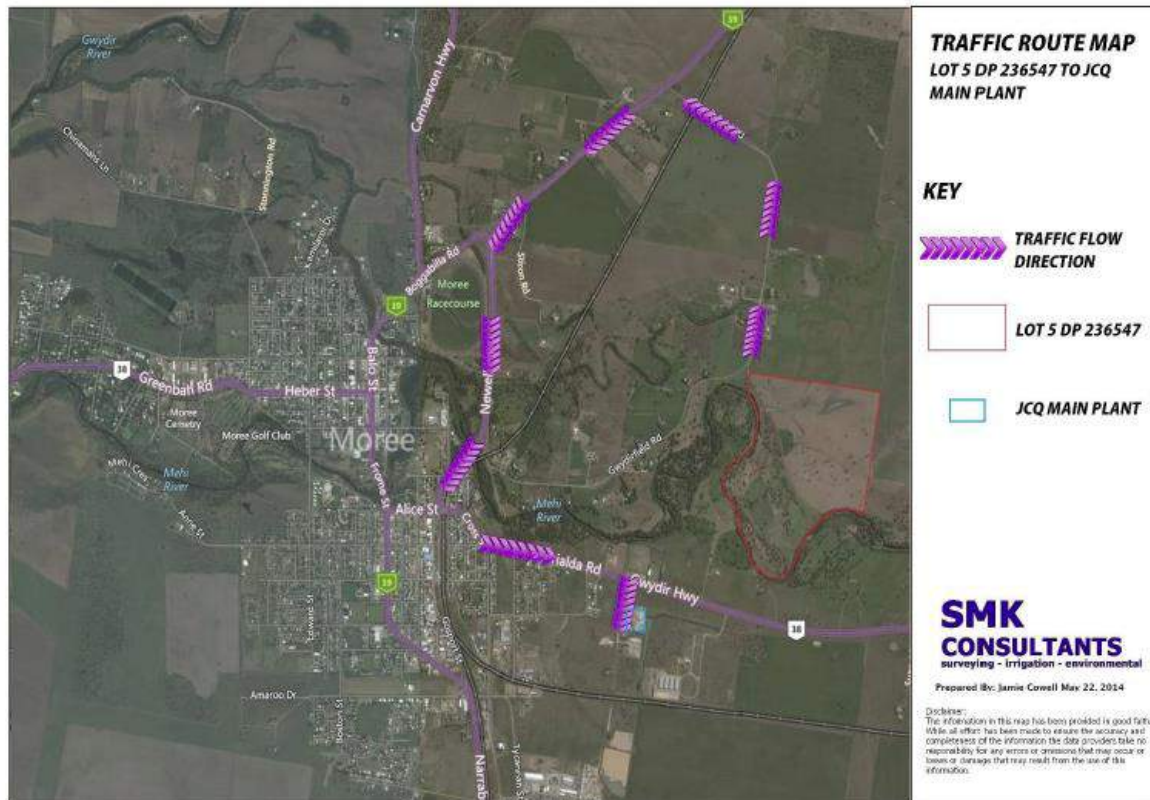


Figure 4: Traffic Route between Wandoona Quarry and Drive Inn Road.

Council has approved the route through the current development approval.

4.3.2 Internal road widths

Internal roads within the quarry have a width of approximately 11m.

4.3.3 Provision for bus movements

Not Required.

4.3.4 Service area layout

Not Applicable.

4.4 Parking

4.4.1 Proposed supply

Ample parking is available on site.

4.4.2 Parking provision recommended by State Government policy

Not Applicable.

4.4.3 Council code and local parking policies and plans

Not Applicable.

4.4.4 Parking layout

Ample space will be available for staff to park on site. The small number of employees and large size of the quarry are such that delineation of designated parking areas is not required.

4.4.5 Projected peak demand, based where appropriate on similar research reports and on surveys of similar developments

Only staff of JCQ visit Wandoona. The facility does not have a sales area and therefore no Client access or sales occur onsite. When operational, Wandoona generally has 1-2 staff working on site to process materials and load trucks. Therefore, a conservative estimate for peak demand for parking is expected to be 2 cars per day. Ample space is available on site to accommodate for this situation.

4.4.6 Parking for Service / courier vehicles and bicycles

As above. Ample parking is available on site. Designated parking areas are not necessary. No courier vehicles are required. Bicycles are excluded from the site during operation of the quarry. Bicycles may be allowed on the site when work is not being undertaken but such access is limited to the farm area. The site is incorporated within the WH&S measures and policies adopted by JCQ.

5 Impact of Proposed Development

5.1 Traffic generation during design periods

No construction is associated with the proposed development, therefore no additional traffic generation is expected as a result of the current application to Council.

5.1.1 Daily and seasonal factors

Quarry operations cease on days of rain/during periods of flooding due to practicality and WHS concerns related with operation of machinery in wet conditions.

During dry, busy periods, a watering truck is used for dust suppression on internal roads within the quarry. This truck may account for one additional return movement per day to/from the quarry when in use. The remainder of the haul route is bitumen sealed road.

Quarry operations are reasonably consistent over time, as demand for raw materials remains consistent throughout the year. This generally involves one week of activity followed by a week of little or no activity.

The quarry is occasionally utilised to supply raw sand to development projects in the Moree area. On average, this may occur three to four times per year as they relate to larger projects such as sporting field developments and RMS road construction works. Such projects would create traffic peaks for supply of materials which is additional to the normal site operation of supplying sand for concrete production. Such projects cannot be predicted and are not seasonal.

5.1.2 Pedestrian generation and movements

Not applicable.

5.2 Traffic generation upon completion

The following section presents a review of alternatives for truck movements to and from the quarry site to meet ongoing demand for quarry materials but not exceeding the annual limit as approved under the current development approval.

The proposal involves more regular use of road trains to increase loads sizes and therefore decrease the total number of truck trips to and from the quarry. A second part of the proposal involves an expansion of the daily limit of truck trips to and from the quarry.

This assessment involves the Proponent varying operations such that stockpiles at Drive Inn Road are replenished monthly, instead of fortnightly in addition to being capable of meeting civil project schedules set by mainly Council and RMS. Such a change would involve removal of the daily number of heavy vehicle movements. These measures will permit significant improvement to the efficiency of JCQ's operations by allowing JCQ to be able to reduce the number of hours required to transport quarry materials to their Drive Inn Road site and other construction sites.

When using road trains, a total of 45 trips is required to transport 2500 tonnes/month at 50 tonnes/load. The Proponent is proposing to use two road trains to transport extracted materials from the quarry to satisfy general requirements for sand material at the concrete works. This does not cater for other projects requiring larger amounts of raw sand or ridge gravel material. These other projects generally require haulage of quarry materials over shorter periods, noting that the annual limit is not subject to extension under this application.

Expected traffic under conditions of the proposal will constitute 2 road trains operating for 10 hours per day to transport quarry materials to the JCQ's Drive Inn Road facilities. Under this scenario, 4 truck movements would be occurring per hour, for 2-3 days per month when averaged over a 12-month period. Approximately 1,000 tonnes of material could be transported per day.

This method of operation is more efficient when compared to using B-Doubles which require a total of 60 loads (totalling 60 road hours) per month over 8 days of quarry activity per month. Using two road trains requires 45 loads in total (totalling 45 road hours), with only 2-3 days of quarry activity per month (as two trucks would be working to transport the loads simultaneously). The proposal also involves supply of quarry materials to other projects at a similar traffic frequency.

The proposal therefore involves slightly increased intensity of traffic generation over shorter periods of time.

5.3 Traffic Distribution and Assignments

5.3.1 Hourly distribution of trips

During standard transport periods (2-3 days/month), two return truck movements will be made per hour for 10 hours each day. During increased operations for special projects, the truck frequency may be increased to 4-trucks per hour for a 10-hour day over a period of 2-3 days.

5.3.2 Assignments of these trips to the road system based where possible on development feasibility studies or on origin/ destination surveys undertaken at similar developments in the areas

Not applicable, as trucks will follow a predetermined haul route.

5.4 Impact on Traffic Safety

5.4.1 Assessment of Road Safety Impact

The Gwydir Highway, between the intersections with the Newell Highway and Tycannah Street, was the only identified region of potential road safety concern, based on traffic accident data.

This stretch of the Highway has a relatively high traffic density as it involves extensive local traffic feeding to residential and industrial sectors of Moree. The increase in traffic frequency by four movements/hour under the current proposal are unlikely to represent a significant difference to baseline traffic conditions. The speed limit of this section of road is 50km/hr, which limits the potential for high speed collisions resulting in injuries or fatalities. Road geometry is considered as suitable as it is within an area of 50 km/h speed limits.

The proposal is therefore unlikely to have significant impacts upon road safety.

5.4.2 Assessment of Gwydirfield Road and Newell Highway Intersection

The intersection of Newell Highway and Gwydirfield Road has appropriate capacity and geometry to accommodate GML Type 1 A-doubles (Road Trains). The intersection type is AUR (Auxiliary lane Right turn). The intersection was surveyed to ascertain the overall dimensions and then assessed in relation to the minimum prescribed dimensions for this type of intersection (RTA Road Design Guide 2003).

The measured intersection with dimensions is shown in the plan below.

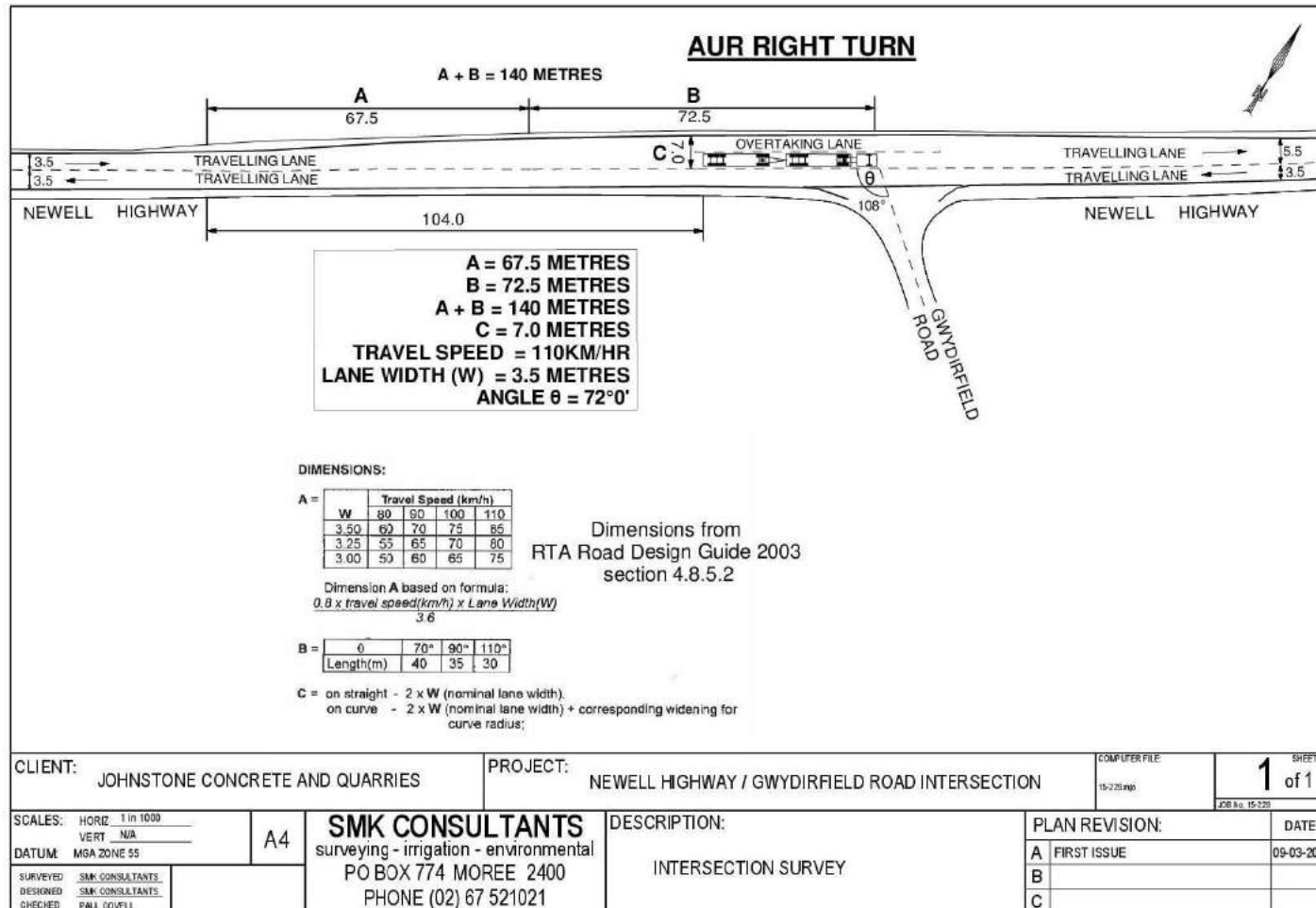
- The current lane width is 3.5 metres and the existing speed limit is 110 km/h for light vehicles. Based on these parameters the length 'A' in the attached plan is required to be 85 meters.
- Gwydirfield road intersects with the Newell Highway at an angle of 108 degrees (θ). Based on this angle the length of 'B' in the attached plan should be 30 metres.

The measured value of A for this intersection is 67.5 metres and the measured value of B is 72.5 metres. Compared to the design length, the A measurement is short by 17.5 metre and the B measurement is long by 42.5 metres.

The total measured distance of 140 metres is more than the minimum required of 115 metres.

This intersection meets the requirements of AUR in that although the transition is applied over a shorter distance than necessary, there is still adequate space for a vehicle to transfer into the left lane at the same rate as the longer transition would require, due to the extended length of B, the storage zone. The intersection was constructed by RMS.

Figure 5: Gwydir Highway Intersection showing surveyed dimensions



5.5 Impact of Generated Traffic

Traffic generated by the proposal is predicted to have minimal net impact upon the road system.

5.5.1 Daily traffic flows and composition on key streets and their expected effect on the environment particularly in residential areas

The total traffic volume, volume of heavy vehicle traffic and proportion of quarry traffic as a percentage of total traffic on Gwydirfield Road is expected to increase under peak traffic generation conditions outlined in the proposal (Table 5). These increases are expected to be noticeable as the amount of daily traffic along this road is minor. The potential increase may have a minor impact upon existing road users along Gwydirfield Road in regard to increased traffic density and related noise generation on days of maximum quarry operations.

Table 5: Traffic conditions of Gwydirfield Road under different quarry operation scenarios, calculated from data in Table 1.

	No Quarry Operations	Current Peak Quarry Operations	Forecast Peak Quarry Operations
Total AADT	77.7	93.7	117.7
Total Heavy Vehicle AADT	6.3	22.3	46.3
% Heavy Vehicles of Total AADT	8.1	23.8	39.3
Quarry Traffic as % of Total AADT	N/A	17.1	34.0
Quarry Traffic as % of Heavy Vehicle AADT	N/A	71.7	86.4

However, these conditions are only expected to occur for 2-3 days per month, which is considered infrequent. Further, the proposal results in a decrease in the duration of quarry operations per month, and a subsequent decrease in the longevity of periods of increased heavy vehicle traffic on Gwydirfield Road in comparison to current operations. Therefore, the proposal is considered have a neutral impact upon residences along Gwydirfield Road, as the negative impacts of increased traffic generation are offset by the positive impacts of shorter periods of road disturbance.

As before, traffic data available for the Newell Highway and the Gwydir Highway in/near Moree indicates that the traffic from the quarry would be less than 5% of traffic on either of these roads. The current high traffic volumes along these roads are such that projected changes in quarry traffic generation under the proposal are unlikely to have a significant net impact upon total or heavy vehicle traffic volumes on either road. Any potential negative impacts of higher traffic volumes in residential areas under the current proposal are expected to be offset by decreased longevity of traffic disturbances.

5.5.2 Peak period volumes at key intersections and effect of generated traffic on congestion levels

The proposed development is in a rural setting. Due to low traffic density, congestion is not an issue on any identified key roads. The proposed development is not expected to produce significant traffic volumes which could cause congestion.

5.5.3 Impact of construction traffic during construction stages

Not applicable.

5.5.4 Other proposed developments in the vicinity their timing and likely impact, if known

There are no other known proposed developments within the area.

5.5.5 Assessment of traffic noise

Under the proposal, there is expected to be a mild increase in the intensity and decrease in the longevity of traffic noise on Gwydirfield Road on days of quarry operations under the proposal conditions, in comparison to current conditions.

Due to high baseline traffic volumes on the Newell Highway and Gwydir Highway, impacts of the proposal on traffic noise is expected to be minimal on these roads.

5.6 Public Transport

5.6.1 Options for extensions and changes to bus routes and bus stops following discussions with the STA and or private bus operators

Not applicable.

5.6.2 Provision for pedestrian access to bus stops

Not applicable.

5.7 Recommended Works

5.7.1 Improvements to site access and circulation

Not Required.

5.7.2 Improvements to roads, signals, roundabouts and other traffic management measures

Not Required.

5.7.3 Improvements to pedestrian facilities

Not Applicable.

5.7.4 Effect of recommended works on the operation of adjacent developments

Not Applicable.

5.7.5 Effect of recommended works on public transport services including access to bus routes and bus stops

Not Applicable.

5.7.6 Provision of LATM measures

Not Applicable.

5.7.7 Funding of proposed improvement projects

No proposed improvements required.

5.7.8 Noise attenuation measures

Trucks used on to haul materials from this site will be subject to standard road inspections and approvals. The trucks will therefore need to conform to noise emission limits set by RMS and others.

The speed of JCQ trucks will be limited to 60 km/h. The trucks will not be excessively accelerating or require large or long braking areas requiring the use of exhaust brakes.

Appendix 15 – Wandoona Quarry Weighbridge Records



Johnstone Concrete and Quarries Pty Ltd
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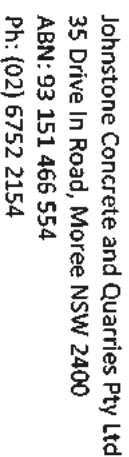


PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 2

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net
SMM AGG - RIVERSTONE								
26/07/2019	MOO11464	IF & SS MORRISON Product:			OCAR1	7.78	3.92	3.86
			SMM AGG - RIVERSTONE					
26/07/2019	MOO11465	IF & SS MORRISON Product:			OCAR1	8.22	3.90	4.32
			SMM AGG - RIVERSTONE					
29/07/2019	MOO11474	IF & SS MORRISON Product:			OCAR1	7.38	3.96	3.42
			SMM AGG - RIVERSTONE					
31/07/2019	MOO11494	IF & SS MORRISON Product:			OCAR1	7.72	3.96	3.76
			SMM AGG - RIVERSTONE					
5/08/2019	MOO11521	MOREE PLAINS SHIRE COUNCIL Product:	5039119		0000CAR1	25.84	18.68	7.16
			RIVERSTONE					
8/08/2019	MOO11544	CASH SALES Product:	NW		CI9SVV	7.54	4.20	3.34
		Delivery To: MOREE	SMM AGG - RIVERSTONE			0.00 kms		
8/08/2019	MOO11545	CASH SALES Product:	NW		CI9SVV	7.70	4.20	3.50
		Delivery To: MOREE	SMM AGG - RIVERSTONE			0.00 kms		
13/08/2019	MOO11569	ZZ DRILLING WATER RESOURCES Product:			BL78MR	21.94	12.94	9.00 ●
			RIVERSTONE					
16/08/2019	MOO11601	MANNION DRILLING Product:			BL97MR	42.74	18.32	24.42
			RIVERSTONE					
28/08/2019	MOO11661	IF & SS MORRISON Product:			0000CAR1	11.06	8.42	2.64
			RIVERSTONE					
29/08/2019	MOO11679	CONDAMINE DRILLING PTY LTD Product:	TAMBAR		CI9SVV	8.86	4.20	4.66
			RIVERSTONE					
29/08/2019	MOO11680	IF & SS MORRISON Product:			0000CAR1	10.06	8.84	1.22
			RIVERSTONE					
25/09/2019	MOO11860	IF & SS MORRISON Product:			0000CAR1	5.70	3.94	1.76
			SMM AGG - RIVERSTONE					



FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 3



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PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 4

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net			
SMM AGG - RIVERSTONE											
14/01/2020	MO012603	CASH SALES			0000CAR1	6.26	4.74	1.52			
		Product:	1.52	t	X	SMM AGG - RIVERSTONE					
16/01/2020	MO012632	CASH SALES			BUCKET	12.00	0.00	12.00	●		
		Product:	12.00	t	X	SMM AGG - RIVERSTONE					
22/01/2020	MO012660	CASH SALES			0000CAR1	6.60	5.18	1.42			
		Product:	1.42	t	X	SMM AGG - RIVERSTONE					
10/02/2020	MO012747	ZZ SILVERBROOK DRILLING			BL97MR	43.46	17.34	26.12			
		Product:	26.12	t	X	SMM AGG - RIVERSTONE					
					WALLANGARR						

Product Totals:

463.440	t	0.000	m
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FS 119051

PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 2

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net			
LOAM											
31/01/2020	MO012705	MOREE PLAINS SHIRE COUNCIL	5044984		XN73LN	14.88	7.32	7.56	●		
		Product: 7.56 t x LOAM									
31/01/2020	MO012706	MOREE PLAINS SHIRE COUNCIL	5044984		XN98GB	20.82	9.46	11.36	●		
		Product: 11.36 t x LOAM									
31/01/2020	MO012707	MOREE PLAINS SHIRE COUNCIL	5044984		XN73LN	14.68	7.32	7.36	●		
		Product: 7.36 t x LOAM									
31/01/2020	MO012708	MOREE PLAINS SHIRE COUNCIL	5044984		XN98GB	21.28	9.46	11.82			
		Product: 11.82 t x LOAM									
31/01/2020	MO012709	MOREE PLAINS SHIRE COUNCIL	5044984		XN98GB	22.08	9.46	12.62			
		Product: 12.62 t x LOAM									
31/01/2020	MO012710	MOREE PLAINS SHIRE COUNCIL	5044984		XN73LN	14.86	7.32	7.54			
		Product: 7.54 t x LOAM									
4/02/2020	MO012721	MOREE PLAINS SHIRE COUNCIL	5045058		XN73LN	14.86	7.34	7.52			
		Product: 7.52 t x LOAM									
4/02/2020	MO012722	MOREE PLAINS SHIRE COUNCIL	5045058		XN98GB	22.00	9.40	12.60			
		Product: 12.60 t x LOAM									
4/02/2020	MO012723	MOREE PLAINS SHIRE COUNCIL	5045058		XN73LN	15.12	7.34	7.78			
		Product: 7.78 t x LOAM									
4/02/2020	MO012724	MOREE PLAINS SHIRE COUNCIL	5045058		XN98GB	20.98	9.40	11.58			
		Product: 11.58 t x LOAM									

Product Totals:

281.820 t

75.000 m



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PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 1



Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net
RIDGE GRAVEL								
8/03/2019	MOO10442	CASH SALES Product: 0.76 t X RIDGE GRAVEL			OCAR1	3.22	2.46	0.76
8/03/2019	MOO10446	CASH SALES Product: 0.60 t X RIDGE GRAVEL			OCAR1	3.22	2.62	0.60
21/03/2019	MOO10550	CASH SALES Product: 5.55 t X RIDGE GRAVEL	PETER		OCAR1	10.84	5.29	5.55
21/03/2019	MOO10554	CASH SALES Product: 6.35 t X RIDGE GRAVEL	PETER		OCAR1	11.64	5.29	6.35
21/05/2019	MOO10948	G & D BOULIOPOULOS Product: 23.00 t X RIDGE GRAVEL			BLS4TN	40.74	17.74	23.00
22/05/2019	MOG10973	JON LOCKLEY HAULAGE Product: 28.98 t X RIDGE GRAVEL			OCAR1	45.98	17.00	28.98
21/06/2019	MOO11202	MOREE PUMPS IRRIGATION & PLUMBING Product: 2.72 t X RIDGE GRAVEL	COL		OCAR1	6.42	3.70	2.72
21/06/2019	MOO11203	MOREE PUMPS IRRIGATION & PLUMBING Product: 2.70 t X RIDGE GRAVEL	COL		OCAR1	6.44	3.74	2.70
3/07/2019	MOO11343	JON LOCKLEY HAULAGE Product: 29.98 t X RIDGE GRAVEL			OCAR1	47.88	17.90	29.98
15/08/2019	MOO11582	CASH SALES Product: 1.00 t X RIDGE GRAVEL			0000CAR1	3.46	2.46	1.00
2/09/2019	MOO11697	JON LOCKLEY HAULAGE Product: 5.20 t X RIDGE GRAVEL			CJ9SVV	9.40	4.20	5.20
26/09/2019	MOO11864	Delivery To: MOREE ZZ RJR ELECTRICAL Product: 9.84 t X RIDGE GRAVEL	ROB REARDON		BZ09QL	18.94	9.10	9.84
26/09/2019	MOO11867	ZZ RJR ELECTRICAL Product: 11.00 t X RIDGE GRAVEL			BZ09QL	20.10	9.10	11.00
7/11/2019	MOO12252	MACKAYS EARTHWORKS PTY LTD BUCKET	BAJO STREET		BUCKET	240.00	0.00	240.00 ●



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PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

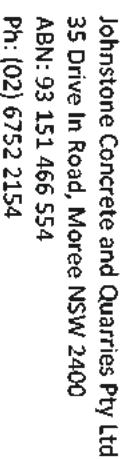
Page: 2

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net			
RIDGE GRAVEL											
26/11/2019	MO012380	ZZ TROY CABAN			0000CARL	4.06	3.36	0.70			
		Product: 240.00 t X RIDGE GRAVEL									
		Product: 0.70 t X RIDGE GRAVEL									
8/01/2020	MO012564	JON WILKINSON			BL97MR	43.00	17.34	25.66			
		Product: 25.66 t X RIDGE GRAVEL									
8/01/2020	MO012565	JON WILKINSON			BL97MR	36.18	11.58	24.60			
		Product: 24.60 t X RIDGE GRAVEL									
8/01/2020	MO012567	JON WILKINSON			BL97MR	41.94	17.34	24.60			
		Product: 24.60 t X RIDGE GRAVEL									
8/01/2020	MO012568	JON WILKINSON			BL97MR	40.46	11.58	28.88			
		Product: 28.88 t X RIDGE GRAVEL									
8/01/2020	MO012570	JON WILKINSON			BL97MR	42.42	17.34	25.08			
		Product: 25.08 t X RIDGE GRAVEL									
8/01/2020	MO012571	JON WILKINSON			BL97MR	38.66	11.58	27.08			
		Product: 27.08 t X RIDGE GRAVEL									
15/01/2020	MO012627	ZZ WENDY BUNCE			BUCKET	49.87	0.00	49.87			
		Product: 49.87 t X RIDGE GRAVEL									
25/02/2020	MO012819	IF & JA REARDON			BL97MR	38.88	17.34	21.54			
		Product: 21.54 t X RIDGE GRAVEL									
25/02/2020	MO012820	IF & JA REARDON			BL97MR	38.74	11.58	27.16			
		Product: 27.16 t X RIDGE GRAVEL									
24/02/2020	MO012853	NATHAN COBB			BUCKET	0.00	0.00	0.00			
		Product: 60.000 m X RIDGE GRAVEL									

Product Totals:

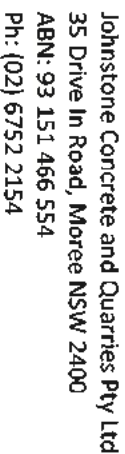
622.850 t

60.000 m



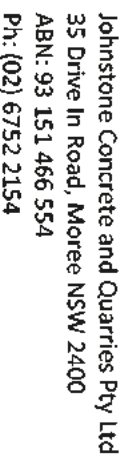
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 1



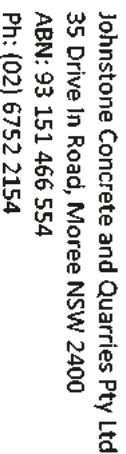
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 2



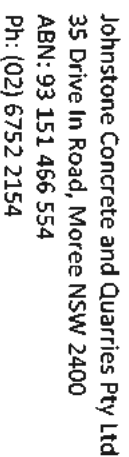
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 3



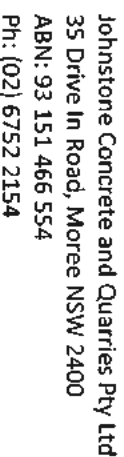
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 5



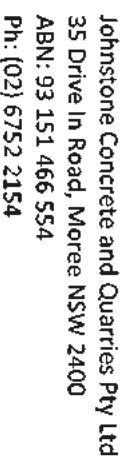
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 6



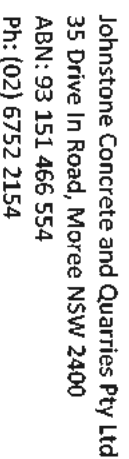
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 7



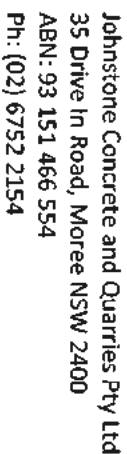
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 8



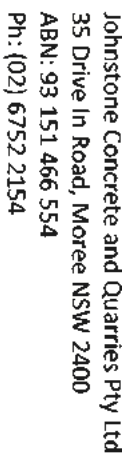
FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 9



FOR PERIOD: 01/03/2019 to 01/03/2020

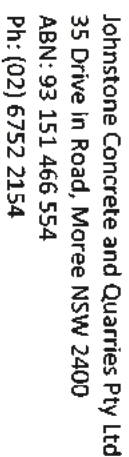
Page: 10



FOR PERIOD: 01/03/2019 to 01/03/2020



Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net				
COARSE SAND												
13/09/2019	MO011784	JCQ			BZ09QL	40.66	15.92	24.74				
		Product:	24.74	⚖	✗	COARSE SAND						
19/09/2019	MO011823	JCQ			BL97MR	42.90	17.34	25.56				
		Product:	25.56	⚖	✗	COARSE SAND						
19/09/2019	MO011824	JCQ			BL97MR	40.78	11.58	29.20				
		Product:	29.20	⚖	✗	COARSE SAND						
19/09/2019	MO011830	JCQ			BL97MR	41.90	17.34	24.56				
		Product:	24.56	⚖	✗	COARSE SAND						
19/09/2019	MO011831	JCQ			BL97MR	41.04	11.58	29.46				
		Product:	29.46	⚖	✗	COARSE SAND						
23/09/2019	MO011844	JCQ			BL97MR	43.28	17.34	25.94				
		Product:	25.94	⚖	✗	COARSE SAND						
23/09/2019	MO011845	JCQ			BL97MR	38.90	11.58	27.32				
		Product:	27.32	⚖	✗	COARSE SAND						
24/09/2019	MO011849	JCQ			BL97MR	41.28	17.34	23.94				
		Product:	23.94	⚖	✗	COARSE SAND						
24/09/2019	MO011850	JCQ			BL97MR	40.32	11.58	28.74				
		Product:	28.74	⚖	✗	COARSE SAND						
27/09/2019	MO011878	JCQ			BZ09QL	42.44	15.92	26.52				
		Product:	26.52	⚖	✗	COARSE SAND						
27/09/2019	MO011879	JCQ			CI05 EB	44.94	20.22	24.72				
		Product:	24.72	⚖	✗	COARSE SAND						
27/09/2019	MO011880	JCQ			CI05 EB	44.04	12.08	31.96				
		Product:	31.96	⚖	✗	COARSE SAND						
17/10/2019	MO012046	JCQ			BZ09QL	41.98	10.10	31.88				
		Product:	31.88	⚖	✗	COARSE SAND						
23/10/2019	MO012079	JCQ			BZ09QL	39.24	16.12	23.12				
		Product:	23.12	⚖	✗	COARSE SAND						



FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 12



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FS 719051

PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 13

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net			
COARSE SAND											
28/11/2019	MO012415	JCQ			CI 05 EB	46.60	21.08	25.52			
	Product:	25.52	t	X	COARSE SAND						
28/11/2019	MO012418	JCQ			CI 05 EB	45.64	21.08	24.56			
	Product:	24.56	t	X	COARSE SAND						
28/11/2019	MO012419	JCQ			CI 05 EB	46.28	21.08	25.20			
	Product:	25.20	t	X	COARSE SAND						
9/12/2019	MO012512	JCQ			BZ09QL	42.92	15.92	27.00			
	Product:	27.00	t	X	COARSE SAND						
9/12/2019	MO012513	JCQ			BZ09QL	39.82	15.92	23.90			
	Product:	23.90	t	X	COARSE SAND						
9/12/2019	MO012514	JCQ			BZ09QL	41.24	15.92	25.32			
	Product:	25.32	t	X	COARSE SAND						
11/12/2019	MO012521	JCQ			BZ09QL	40.50	15.92	24.58			
	Product:	24.58	t	X	COARSE SAND						
11/12/2019	MO012523	JCQ			BZ09QL	41.54	15.92	25.62			
	Product:	25.62	t	X	COARSE SAND						
18/12/2019	MO012552	JCQ			BZ09QL	41.20	15.92	25.28			
	Product:	25.28	t	X	COARSE SAND						
20/01/2020	MO012644	JCQ			BZ09QL	41.16	15.92	25.24			
	Product:	25.24	t	X	COARSE SAND						
28/01/2020	MO012683	JCQ			BZ09QL	45.96	16.12	29.84			
	Product:	29.84	t	X	COARSE SAND						
28/01/2020	MO012684	JCQ			BZ09QL	42.14	16.12	26.02			
	Product:	26.02	t	X	COARSE SAND						
19/02/2020	MO012796	JCQ			BZ09QL	41.14	16.36	24.78			
	Product:	24.78	t	X	COARSE SAND						
19/02/2020	MO012799	JCQ			BZ09QL	41.14	16.36	24.78			
	Product:	24.78	t	X	COARSE SAND						



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PRODUCT DETAIL REPORT

FOR PERIOD: 01/03/2019 to 01/03/2020

Page: 14

Date	Docket No	Customer	PO Number	Order Number	Registration	Gross	Tare	Net				
COARSE SAND												
27/02/2020	MO012830	JCQ			BZ09QL	48.92	16.12	32.80				
		Product:										
27/02/2020	MO012831	JCQ			BZ09QL	46.44	16.12	30.32				
		Product:										
27/02/2020	MO012832	JCQ			BZ09QL	42.96	16.12	26.84				
		Product:										

Product Totals:	4559.560 t	0.000 m
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