



Tarcoola Quarries

Tarcoola Modification and Planning
Extension of Tarcoola Quarry - Modification 1

September 2017

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1. Introduction

1.1 Background

Tarcoola Quarries (Tarcoola) operate a quarry located at Lot 4 DP 740222, East Wagga Wagga. The operations include open pits, crushing, screening, washing and transporting of material offsite for use in the building industry. The quarry operates under an Environmental Protection Licence (EPL) number 20543.

Development consent for the operation of the quarry was initially granted on the 23 March 1989 for the extraction of loam and sand from the site at a rate of up to 26,000 m³ per year. The quarry has slowly increased production to cater for increasing demand resulting in the operations exceeding the previously approved extraction limits for the site.

Discussions between Tarcoola Quarries and Wagga Wagga City Council (Council) commenced in late September in 2011 and it was agreed a new development application (DA) would be submitted to regularise the consent by expanding the extraction limit and extending the quarry footprint beyond the existing consent boundary.

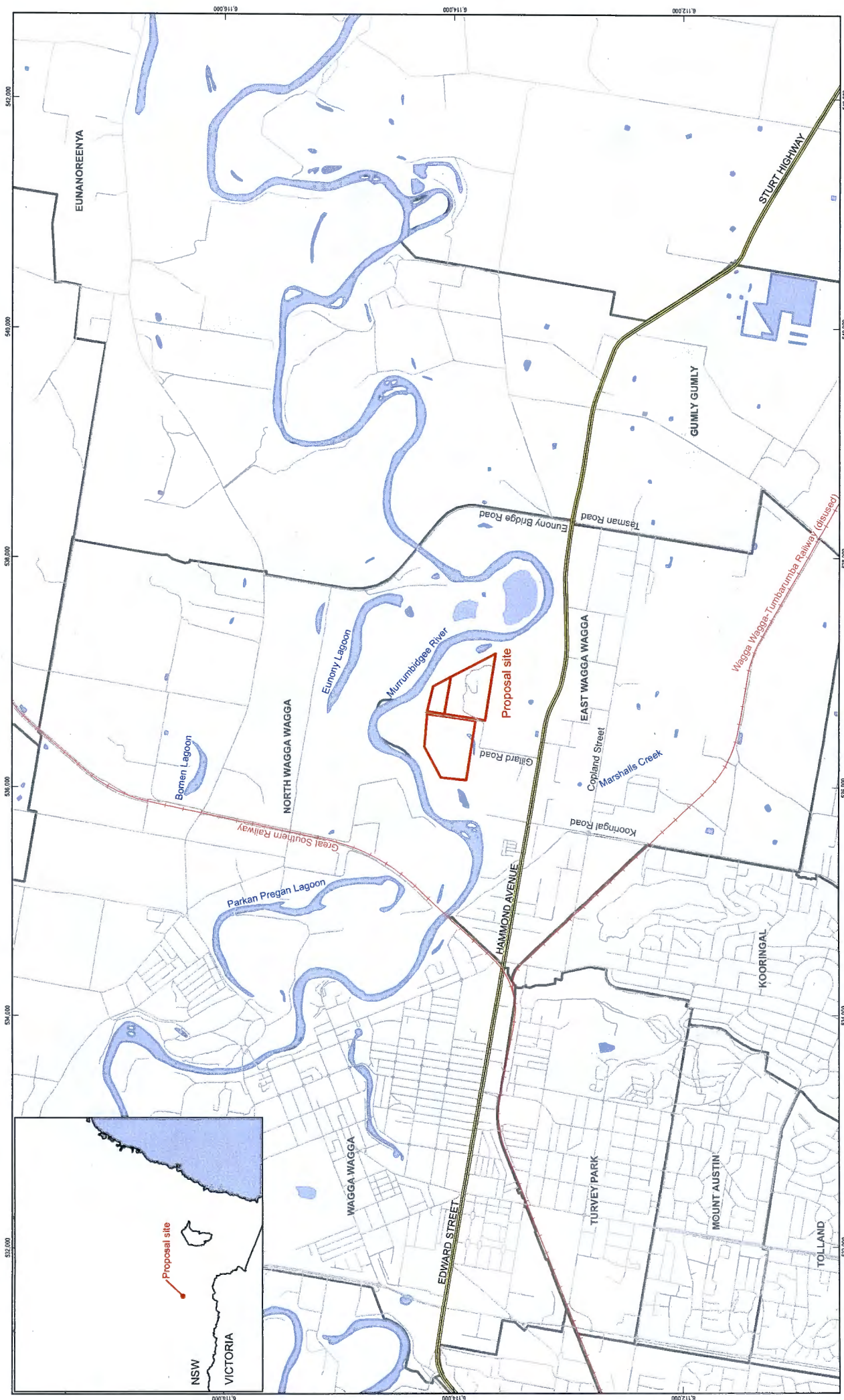
A detailed Environmental Impact Statement (EIS) was prepared to support the proposed Extension of Tarcoola Quarry (DA 13/0307), which was lodged with Council on 20th of June in 2013. The DA initially proposed increasing the extraction rate to a maximum of 200,000 tonnes per annum, with operations extending in two stages to the east and west of Gillard Road. The DA was modified following community and stakeholder feedback during the exhibition of the EIS to reduce the extraction rate from 200,000 tpa to 150,000 tpa with a 50% reduction to the Stage 2 quarry footprint.

The Extension of Tarcoola Quarry (DA 13/0307) was approved by the Southern Joint Regional Planning Panel on 1 December 2014 under Section 81 (1) of the *Environmental Planning & Assessment Act 1979*. DA13/0307 requires the development and ongoing operations to be undertaken in accordance with the conditions of consent and generally in accordance with description of the development described within the original EIS as modified in supplementary report submitted as part of the approval process.

Tarcoola Quarry propose to modify DA 13/0307 under Section 96(2) of the EP&A Act to alter the approved use and maintenance regime of Gillard Road and the related conditions of consent. The main subject of this modification will be to eliminate the seal of Gillard Road and in its place utilise an emulsion to reduce dust and sediment transportation. The proposed changes will include implementation of a maintenance regime/agreement whereby Tarcoola will undertake the requirement for maintenance on behalf of the Council.

1.2 Site location

The Tarcoola quarry is located on Lot 4 DP 740222, East Wagga Wagga. The site is located within the Wagga Wagga Local Government Area, is approximately 3.5 km east of the CBD in the Riverina Region, NSW. The Murrumbidgee River forms part of the northern boundary of the site and the current site access is via Gillard Road and the Sturt Highway. Figure 1-1



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Tarcoola Quarries
Tarcoola Quarries EIS



CLIENTS PEOPLE PERFORMANCE

- LEGEND**
- Drainage line
 - Railway line
 - Road
 - Highway
 - Waterbody
 - Suburb
 - Proposal site



1:30,000 @ paper size A3
0 250 500 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
GCR: GDA 1994 MGA Zone 55

Figure 1.1
Location of Tarcoola Quarry

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Data sources: LPI Roads, railway lines, suburbs, waterbodies, drainage lines - 2008; Geoscience Australia. Cities and state boundaries - 2003. Created by: JG/MS

1.3 Project overview

Tarcoola Quarries is seeking to modify its development consent DA 13/0307. This modification seeks to gain approval for the following:

- Remove the need to seal Gillard Road from the Sturt Highway to 100 metres within the site boundary;
- Rectify minor errors and misdescriptions within the consent.

1.4 The proponent

Tarcoola currently operates a turf farm, weighbridge and quarry operations across the East Wagga Wagga site. The turf operations stock a variety of turf products for use on domestic lawns and major sporting fields. The weighbridge, situated adjacent to the Tarcoola site office, is available to the public as NSW Registered Weighbridge No. 485. With a 60 tonne capacity and 20 metres in length, the operations include direct measurements, axle mass measurements and tare mass measurement for a variety of larger vehicles.

This application and modification is solely focused around the quarries operations.

1.5 Need for the modification

Tarcoola Quarries have been operating the quarry and turf operations at the site for the last 30 years. Access to the site is via from Gillard Road, which runs northwards from Hammond Avenue (Sturt Highway).

Gillard Road is sealed for approximately 90 metres to the intersection with Tarcoola Road and subsequently becomes an all-weather gravel road primarily servicing the Tarcoola turf and quarry operations and small recreational reserve at Orange Tree Point on the Murrumbidgee River. The weighbridge for the quarry operations is located around 275 metres from the intersection with Tarcoola Road and entry to the Stage 1 pits located a further 425 metres along Gillard Road.

Gillard Road has historically been operated as Crown road, with road corridor leased and gravel surface maintained by Tarcoola Quarries in accordance with the lease agreement with the crown. It is understood that Wagga City Council took over the ownership and management responsibility of the road in July 2015.

Consent for the continued operation of the quarry (DA 13/307) was granted subject to a number of conditions. Conditions 8, 9 and 32 of the consent are specifically related to the sealing and ongoing maintenance of Gillard Road from Sturt Highway to 100 metres within the site boundary in accordance with Councils Engineering guidelines for a minimum period of 30 years.

The conditions relating to the maintenance of the road are not practical to implement and place an unequitable economic burden on the Tarcoola Quarry operations. Sealing of Gillard Road is not considered reasonable or feasible for a number of reasons including:

- The impact of regular inundation of flood waters on the pavement surface resulting in a limited pavement life and significant ongoing maintenance costs;
- The approval of the application is for 15 year and the requirement is to construct a road to last double the expected life of the quarry.
- The full cost of the pavement sealing and maintenance to be paid for by the Tarcoola Quarry operations where Gillard road in the first 90 m services a number of businesses located on Hammond Avenue, Tarcoola Road and the general public.

Tarcoola have been maintaining the road to an acceptable standard for use by the public to access the reserve along the river since the commencement of quarry operations. Condition 32 of the consent requires Tarcoola to pay for all repairs required on Gillard Road and provide a bond for these repairs upfront and keep it replenished on a regular basis after use. This condition is unequitable for a number of reasons:

- There would be other road users using Gillard Road, especially from the businesses from the Sturt Highway and along Tarcoola road
- There is likely to be damage from flood waters which is out of the control of the quarry operations
- Sealing the road may attract unwanted drag racing and hooning which has been observed in the locality

1.6 Stakeholder Consultation

A number of meetings between Tarcoola Quarries, GHD and Council have been undertaken to discuss the concerns, approach, requirements and possible impacts of the current access to Tarcoola quarry. A number of options were investigated over the last year and a range of meetings have been held with Council.

GHD met with Council on the 24 July 2017 in regards to the possibility of constructing a private road or updating/changing the consent conditions associated with Gillard Road (8, 9 and 32) in DA13/0307 for the Extension of Tarcoola Quarry. Council responded via email on the 9 August 2017 and outlined they would be in favour of updating/changing the conditions relating to the use of Gillard Road.

This modified conditions for the use of Gillard Road would be obtained via a modification under Section 96 (2) modification of the *Environmental Planning and Assessment Act, 1977 (EP&A Act)*.

This SEE has been prepared by GHD Pty Ltd (GHD) to support the application to Council to modify the existing approval under Section 96 of the EP&A Act. The SEE provides a description of the proposed changes, reviews the applicable legislative framework and includes a detailed assessment to determine the potential environmental impacts of the proposal. The SEE subsequently proposes management measures to be implemented to mitigate any impacts associated with the proposed modification.

1.7 Report structure

The purpose of this SEE is to enable consideration of the implications of proceeding with the modification. It has been prepared in accordance with the applicable legislative framework and industry standards, and in consultation with relevant government agencies and stakeholders. The SEE is structured as follows:

Section 1 - Introduction	Introduces the Project and provides an overview of the site locality, details of land ownership and the quarries operations.
Section 2 – Site description	Provides an overview of the proposed modifications to the existing consent and the construction information.
Section 3 – Regulatory framework	Describes the approval pathway and legislative framework for the project.

Sections 4 to 4.8 – Environmental impacts	Each section contains an assessment of a different environmental issue and the potential implications of the project on these issues. Proposed mitigation measures to be implemented are also identified where required to minimise any potential impacts.
Section 5 – Draft environmental management commitments	Provides a list of the commitments proposed to be adopted for the project in order to mitigate any potential adverse impacts and ensure appropriate management and monitoring.
Section 6 – Project justification and Conclusion	Provides an overview of the justification of the Project.

2. Proposal description

2.1 The proposal

The proposed modification to DA 13/0307 requests removal of conditions associated with sealing Gillard Road and minor changes to the wording of other conditions to correct minor errors or misdescriptions. The modification requests a practical approach be taken for the use and maintenance of Gillard Road. This is mainly associated with the application of a seal to reduce dust and sediment transportation. There are other products on the market such as emulsions that more practical as an application to the road to meet the current requirement and for overall longevity of the road into the future.

The road is presently in a satisfactory condition and it is proposed that the emulsion be applied to the unsealed portion of Gillard Road from Tarcoola Road. The application of this emulsion will continue through the boundary of Tarcoola to the processing area. Regular recommended applications of the emulsion will be applied along with maintenance such as grading and use of a water cart will still continue to be undertaken by Tarcoola on behalf of Council.

Figure 2-1 illustrates the areas of Gillard road and internal Tarcoola roads that the emulsion will be applied and further details of the emulsion is provided in section 2.3.

2.2 Consent conditions

There are a number of conditions that are minor and can be addressed under Section 96 (1) or (1(b)) of the EPA Act, detailed in section 2.2.1. The remaining conditions detailed in section 2.2.2 relate to the maintenance of Gillard Road are addressed under Section 96 (2) and are presented for consideration through alteration or deletion from the consent as part of this modification.

2.2.1 Minor modifications

Condition 16

Original condition:

The extraction is limited to 150,000 tonnes per annum. The proponent must supply Council with a quantity surveyors report at the end of each financial year that clearly certifies the amount of material extracted and further certifies that approved extraction limit has not been exceeded.

Summary

The extraction limit is up to 150,000 tonnes. This does not include waste or overburden which is not removed from site. Every truck that leave Tarcoola with material is recorded over the weigh bridge. Therefore, each truck movement and amount of material is recorded in a system. This system would provide a more accurate measure of extracted material.

Suggested change

The extraction is limited to 150,000 tonnes per annum. The proponent must supply Council with **a report presenting the truck movements and weight of material** at the end of each financial year that clearly certifies the amount of material extracted and further certifies that approved extraction limit has not been exceeded.

Condition 18

Original condition

Within 12 months of the date of this approval the consent given by Councils Notice of Determination of Development Application No. 292/88 and dated 23 March 1989 must be surrendered by the submission of a document in accordance with Clause 97(1) if the Environmental Planning and Assessment Regulation 2000.

Summary

This condition has not been met due to the road conditions not being agreed upon. This condition does not accord under the provision of Section 80A(b) (Imposition of Conditions) of the Environmental Planning and Assessment Act 1979. The surrender of the development consent is required however, the imposition of the 12-month timeframe for surrender is not reasonable. The timeframe imposed under the current condition attempts to address a compliance issue in relation to the existing consent, which is not a relevant matter under Section 80A and therefore should be removed or reworded.

Suggested change

On commencement of the operations under enacted consent conditions DA13/0307 the consent given by Councils Notice of Determination of Development Application No. 292/88 and dated 23 March 1989 must be surrendered by the submission of a document in accordance with Clause 97(1) if the Environmental Planning and Assessment Regulation 2000.

Condition 19

Original condition

The applicant is to submit monthly extraction reports to Council from the date of this consent until Development Application No. 292/88 has been surrendered or the period of 12 months referred to in condition 18 has lapsed. The extraction reports must show compliance with the extraction limits under DA292/88.

Suggestion

Please delete as it does not accord with any of the provisions of Section 80A (Imposition of Conditions) of the EP&A Act. The issues surrounding compliance with the previous current consent is not a matter that is of relevance to the determination of the current application and can be dealt with as a separate matter by Council if deemed necessary.

Condition 47

Original condition

The air quality monitoring in Condition M2.3 shall be report to council in units of micrograms per cubic metre.

Summary

The condition in section 1, M2.3 asks for results to be presented in units - grams per square metre. In addition to this air particulates (dust deposition) is measured in the laboratory as g/m²/month. Generally high volume air samplers which are electronic measure the sample in cubic metres.

Suggested change

The air quality monitoring in Condition M2.3 shall be report to council in units of grams per square metre.

Condition M2.2 (Section 1)

Original condition

A Noise Management Plan for the site should be produced and noise monitoring undertaken on a biannual basis at the key receptors identified in the EIS as R1, R2, R4 and R5. An annual noise audit of plant and activities should be implemented to ensure best available economically achievable technologies are used.

R1, R2, R4 and R5

Noise

Pollutant	Unit of Measure	Frequency	Sampling Method
Noise	dB (A)	Biennial	As described in the NSW Industrial Noise Policy, Jan 2000 as amended from time to time.

Summary

This condition should reflect the same as Tarcoola's Environmental Protection Licence (EPL 20543) as this is where the condition has originated from. It would seem excessive to introduce annual noise monitoring/audit of the plant when the noise impact directly at key receptors is undertaken biennially.

Suggested change

A Noise Management Plan for the site should be produced and noise monitoring undertaken on a **biennial** basis at the key receptors identified in the EIS as R1, R2, R4 and R5.

2.2.2 Major modification

Condition 8

Original condition

Gillard Road shall be constructed and sealed to provide for 2 travel lanes in accordance with Council's Engineering Guidelines to minimum 30 year life span. The road shall be sealed from the Sturt Highway up to and including the entry of the site by a suitably experienced contractor. Prior to commencement of works, plans and a pavement design carried out by a suitably experienced Geotechnical Engineer shall be submitted to Council's Development Engineer for approval. Plans are to indicate how stormwater runoff will be drained from the road surface and how any low points in the road will be drained and location of additional safety signage.

Suggestion

Tarcoola would request this condition to be considered for deletion on the basis that Gillard road will be maintained in accordance with the maintenance regime/agreement adopted under condition 32 of this consent.

Condition 9

Original condition

Within the site, the first 100 m of the access road from the front boundary on Gillard Road shall be maintained with continuous seal to reduce the transportation of sediment and to minimise dust.

Suggestion

Tarcoola would request this condition to be considered for deletion on the basis that the internal access road (between Gillard Road and the quarry processing area) will be maintained in accordance with the maintenance regime/agreement adopted under condition 32 of this consent.

Condition 32

Original condition

The applicant/owner of the quarry is required to ensure that Gillard Road is maintained to a standard acceptable to Council and as approved under condition 8 of this consent.

For the life of this consent the applicant shall provide a bank guarantee to the value of 30% of the works required under condition 8 of this consent for the purpose of making good any damage caused to Gillard Road as a consequence of the doing of anything to which this consent relates.

Should any repair and maintenance works be required during the life of the quarry they shall be at the full cost of the owner of the quarry. Council will undertake any works required and bill the owner appropriately or, if required, access the required security referred to above to fund the works.

Any repair works required on Gillard Road, by Council, shall be addressed to Councils satisfaction within 14 days of written notice by Council to the quarry operator, or Council will utilise bond monies for the purpose of undertaking required road maintenance works. Bond monies shall be replenished to required 30% threshold within 14 days after council carries out any required road maintenance works.

Suggested Change

Tarcoola would request this condition be reviewed and modified to reflect the change from a sealed road to the application of an emulsion to the unsealed portion of Gillard Road through to the Tarcoola processing area. Tarcoola would enter a formal agreement with Council for the ongoing maintenance of both Gillard Road and the internal access road to the processing area to a standard appropriate for the operation of the quarry. The agreement would be developed once approval for the modification has been received, be implemented prior to operation and would include the following but not limited to:

- Details of a dust suppression regime
- Details of a regular maintenance regime
- Maintaining appropriate licences/approvals to allow the proponent to work on a Council road
- Extent of road to be maintained



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Tarcoola Quarries
Tarcoola Compliance Services



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Extent of Emulsion Application

Figure 2-1

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Data sources: NSW LPI aerial imagery 2015; NSW Government Property boundary - 2012. Created by pavellains

Paper size A3
0 50 100 200
Metres



Map Projection: Transverse Mercator
GDA 1984 MGA Zone 55

2.3 Details of emulsion

The emulsion proposed to be used is known as PetroTac. It is a scientifically advanced emulsion specifically formulated to control dust emissions. It improves and stabilises unpaved road surfaces by saturating, penetrating and bonding dust and aggregated particles together, creating a hard, durable surface that offer excellent longevity and superior load-bearing qualities.

PetroTac is environmentally safe, applied with water to quickly cure as a water-resistance surface. As a result, treated surfaced aren't washed out or destabilised by rain or drainage lines, which means it can be used in environmentally delicate areas. It is a non-leaching and does not contain PCBs or any other harmful contaminants often found in some suppressants. Further information and leachability reports are presented in Appendix A.

PetroTac reduces the dust emissions by 90% compared to an unsealed road. It also reduces the amount of watering required for dust suppression by up to approximately 90%. It is widely used in all climatic conditions and used by mining operations that operate every day of the year.

3. Legislative framework

3.1 Environmental Planning and Assessment Act

3.1.1 Approval pathway

The Extension of Tarcoola Quarry (DA 13/0307) was approved under Part 4 of the EP&A Act on the 1st of December 2014. The approval requires the development to be undertaken in accordance with the conditions of consent and the approved plans and specifications described in the EIS and the supplementary reports prepared during the determination of the original proposal.

The consent included a number of conditions in regards to the maintenance and use of Gillard Road. . A modification to DA 13/0307 under Section 96 is required to modify conditions relating to site access and maintenance of the access road.

Section 96 of the EP&A Act contains three pathways for which a consent may be modified including:

- Section 96 (1) – modifications involving minor error, misdescription or miscalculation
- Section 96 (1A) – modifications involving minimal environmental impact
- Section 96 (2) – other modifications

Preliminary discussions with Wagga City Council have indicated that the modification would be considered under Section 96 (2) of the EP&A Act. Under this section, consent authority may modify the consent if it is satisfied that the development is substantially the same development as the development for which consent was originally granted.

The operation of the quarry remains predominantly in accordance with the development forming the basis of the consent. The modification involves a minor change in access to the site and the development is considered to be substantially the same development as approved as part of the consent.

Section 79C of the EP&A Act outlines the matters that must be taken into consideration by a consent authority where applicable, when assessing a development application or modification to consent under Part 4 of the EP&A Act. Matters to be considered where relevant include:

(a) the provisions of:

- (i) any environmental planning instrument, and
- (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and
- (iii) any development control plan, and
- (iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and
- (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and
- (v) any coastal zone management plan (within the meaning of the [Coastal Protection Act 1979](#)), that apply to the land to which the development application relates,

- (b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,
- (c) the suitability of the site for the development,
- (d) any submissions made in accordance with this Act or the regulations,
- (e) the public interest.

This SEE has been prepared to address matters for consideration under Section 79C of the EP&A Act and the requirements of the EP&A Regulation.

3.1.2 Environmental Planning Instruments

Wagga Wagga Local Environmental Plan 2010

Under the WWLEP 2010, the proposed site is zoned RU1 Primary Production. The objectives of the RU1 zoning 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 the zone and land uses within adjoining zones.
- To foster strong, sustainable rural community lifestyles.
- To maintain the rural landscape character of the land.
- To allow tourist and visitor accommodation only where it is in association with agricultural activities.

Extractive industries are permitted with consent within the RU1 Primary Production land use zoning. The Extension of Tarcoola Quarry has previously been granted consent in DA 13/0307 and the operations are considered to continue to meet the objectives of the LEP following implementation of the modification.

State Environmental Planning Policy State and Regional Development

The aim of this policy is to identify development that is State Significant development, state significant infrastructure and to confer functions on joint regional planning panels to determine development applications.

The Extension of Tarcoola Quarry was determined as a Regional Development as it fell under the definition of extractive industries under Schedule 4A of the EP&A Act. Under Section 21 of the State and Regional Development SEPP, a regional panel may exercise consent authority functions for determination of development applications under Part 4 of the EP&A Act. The Section 96 (2) modification will be assessed and notified by Council and may be determined under the Southern Joint Regional Planning Panel.

The proposal does not constitute a state significant development under Schedule 1 of the State and Regional Development SEPP.

State Environmental Planning Policy Mining Petroleum and Extractive Industries 2007

The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:

- (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,
- (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.

Under the SEPP, extractive industries may be carried out with consent on any land for which agriculture or industry is permitted with or without consent. The site is zoned RU1 Primary Production and extractive industries are permitted with consent.

The proposed modification is for a minor change to use of the access road to the approved quarry and is considered consistent with the objectives and assessment requirements of the SEPP.

State Environmental Planning Policy (Rural Lands) 2008

The aims of this policy are as follows:

- to facilitate the orderly and economic use and development of rural lands for rural and related purposes,
- to identify the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State,
- to implement measures designed to reduce land use conflicts,
- to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,
- to amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions;

The proposal represents a modification to an existing quarry operation that has been operating at the site for around 30 years. The access road passes through an area of the site used by the proponent as a turf farm, which will continue to operate in conjunction with the quarry operations and is consistent with the requirements of the SEPP.

State Environmental Planning Policy 55 – Remediation of Land

SEPP 55 provides for a statewide planning approach to the remediation of contaminated land and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment by:

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

The land is not known to be contaminated and the proposal does not represent an alteration of the existing land use on the site. Remediation work will not be required as part of the proposal.

State Environmental Planning Policy 33 – Hazardous and Offensive Development

SEPP 33 presents a systematic approach to planning and assessing proposals for potentially hazardous and offensive development for the purpose of industry or storage. Through the policy, the permissibility of a proposal to which the policy applies is linked to its safety and pollution control performance. The policy ensures that only those proposals which are suitably located, and able to demonstrate that they can be built and operated with an adequate level of safety and pollution control are permitted to proceed.

The quarry operations result in a number of emissions associated with noise and dust emissions and as such can be classed a potentially offensive industry. All reasonable and feasible mitigation measures will be employed on site and activities and emissions are not significant and will be within Environmental Protection Authority (EPA) licensing requirements.

SEPP 33 states that “in most cases compliance with the EPA requirements should be sufficient to demonstrate that the proposal is not an offensive industry. The site operates under an EPL and was not determined to be an offensive industry as part of the original determination. Potential noise and dust emissions associated with the proposed modification have been assessed as part of this SEE and will continue to meet EPA Licence requirements.

State Environmental Planning Policy 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas. SEPP 44 also aims to ensure a permanent free-living population of Koalas over their present range, and reverse the current trend of Koala population decline by:

- Requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat.
- Encouraging the identification of areas of core Koala habitat.
- Encouraging the inclusion of areas of core Koala habitat in environment protection zones.

SEPP 44 applies to each local government area (LGA) listed in Schedule 1, which includes the Wagga Wagga LGA. Schedule 2 of SEPP 44 lists preferred feed tree species of the Koala, including River Red Gum. River Red Gum constitutes at least 15 per cent of the total number of trees in the upper or lower strata within the riverine corridor. As a result the habitat in the study area comprises potential Koala habitat as defined under SEPP 44.

The habitat assessment undertaken as part of the EIS has found that the Koala is unlikely to inhabit the study area due to a lack of recent local records. The species has not been reliably recorded in the Wagga Wagga LGA since the mid 1960's.

The study area is therefore unlikely to contain core Koala habitat, defined by SEPP 44 as *‘an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.’*

3.1.3 Wagga Wagga Development Control Plan

The Wagga Wagga Development Control Plan 2010 has been reviewed as part of this SEE with a particular focus on Section 4 – Environmental Hazards and Management and Section 8 – Rural Industries.

The proposed modification is considered to be consistent with all applicable objectives and controls within the DCP.

A key objective in Section 4 is to minimise the public and private costs of flood damage. Construction and maintenance of a sealed surface on Gillard Road is not considered to be in the public interest as a result of the high potential for damage from floodwaters and ongoing maintenance costs. Effective maintenance of the existing all-weather gravel road and is considered to be consistent with the DCP.

Key objectives for rural development within Section 8 of the DCP are to ensure that rural development is compatible with the site context and to minimise conflicts between agricultural and non-agricultural uses. The modification is considered to be consistent with the requirements of the DCP. The project meets the requirement for provision of adequate facilities for additional traffic in terms of vehicle access and movements, parking areas and loading and unloading of goods.

3.2 Related NSW legislation

3.2.1 *Protection of the Environment and Operations Act 1997*

The objectives of the *Protection of the Environment and Operations Act 1997* (PoEO Act) are to protect, restore and enhance the quality of the environment, in recognition of the need to maintain ecological sustainable development.

The PoEO Act provides for an integrated system of licensing and contains a core list of activities requiring Environmental Protection Licenses (EPL) from the Environmental Protection Authority (EPA). These activities are called 'scheduled activities' and are listed in Schedule 1 of the Act.

Extractive industries including crushing, grinding and separating is defined as an activity that requires an EPL when the operations exceed 30,000 tonnes per year. The quarry operates in accordance with EPL 20543 which will not require modification as part of the proposal.

The PoEO Act also includes requirements for the protection against water, air and noise pollution, waste disposal and incident reporting requirements for actual or potential pollution incidents.

3.2.2 *Water Management Act 2000*

The *Water Management Act 2000* is intended to ensure that water resources are conserved and properly managed for sustainable use benefitting both present and future generations. It is also intended to provide a formal means for the protection and enhancement of the environmental qualities of waterways and their catchments.

The *Water Management Act 2000* applies to areas of New South Wales that have a water sharing plan. Water sharing plans for the Murrumbidgee Regulated River Water source and the Murrumbidgee Unregulated and Alluvial Water Sources regulate water use and environmental protection requirements for the surface water and groundwater resources at the Tarcoola site respectively.

The turf and quarry operations currently operate under a number of water licences for the extraction of water from the Murrumbidgee River to the turf and quarry operations of TTQ and allow for the dewatering of Wagga Wagga alluvial groundwater sources. There will be no alteration to water take or licencing requirements associated with the proposed modification.

Activity approvals are required under Section 91 of the WM Act for controlled activities being undertaken within 40 m of a waterway or for interference to an aquifer. The modified use of the Gillard Road will not constitute a controlled activity or interfere with an aquifer and will therefore not require an activity approval under Section 91 of the WM Act.

3.2.3 Roads Act 1993

Section 138 of the Roads Act, 1993 sets out the requirement for approval to carry out certain works or undertaking within a road. Under Section 138 a person must not without consent of the appropriate roads authority:

- erect a structure or carry out a work in, on or over a public road.
- dig up or disturb the surface of a public road.
- remove or interfere with a structure, work or tree on a public road.
- pump water into a public road from any land adjoining the road, or
- connect a road (whether public or private) to a classified road.

Tarcoola Road and Gillard Road are local roads and Council is the appropriate roads authority for any work in or over a public road. A rationalised approval is sought as part of the development application for works impacting upon Gillard Road.

3.2.4 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 provides for the protection of Aboriginal objects (sites, objects and cultural material) and Aboriginal places. Under the NPW Act, an Aboriginal object is defined as: any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains.

An Aboriginal place is defined under the National Parks and Wildlife Act 1974 as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

It is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the NPW Act provides a series of defences against the offences listed in Section 86 which includes if the harm was authorised by and conducted in accordance with the requirements of an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the NPW Act.

Maintenance and application of the emulsion to Gillard Road will not result in potential to disturb Aboriginal objects and an AHIP will not be required as part of the modification.

3.2.5 NSW Threatened Species Conservation Act 1995 (TSC Act)

The TSC Act lists a number of threatened species, populations or ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If a species of flora or fauna listed in Schedule 1 or 2 of the TSC Act is identified, a review must be undertaken of the factors set out to establish if there is likely to be a significant effect on that species, population, ecological community or habitat. If any of these could be impacted by the proposal, an assessment of significance that addresses the requirements of Section 5A of the EP&A Act must be completed to determine the significance of the impact. If a significant impact on a threatened species, population or ecological community is likely, a SIS must be completed and consultation with the NSW Office of Environment and Heritage (OEH) is required.

An ecological assessment was undertaken as a part of the EIS and found that the proposed development may potentially impact six bird species listed as threatened under the TSC Act. No

other species or endangered ecological communities are likely to be impacted. Seven part tests were undertaken for these species, and concluded that the proposed development is unlikely to have a significant impact on any species listed under the TSC Act and therefore an SIS was not required. The proposed modification will not result in potential for any additional disturbance to flora and fauna associated with the operation of the quarry.

3.3 Commonwealth legislation

3.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions that may have a significant impact on matters of national environmental significance. The EPBC Act also requires Commonwealth approval for certain actions on Commonwealth land. Matters of national environmental significance under the Act comprise:

- World Heritage areas.
- National Heritage Places.
- Ramsar wetlands of international importance.
- Threatened species or ecological communities listed in the EPBC Act.
- Migratory species listed in the EPBC Act.
- Commonwealth marine environments.
- Nuclear actions.

There are no World Heritage areas, National Heritage places, Ramsar wetlands or Commonwealth marine areas on or near the proposed Tarcoola quarry site and the proposal does not involve a nuclear action. Ecological investigations have been undertaken as part of previous studies have shown that threatened or migratory species or ecological communities listed under the EPBC Act are unlikely to be impacted and a referral under the EPBC Act is not considered to be warranted.

4. Impact assessment

4.1 Air quality

4.1.1 Existing environment

Background air quality

A detailed air quality assessment of the operation of the proposed extension of Tarcoola Quarry has been undertaken with consideration to the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation (OEH 2005) (Approved Methods)*. This was the for all quarry activities including the use of Gillard Road for access.

The study area predominately comprises agricultural land, located to the north, west and east of the site. A number of rural residential farmhouses are located on properties surrounding the quarry. Sensitive receivers which have been identified within proximity to the existing and proposed quarry operations are listed in Table 4-1.

Table 4-1 Identified air quality sensitive receivers

Receiver	Receiver type	Distance from quarry activity (m)	Direction from quarry
R1	Residential	300	Southwest
R2	Residential	275	Northwest
R3	Residential*	200	South
R4	Residential	400	South
R5	Residential	300	Southeast

The nearest identified sensitive receiver to the quarry is Receiver 2 (R2), a residential property located approximately 275 metres northwest of proposed future quarrying operations. As Receiver 3 (R3) is occupied by the owner/operator it is considered to be a care takers cottage for the purpose of the assessment. Identified sensitive receivers within proximity to the quarry are shown on Figure 4-2.

Background ambient air quality

Available ambient air quality monitoring data was reviewed to gain an understanding of existing air quality in the vicinity of the quarry. Ambient dust levels were sourced from data recorded OEH ambient monitoring station located in Wagga Wagga. Daily average PM₁₀ data was obtained for the period October 2011 to October 2012. Over the 12 month period, the average 24-hour PM₁₀ concentration level was found to be 16.8 µg/m³ with a minimum of 3.9 µg/m³ and a maximum of 41.9 µg/m³.

Given the lack of measured background data for TSP, a 2:1 ratio of TSP to PM₁₀ ratio was assumed for TSP. Background dust deposition levels were not available to directly gauge the cumulative deposited dust level. And therefore, in the absence of site-specific dust deposition data, a conservative background dust deposition level of 2.0 g/m²/month was adopted.

Pollutant background levels adopted for the assessment are summarised in Table 4-2.

Table 4-2 Adopted background levels

Pollutant	Averaging period	Value
PM10 ($\mu\text{g}/\text{m}^3$)	24-hour	16.8
PM10 ($\mu\text{g}/\text{m}^3$)	Annual	16.8
TSP ($\mu\text{g}/\text{m}^3$)	Annual	33.6
Dust deposition $\text{g}/\text{m}^2/\text{month}$	Annual	2

Emission Sources

Activities at the quarry include sand and gravel extraction, screening, crushing and transport of the processed rock off-site. Individual processes that generate significant amounts of particulate matter (dust) include:

- Quarry operations e.g. excavation.
- Material processing and handling e.g. screening and loading.
- Vehicle induced dust emissions in pit area and haul road.
- Wind erosion of exposed unstable soil surfaces and localised stockpiles.

The primary sources of dust generation observed at the site are associated with vehicle movements along unsealed surfaces within the site and along the access road.

Table 4-3 Dust emission inventory

Equipment	Application	TSP Emission rate (kg/hr)	PM ₁₀ Emission rate (kg/hr)
Screen	80 tonnes per hour, operating 8 hours per day	6.4	4.8
Loaders	2 loaders, 40 tonnes per hour for each loader over a 8 hour day	1	0.48
Excavator	2 excavators, 40 tonnes per hour for each excavator over a 8 hour day	1	0.48
Dump truck - dumping	Dumping 80 tonnes per hour	0.96	0.34
Dump truck – travelling on unpaved roads	Average 9.6 haul trucks per hour. Haul route 1460 m metres. Equals 14 km per hour total travel.	59	17.5
Mitigation 1 – Dump truck – traveling on unpaved roads	As above with Level 2 watering - more than 2L/m ² /hr water spray on unpaved access road.	14.8	4.4

Equipment	Application	TSP Emission rate (kg/hr)	PM ₁₀ Emission rate (kg/hr)
Mitigation 2 – Dump truck – traveling on unpaved roads	With chemical dust suppression. Assumes a 90% reduction in dust emissions compared to base case	5.9	1.8
Wind erosion	Assumed 6 hectares of uncovered (quarry pit) surfaces.	4	2

4.1.2 Air quality assessment criteria

Air quality impact assessment criteria as prescribed within the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, Department of Environment and Conservation (OEH 2005) are provided in Table 4-4. These have been provided as cumulative (incremental plus background) concentration levels.

Table 4-4 Assessment criteria

Pollutant	Averaging period	Criteria
PM ₁₀	24 hours	50 µg/m ³
	Annual	30 µg/m ³
TSP	Annual	90 µg/m ³
Dust deposition	Annual	4 g/m ² /month*

Note * The EPA criterion is provided as maximum cumulative concentration levels and is based on background air quality concentrations plus the site criterion.

4.1.3 Potential impacts

Detailed modelling of dust emissions from the site was undertaken as part of the initial EIS and included scenarios with and without dust mitigation. The results of the initial model indicated that the 24-hour PM₁₀ concentration levels would potentially exceed the NSW assessment criteria at receivers R1 and R4.

The initial modelling identified haul trucks operating on unsealed surfaces as being the primary source of dust at the quarry. In order to control the primary source of dust, Level 2 (greater than 2L/m²/hr) water spraying would be undertaken on the unsealed access road from the site office into the site. A summary of the dust levels predicted in the EIS at sensitive receivers 1 and 4 with the implementation of Level 2 water spraying is presented Table 4-5.

Table 4-5 Maximum predicted dust impacts at sensitive receivers

Receiver	Pollutant	Averaging period	Maximum predicted incremental impact	Adopted back-ground level	Cumulative impact	Criteria
R1	PM ₁₀ (µg/m ³)	24-hour	28.8	16.8	45.6	50
	PM ₁₀ (µg/m ³)	Annual	5	16.8	21.8	30
	TSP (µg/m ³)	Annual	11.5	33.6	45.1	90

Receiver	Pollutant	Averaging period	Maximum predicted incremental impact	Adopted back-ground level	Cumulative impact	Criteria
R4	Dust deposition g/m ² /month	Annual	0.24	2	2.24	4
	PM10 (µg/m ³)	24-hour	18.6	16.8	35.4	50
	PM10 (µg/m ³)	Annual	2.7	16.8	19.5	30
	TSP (µg/m ³)	Annual	6	33.6	39.6	90
	Dust deposition g/m ² /month	Annual	0.14	2	2.14	4

The results of the dispersion model indicate that with mitigation, dust emissions from the quarry would meet the adopted 24-hour PM₁₀ criteria at all sensitive receivers. At the most exposed sensitive receiver (R1), the maximum predicted PM₁₀ level is 45.6 µg/m³ which is lower than the criteria of 50 µg/m³.

4.1.4 Assessment of additional dust mitigation

The EIS identified that PM₁₀ is the main pollutant of concern as although the assessment showed full compliance with mitigation, the predicted PM₁₀ levels over a 24-hour average were closest to the criteria.

It is recognised that dust from unpaved roads is a significant source of particulates, and in order to further manage and mitigate dust impacts at the site, Tarcoola have investigated additional controls. Chemical dust suppression through use of a suppressant can reduce the potential for dust, as well as reducing watering requirements.

Additional modelling has been undertaken to consider the effect of applying the dust suppressant to the unpaved access road. Predicted PM₁₀ over a 24 hour average with the different levels of mitigation are presented below in Table 4-6. Predicted results comply at all receivers for both mitigation scenarios, however with chemical dust depression the highest predicted PM₁₀ impact is 37.7 µg/m³, which is approximately 25% below the EPA criterion.

Table 4-6 Overview of dust mitigation

Mitigation	R1	R2	R3*	R4	R5
Unmitigated	102.6	48.4	229.1	65.3	42.7
Level 2 watering	45.6	38.1	93.6	35.4	34.9
Chemical dust suppression	37.7	37.0	66.1	35.2	33.4

4.1.5 Mitigation measures

The following mitigation measures would be implemented to minimise off-site dust impacts for the new road and whole quarry operation:

- Gillard road and internal access road to the processing area will have regular applications of a specialised emulsion suppressant that is formulated to stabilise unpaved roads and works by bonding dust and aggregate particles together, creating a hard, durable surface that offer excellent longevity and superior load-bearing qualities.
- Level 2 (greater than 2L/m²/hr) water spraying would be undertaken on the unsealed access road from the site office into the site. This should be undertaken during daytime weather conditions that assist dust dispersion (dry and windy) towards Receivers 1 and 4. During times of consistent adverse weather conditions (dry and winds), operations of these items should be reduced if possible.
- Material should be watered prior to it being loaded for haulage, where appropriate.
- The size of storage piles should be minimised where possible.
- Cleared areas of land should be limited and cleared only when necessary to reduce fugitive dust emissions.
- On-site traffic should be controlled by designating specific routes for haulage and access and limiting vehicle speeds to below 25 km/hr.
- All trucks hauling material should be covered before exiting the site and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer.
- Material spillage on sealed roads should be cleaned up as soon as practicable.
- A rumble-strip at the interface of the sealed road and the unsealed access road should be considered.
- Excavating operations conducted in areas of low moisture content material should be suspended during high wind speed events or water sprays should be used.

4.2 Soil and water

4.2.1 Existing environment

Regional geology

The geology of the area immediate to the site is dominated by the Quaternary Alluvium associated with the Murrumbidgee River and its tributaries.

The geology of the region can be simplified into two basic types, with young unconsolidated sediments overlying a much older bedrock system. The bedrock comprises either Ordovician age indurated sediments, referred to as the Kiandra Beds, or granite intrusives, referred to as the Wantabadgery Granite.

The Kiandra Beds comprise metasediments, including quartzite, slate, phyllite, greywacke, hornfels and schists. These are mapped in outcrop in areas to the south of the Murrumbidgee River, whereas the granites are mapped on the north side of the Murrumbidgee River.

Soils and landform

The Tarcoola quarry site is located on the floodplain of the Murrumbidgee River. The floodplain is a result of aggradation which refers to the process of land forming as a result of sediment deposition from the sediment in the water supply being greater than the amount of material the river is able to transport. Aggradation forms thick alluvial bands without terraces. The area is flat with typically less than 1% gradient.

The site is situated within the alluvial soils associated with the Murrumbidgee River. The last 3,000 years of sediment deposition have been grey silty clay material that overlies gravel with sand lenses.

The following limitations are usually associated with this soil landscape:

- Flooding and stream bank erosion
- Water ponding
- Water logging.

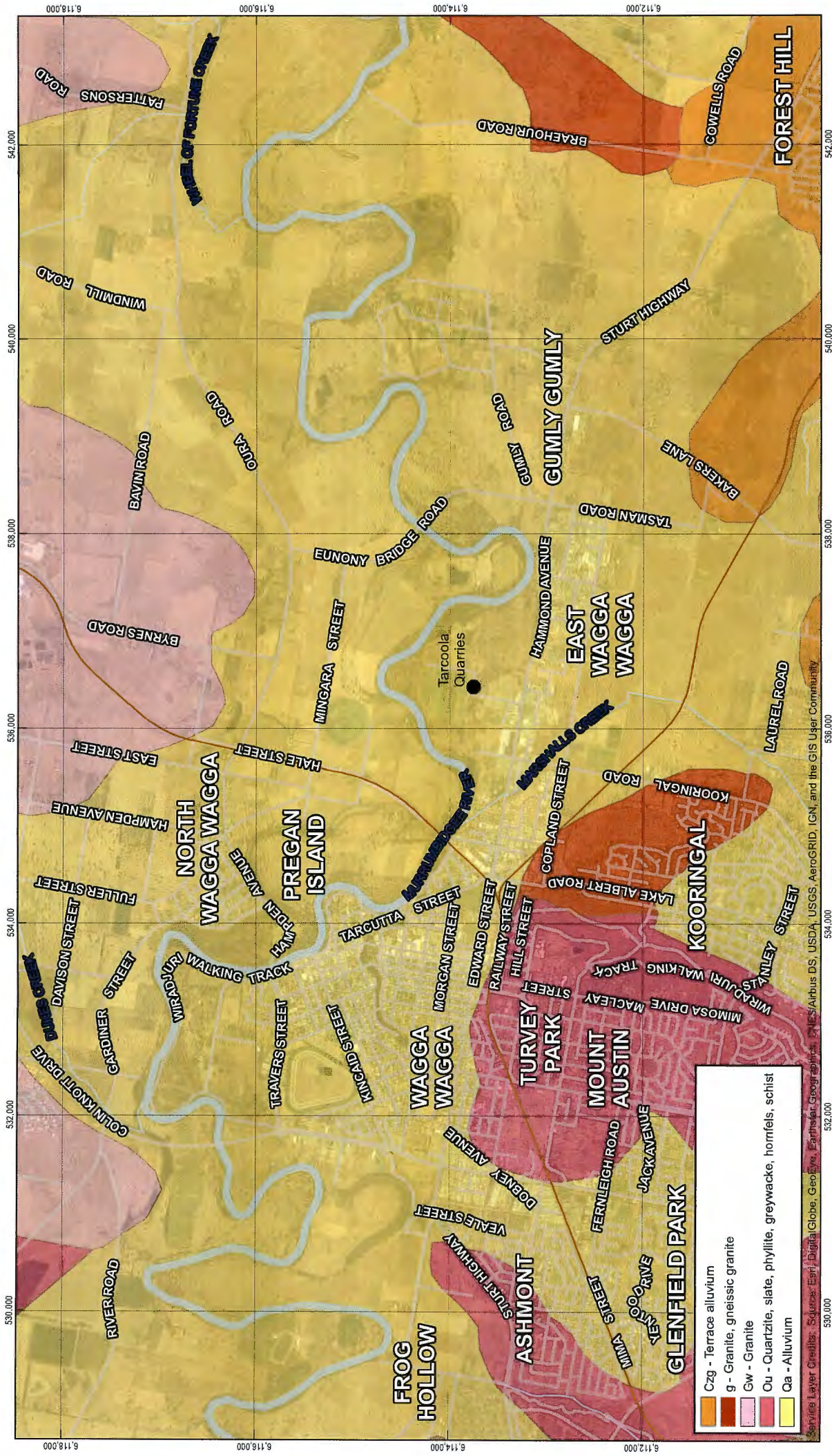
Groundwater

The Cainozoic sediments constitute a highly transmissive, porous media aquifer system. These sediments have been subdivided into an upper and lower system, referred to as the Cowra and Lachlan Formations respectively.

The Lachlan Formation is that which is most often developed for urban water supply purposes. The coarse sand and gravel aquifers within this formation produce high bore yields and low salinity groundwater. There can be intermittent layers of grey clay, which are interpreted as being remnants of floodplain and/or wetland environments (Mitchell 2007).

The shallower Cowra Formation (generally less than 30 m thickness) tends to be finer grained, and containing a higher proportion of clays and silts. The groundwater salinity within the formation tends to be higher than that of the deeper Lachlan Formation, but is widely used for stock and domestic purposes.

The major groundwater use in the region is for town water supply. Other uses are irrigation, stock and domestic, industrial and recreational uses.



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Tarcoola Quarries



Geological Map

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Recharge to the aquifer systems is via a number of processes. The shallow Cowra Formation is semi confined to unconfined. It is recharged through infiltrating rainfall, leakage from the river systems, flood events, and a small component of the irrigation recharge.

The deeper Lachlan Formation a confined aquifer system and is recharged via vertical leakage from the Cowra aquifer, and throughflow from the surrounding and underlying basement (fractured) rocks.

Floods are considered to form a significant component of groundwater recharge. The graphs below shows historical groundwater levels taken from bores in the Wagga Wagga area. The bored exhibit a gradual drawdown between flood events, with the flood events providing rapid recharge to the aquifers.

4.2.2 Potential impacts

There are no potential impacts for the application of emulsion to Gillard Road on Soil and water. The road will be coated with a suppressant that will prevent sediment, dust and erosion issues commonly associated with dirt and gravel roads. The product is safe to use in environmentally sensitive areas such as drainage line due to its non-leachable properties and not containing any harmful chemical such as PCBs.

Grassed swales will be established along the side of the road for interception and conveyance of surface water. The grassed swales will intercept pollutants from the road and provide primary treatment through capturing sediment and reducing nutrient levels.

4.2.3 Mitigation Measures

The use of a suppressant on the unsealed surface forms part of the basis of the proposed modification. Additional mitigation measures beyond those presented in the original EIS are not proposed as part of the modification.

4.3 Biodiversity

4.3.1 Overview

A number of flora and fauna investigations have been undertaken to assess the impacts of the proposal on the ecological and biodiversity values of the locality. These studies include:

- An ecological assessment for the Tarcoola Quarries flora and fauna assessment statement volume 1 and volume 2 (2013).
- GHD (2012). Expansion of Tarcoola quarry operations. Preliminary Environmental Assessment. Report for Tarcoola Quarries (TQ).

This section presents a summary and interpretation of the key findings of the ecological assessments in relation to the project.

4.3.2 Existing environment

Vegetation communities

Vegetation throughout the subject site is relatively uniform. Native vegetation is largely restricted to the upper stratum of the riparian corridor along the Murrumbidgee River within the study area, with an introduced groundlayer (Figure 4 and Figure 5). Scattered mature paddock trees exist along the southern border of the subject site.

The vegetation community along the river is dominated by River Red Gum. The plant community type as listed in the NSW PCT database as *River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion* (PCT ID 5).

This community is not listed under State or Commonwealth legislation as an endangered or threatened ecological community. No other native vegetation communities were identified in the subject site and no other tree species were identified that could potentially constitute a threatened ecological community.

The Lowland Murray River aquatic ecological community is considered likely to occur within the immediate locality but wouldn't be impacted as vegetation removal will be limited to the access road in the south of the study area. Lowland Murray River aquatic ecological community is an endangered ecological community under the TSC Act.

Flora

Surveys undertaken by GHD identified 55 flora species, of which 10 are native and 45 are introduced. No threatened flora species were identified in the study area during surveys.

Canopy species in the study area were dominated by one eucalypt species; River Red Gum (*Eucalyptus camaldulensis*) with no other naturally occurring native tree species recorded. Three introduced tree species were recorded; the introduced Walnut (*Juglans regia*), which was planted in the western section of the subject site, the Canary Island Date Palm (*Phoenix canariensis*) and Weeping Willow (*Salix babylonica*), both of which occur along the river banks. There was no evidence of dieback of eucalypt species observed during field surveys.

Naturally occurring shrub species were restricted with Silver Wattle (*Acacia dealbata*) the only occurring species in the riparian zone of the Murrumbidgee River. No other shrub species were identified.

The ground layer is predominately introduced across the entire study area with commonly occurring introduced species including Great Brome (*Bromus diandrus*), Soft Brome (*Bromus molliformis*), Wimmera Ryegrass (*Lolium rigidum*) and Barley Grass (*Hordeum leporinum*).

Native grasses and forbs were generally uncommon with Water Couch (*Paspalum distichum*) the most commonly occurring native species in periodically wet or waterlogged areas.

Fauna

Surveys undertaken by GHD identified 28 fauna species, of which 27 are native species.

The woodland community of the study area provides habitat for a variety of bird species. All species identified during field surveys were birds, one of which was introduced; the Common Blackbird (*Turdus merula*). Commonly occurring native species included the Australian Magpie (*Gymnorhina tibicen*), Magpie-lark (*Grallina cyanoleuca*), Sulphur-crested Cockatoo (*Cacatua galerita*) and Australian Wood Duck (*Chenonetta jubata*).

Two threatened bird species were recorded during surveys;

- Brown Treecreeper (*Climacteris picumnus victoriae*)
- Superb Parrot (*Polytelis swainsonii*).

Both species are listed under the TSC Act as vulnerable and were observed in River Red Gum Woodland. The Superb Parrot is also listed as vulnerable under the EPBC Act. The woodland trees provide foraging, roosting and nesting resources for the species. In the study area and locality, Superb Parrots are only known to breed in the hollows of River Red Gum trees along the Murrumbidgee River. This species is known to breed in River Red Gum trees on the North Wagga Wagga flats, less than three kilometres north-west of the subject site.

One migratory species, as listed under the EPBC Act, was recorded during surveys; the Rainbow Bee-eater (*Merops ornatus*). The species was observed in a River Red Gum on the northern boundary of the subject site.

No species of mammal were recorded during field surveys, threatened or otherwise. The woodland and grassland in the study area is likely to provide suitable habitat for commonly occurring native species such as the Common Brushtail Possum (*Trichosurus vulpecula*), Eastern Grey Kangaroo (*Macropus giganteus*) and White-striped Freetail Bat (*Tadarida australis*). The limited survey period and confinement to diurnal surveys means that not all species that are resident to the subject site and study area were recorded.

The Squirrel Glider (*Petaurus norfolcensis*), listed as an endangered population in the Wagga Wagga LGA under the TSC Act, is known to occur in the riparian corridor of the Murrumbidgee River west of the subject site, to about the area near Marshall's Creek about 850 metres from the subject site. The species is therefore considered likely to occur in the study area given the connectivity of the riparian corridor.

No species of reptile or amphibian were recorded during field surveys. Woody debris in the study area is likely to provide suitable habitat for commonly occurring species of reptile such as skinks and snakes. The warm weather experienced during the survey period was optimal for observations of reptile species, although none were sited; however, given the suitable potential habitat; reptiles are considered highly likely to occur here. The Murrumbidgee River, drainage lines, lagoons and areas of ephemeral water ponding may provide breeding habitat for amphibian species to potentially occur.

4.3.3 Potential impacts

There are no potential impacts from the application of the emulsion to Gillard Road on flora and fauna.

4.3.4 Mitigation measures

Additional mitigation measures beyond those presented in the original EIS are not proposed as part of the modification.

4.4 Heritage

4.4.1 Existing environment

An Aboriginal Heritage and Historic Heritage Assessment was undertaken for the extractive aspects of the project in the 2015 EIS. No historic heritage was identified during the desktop assessment or during the site visit as a result of the disturbed nature of the site.

Given the proximity to the Murrumbidgee River there was doubt that any artefacts of Aboriginal Heritage would be identified due to impacts of flooding. There was however, an artefact identified in 2012. This area was excluded from the operations and an Aboriginal Heritage Impact Permit (AHIP) was granted in November 2015 for the salvage and reburial of the isolated artefact outside of the area of impact. The survey was undertaken in November 2016 to relocate the artefact however, it could not be located and was deemed a destroyed site.

4.4.2 Potential Impacts

There will be no disturbance required for the application of an emulsion to Gillard Road and no potential impact on any items of heritage significance.

4.4.3 Mitigation Measures

Additional mitigation measures beyond those presented in the original EIS are not proposed as part of the modification. .

4.5 Traffic and Transport

4.5.1 Existing Environment

The existing access to the Quarry is via Gillard Road. This is an unsealed public road that provides access to Orange Tree Point Reserve. The road was crown land until taken over by Council in July 2015.

4.5.2 Potential Impacts

There are no potential impacts from the application of emulsion to Gillard Road on Traffic and Transport. Access and traffic volumes remain the same as outlined in the previous EIS and Supplementary Report.

4.5.3 Mitigation measures

The Transport Management Plan will be updated to reflect the use of an emulsion for Gillard road and a Maintenance agreement will be agreed upon between Council and Tarcoola outlining the emulsion application and regime.

4.6 Noise

4.6.1 Existing Environment

The study area for noise impacts is comprised of the rural residential receivers surrounding the quarry considered in the EIS. Sensitive receivers and project specific noise criteria are shown in Table 4-7 below and shown on Figure 4-2.

Table 4-7 - Identified Noise Sensitive Receivers

Receiver	Receiver Type	Distance from Road (m)	Direction from Road	Daytime Noise Criteria dB(A)
R1	Residential	360	West	43
R2	Residential	630	North	42
R3 ¹	Quarry landowner	-	-	-
R4	Residential	360	Southeast	43
R5	Residential	955	East	43

1. R3 is the house of the quarry landowner and for the purpose of this assessment is not considered as a sensitive receiver.



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Tarcoola Quarries
 Tarcoola Compliance Services



Key Features

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Figure 4-2

Paper size A3

0 50 100 200 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 55

LEGEND

- Sensitive receivers
- Property boundary

N

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 Data source: Google Earth aerial imagery - extracted May 2013; NSW Government: Property boundary - 2012. Created by csw/llm

4.6.2 Potential impacts

The application of emulsion to the existing Gillard Road will not generate any additional noise impacts to the surrounding sensitive receivers. Noise emission from the quarry site is primarily due to excavation and screening works. Trucks utilising Gillard Road for access were included in the original noise modelling and represent an intermittent noise source when compared to the constant operation of quarry equipment. Gillard Road is not a dominant noise source and will not contribute to the overall noise levels experienced at surrounding receivers.

4.6.3 Mitigation measures

The existing mitigation measures outlined in the *Extension of Tarcoola* EIS is sufficient to attenuate any potential noise impacts experienced at sensitive receivers.

4.7 Land use

4.7.1 Existing environment

The proposal site is located within landuse zone RU1 containing a rural primary production land zone adjoining an enterprise corridor along the Sturt Highway incorporating a range of commercial and commercial activities. As a result of these land uses the area has been largely cleared and developed to the south. In the north of the study area riparian vegetation remains along the Murrumbidgee River, to the east and west small grazing properties remain with scattered patches of remnant vegetation including hollow-bearing trees.

There is light industrial and commercial development to the south-west, south and south-east of the site and Supermix Concrete and Quarries operate a large quarry on the northern bank of the Murrumbidgee River to the east of the site.

4.7.2 Impact assessment

There is no changes to the current use of the site, no disturbance required and therefore no potential impacts to land use.

4.7.3 Mitigation measures

No specific mitigation measures are proposed for land use impacts.

4.8 Visual amenity

4.8.1 Existing environment

The study area predominately comprises agricultural land, located to the north, west and east of the site. The quarry is located on a floodplain and the landscape is predominantly flat. The landscape character is strongly influenced by the Murrumbidgee River, which has played a significant role in the history and development of the Wagga Wagga area and continues to play a role in the community as the city's most important and prominent natural feature (Wagga Wagga Recreation and Open Space Strategy, 2005-2015).

In the north of the study area riparian vegetation remains along the Murrumbidgee River, to the east and west small grazing properties remain with scattered patches of remnant vegetation including hollow-bearing trees.

There are a number of rural residential farmhouses located on properties surrounding the Tarcoola Quarry. There is light industrial and commercial development to the south-west, south and south-east of the site and Supermix Concrete and Quarries operate a large quarry on the northern bank of the Murrumbidgee River to the east of the site.

Views to the proposal site are available from the following locations:

- Users of Gillard and Tarcoola Road
- Workers along Gillard and Tarcoola Road
- Customers of businesses located along Gillard and Tarcoola Road.
- Visitors to Orange Tree Point in the very north of the study area.

4.8.2 Impact assessment

There are no potential impacts from the application of emulsion to Gillard Road on visual amenity.

4.8.3 Mitigation measures

No specific mitigation measures are proposed for any visual amenity impacts.

5. Environmental Management

5.1 Environmental Management and Monitoring

Tarcoola Quarry is committed to sound environmental management for all aspects of the quarry operations and have implemented a number of environmental management and monitoring systems to guide the operations. Tarcoola will utilise these management plans and systems for the use of Gillard Road, such as:

- Pollution and Incident Response Management Plan
- Safety Management Plan
- Noise Management Plan
- Dust Management Plan
- Erosion and Sediment Control Plan
- Flood Evacuation Plan
- Transport Management Plan

They will also implement all mitigation measures proposed in this report.

6. Conclusion

The proposed modification for the use of an emulsion on Gillard Road is a more practical, cost effective and provides a more desirable solution for the longevity of road, whilst still meeting the environmental compliance of the site. The use of an emulsion will ensure compliance with dust limits 25% less than the set EPA criterion.

Potential environmental impacts associated with the proposal are considered minimal and can be appropriately managed through the adoption of the proposed management procedures and mitigation measures.

7. References

GHD 2013a. GHD, *Tarcoola Turf and Quarries, Environmental Impact Statement Vol. 1 and 2*. Report for Tarcoola Quarries.

GHD 2013b. GHD, *Tarcoola Turf and Quarries, Extension of Tarcoola Quarry, Supplementary Report*. Report for Tarcoola Quarries.

OzArk 2017, OzArk Environmental & Heritage Management Pty Ltd. *Desktop Aboriginal Due Diligence Archaeological Assessment, Tarcoola Quarry Access Road*. Report for Tarcoola Quarries.

Appendices

Appendix A – Emulsion Information



Dust Control Solutions

1800 NO DUST



PetroTac®

www.dustcontrol.com.au

More than just a nuisance, dust is a pervasive problem.
It undermines the health of people, machines and the environment.
It can impair the most sophisticated equipment and technology.

Take Control of a Damaging, Costly Nuisance

Uncontrolled, dust can violate mandatory compliance levels.

The best solution for the problem?

PetroTac® from Dust Control Solutions a pioneer in the formulation and development of affordable dust control programs.

Why? Because Dust Control Solutions gives you an effective, durable method of dust control, surface stabilisation and water reduction for an extremely economical overall cost.



How PetroTac® Works

PetroTac® is a scientifically advanced emulsion specifically formulated to control dust emissions. It improves and stabilises unpaved road surfaces. It works by saturating, penetrating and bonding dust and aggregate particles together, creating a hard, durable surface that offers excellent longevity and superior load-bearing qualities. In fact, depending on the aggregate and preparation, PetroTac®-treated surfaces can look like paved roadways, sometimes after only one application. Environmentally safe, PetroTac® is applied with water but quickly cures to a water-resistant surface. As a result, treated surfaces aren't washed out or destabilised by rain or rain water run-off. Cured roadways remain intact even after it rains.

In addition, PetroTac® has been used in sensitive, environmentally delicate areas, because it has excellent non-leaching characteristics and doesn't contain PCBs or any of the other harmful contaminants often found in some suppressants.

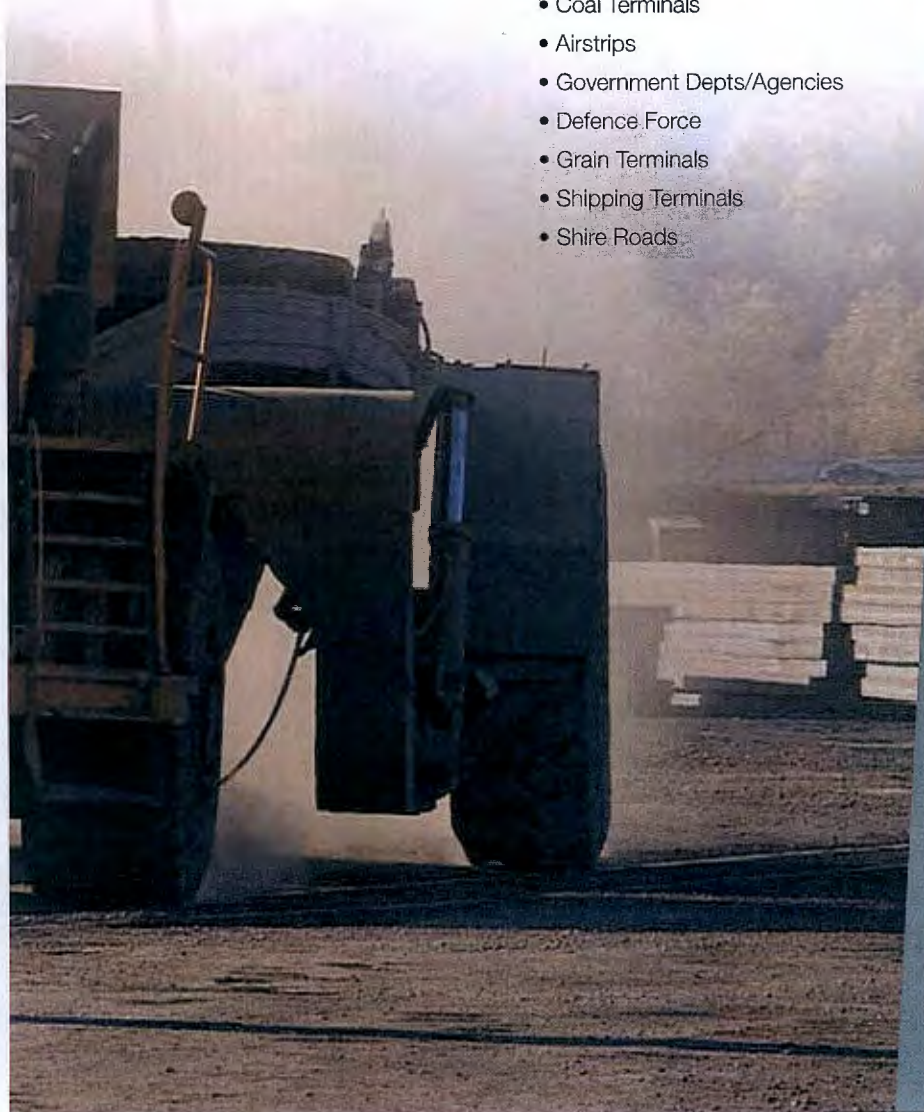
Where PetroTac® Works

Since it was first introduced to the market in the early 1980s, PetroTac® has proven its effectiveness under a variety of climatic conditions and at a broad range of industry sites:

- Iron and Steel Mills
- Underground Mines
- Open Cut Mines
- Quarries
- Power Plants
- Rail Roads
- Coal Terminals
- Airstrips
- Government Depts/Agencies
- Defence Force
- Grain Terminals
- Shipping Terminals
- Shire Roads



"We looked at a lot of dust control options. Oils, salts, asphalt. But PetroTac® gave the best value for our dollar. A tough, stable roadway that holds up really well and we think we're doing a better job protecting the environment."



"PetroTac® not only stabilised our roadways and controlled the dust, it looked like we paved the roads- after only a few applications!"

A wide variety of materials have been applied to unpaved roadways in an effort to control dust. But water, oil based emulsions, petroleum resins and other chemical suppressants all provide limited effectiveness. Each of these alternatives presents its own set of problems.

Only the PetroTac® dust control system offers optimal performance, combining durability and effectiveness in one reliable, economical solution.

The Problem with Other Dust Control Alternatives

- **Water** can be an effective short-term solution, but when the moisture dries, it leaves the soil more fragile creating even more dust.
- **Oil-based emulsions** continually percolate and leach through the soil, never binding with the road bed particles to stabilise the surface.
- **Most asphaltic materials** create a thin top layer which is easily picked up and tracked by heavy equipment, leading to surface deterioration in the form of ruts, washboards and potholes.



The Optimum Alternative in Fugitive Dust Control



The Benefits of the PetroTac® Dust Suppression System

One of the most widely used dust control and surface treatments available in today's marketplace, PetroTac's innovative chemical composition is specially engineered for elasticity, longevity and load-bearing qualities.

As a result, PetroTac® provides a broad range of end-use benefits, including faster, safer material transport, longer equipment life, improved efficiency and a healthier working environment.

- **Penetrating chemical compound** quickly bonds with road aggregate and cures to a water resistant surface, ensuring excellent durability almost instantly.
- **Superior soil stabilisation** improves load-bearing strength to ensure roadways will stand up to the toughest heavy equipment, such as the slab haulers and slag pot carriers used in the steel industry and dumpers used on open cut mining.
- **PetroTac® cures to a water-resistant surface** so quickly, it is completely effective even when applied a few hours before rain.
- **Fewer reapplications are necessary**, because PetroTac® decays less than other dust control alternatives.
- **A PetroTac® surface looks like an asphalt roadway** very quickly (and sometimes immediately), because PetroTac® stays where it lays and builds up over time. This increases the strength and elasticity of the surface, virtually eliminating washboards, ruts and potholes.
- **Proven safe in environmentally sensitive areas**, PetroTac® leads the industry when it comes to the prevention of leaching. Its naturally occurring resin base assures there are no PCBs or other harmful contaminants the leach into the environment.
- **Uncommon applications and special situations** are part of our everyday experience. With custom capabilities, we'll find the right solution for your particular need.

Evaluating the Cost of a Dust Control System

Some dust control alternatives appear to cost very little in the short term. However, a "cheap" solution can cost a lot more in the long run.

That's why it's so important to evaluate all the costs associated with any dust control program. That's what makes PetroTac® so popular- it delivers optimum benefits for the lowest overall cost.

- **Improve long-term durability**

and minimise the frequency of reapplications. PetroTac® stays put and builds up quickly, giving unpaved roads the look and strength of asphalt surfaces without the expense of paving.

- **Reduce water consumption**

PetroTac® significantly minimises water used for dust suppression by up to approx 90%.

- **Reduce maintenance needs**

and keep transportation arteries stable and clear. PetroTac® remains stable to help eliminate ruts and potholes, so you spend less on road maintenance and more on productivity.

- **Eliminate erosion repair**, because

PetroTac® penetrates, bonds and stabilises surfaces so you save on time, materials and money.

- **Minimise vehicle damage and**

tyre wear to keep equipment running longer. PetroTac® will give you a stable road reducing tyre consumption.

- **Decrease downtime** and maximise

uptime. PetroTac® will stabilise haul roads and will minimise and/or eliminate downtime due to wet weather periods.





No two sites or situations are identical, so DCS develops individual solutions for each PetroTac® customer.

The first step is a detailed analysis of the site, which involves everything from evaluating the soil and aggregate to assessing the climate and compliance. DCS works as your partner to develop effective work place practice standards that will keep you on top of any compliance requirements, whether or

not you're responding to a notice of violation.

We also offer a complete record of your dust control program, documenting application schedules, weather logs and preventive maintenance checklists. Accumulated on a monthly, quarterly and year-to-date basis, these reports provide you with the comprehensive data required for proof of compliance.



You Partner in Dust Control and Compliance



"I've been impressed with how quickly PetroTac® cures. We can drive on it almost immediately, and even when it rained shortly after the application, the surface seemed completely unaffected"

Now See for Yourself

Dust control is a complex problem that involves a number of issues: cost, effectiveness, compliance, environmental impact and health.

We can tell you PetroTac® is better, but we also think you should see for yourself.

That's why we're prepared to provide you with proof: test results, technical literature, environmental reports and hard engineering data.



*Whatever your project or application,
DCS has the answers to your needs.
Through years of proven success, we've
helped customers like you solve their
dust control problems – effectively,
economically and reliably. So call us
today about your particular situation.*

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LEACHABILITY OF PETROTAC EMULSION IN AUSTRALIA

September 30, 1999

Anthony J. Kriech

Introduction

Heritage Research has completed a study of leachability of PetroTac Asphalt Emulsion from SAMI Pty. Limited, 12 Grand Avenue, Camellia, NSW 2142, Australia.

This product is used as a dust palliative in Australia for industrial and municipal applications.

Sampling and Analytical

PetroTac asphalt emulsion was obtained from SAMI in Australia. This product is a cationic slow setting solvent free emulsion. The emulsion residue was submitted for the following tests to our commercial laboratory Heritage Environmental Services, LLC in Indianapolis, Indiana, USA, an EPA certified laboratory. The test methods used in this evaluation are listed below:

Test Methods

Test	Method/Procedure
TCLP Procedure	SW 846-1311
Volatiles	SW 846-8240
Semi-Volatiles GC/MS	SW 846-3510
Polynuclear Aromatic Hydrocarbons	SW 846-8310
Metals	SW 846-3010

Results

The leachate results on metals are summarized in Table A. The leachate volatiles are listed in Table B. The leachate semivolatiles are listed in Table C. The polynuclear aromatic compounds (PACs) are presented in Table D. The Certificate of Analysis from Heritage Environmental Services, LLC is included with this report.

TABLE A

TCLP for Metals (mg/l)

Description	PetroTac	Det. Limit
BARIUM	BDL	0.05
CADMIUM	BDL	0.05
CHROMIUM	BDL	0.05
LEAD	BDL	0.25
SILVER	BDL	0.05
ARSENIC	BDL	0.05
SELENIUM	BDL	0.05

TABLE B

Volatile Organics (µg/L)

Description	PetroTac	Det. Limit
BENZENE	BDL	50
CARBON TETRACHLORIDE	BDL	50
CHLOROBENZENE	BDL	50
CHLOROFORM	BDL	50
1,2-DICHLOROETHANE	BDL	50
1,1-DICHLOROETHYLENE	BDL	50
METHYL ETHYL KETONE	BDL	100
TETRACHLOROETHYLENE	BDL	50
TRICHLOROETHYLENE	BDL	50
VINYL CHLORIDE	BDL	100

TABLE C

TCLP Semi-Volatile Organics (µg/L)

Description	PetroTac	Det. Limit
1,4-DICHLOROBENZENE	BDL	50
2,4-DINITROTOLUENE	BDL	50
HEXACHLOROBENZENE	BDL	50
HEXACHLOROBUTADIENE	BDL	50
HEXACHLOROETHANE	BDL	50
NITROBENZENE	BDL	50
PYRIDINE	BDL	250
2-METHYL PHENOL	BDL	50
3-METHYL PHENOL	BDL	50
4-METHYL PHENOL	BDL	50
PENTACHLOROPHENOL	BDL	250
2,4,5-TRICHLOROPHENOL	BDL	50
2,4,6-TRICHLOROPHENOL	BDL	50

TABLE D

Polynuclear Aromatic Hydrocarbons by HPLC ($\mu\text{g/L}$)

Description	PetroTac	Det. Limit
NAPHTHALENE	BDL	50
ACENAPHTHYLENE	BDL	50
ACENAPHTHENE	BDL	50
FLUORENE	BDL	50
PHENANTHRENE	BDL	50
ANTHRACENE	BDL	50
FLUORANTHENE	BDL	50
PYRENE	BDL	50
BENZ (A) ANTHRACENE	BDL	50
CHRYSENE	BDL	50
BENZO (B) FLUORANTHENE	BDL	50
BENZO (K) FLUORANTHENE	BDL	50
BENZO (A) PYRENE	BDL	50
DIBENZO (A,H) ANTHRACENE	BDL	50
BENZO (G,H,I) PERYLENE	BDL	50
INDENO (1,2,3-CD) PYRENE	BDL	50

Comments

1. No metals leached above the detection level.
2. No volatiles were found in the leachate above the detection level.
3. The semi-volatiles were not found above the level of detection
4. The PACs were not found above the level of detection

Conclusions

This study found that PetroTac had no leachable compounds of concern above the limit of detection. Based on this testing, PetroTac properly used would not be expected to leach measurable compounds of concern.

This study does not preclude the need to use good engineering practices in locating, storing, and spraying PetroTac emulsion. PetroTac should not be stored near bodies of water without secondary containment because liquid emulsions are water miscible before reacting with soils or aggregate roadways. Liquid asphalt emulsions can foul water supplies temporarily. Proper use of PetroTac should provide an environmentally safe material for roadways and industrial dust control applications.

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B	B Fourie	K ROSEN	5/9/2017	K ROSEN		5/9/2017

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