



08 February 2017

Mr Sam Robins  
Senior Planner  
Wagga Wagga City Council  
PO Box 20  
Wagga Wagga NSW 2650

Our ref: 23/15786

Your ref:

Dear Mr Robins

**Tarcoola Turf and Quarries DA 13/0307  
Annual Environmental Management Report**

Tarcoola Turf and Quarries (ABN 69 487 642 199) would like to submit there 2016 Annual Environmental Management Report as part per condition 42 of DA 13/0307.

***Attachments***

Tarcoola Quarries 2016 AEMR

Sincerely  
GHD Pty Ltd

A handwritten signature in black ink, appearing to read 'B Fourie', is positioned above the printed name.

Belinda Fourie

61 2 6923 7400



# **Tarcoola Quarries**

## Tarcoola Environmental Monitoring Annual Environmental Management Report 2016

February 2017

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Appendix A – OzArk Aboriginal Heritage Impact Permit Post Activity Report

# 1. Introduction

## 1.1 Overview of the project

The Tarcoola quarry (the quarry) is located in the Wagga Wagga Local Government Area, approximately 3.5 km east of the CBD (Figure 1-1 and Figure 1-2) and is operated by Tarcoola Quarries and Turf (Tarcoola). The Murrumbidgee River forms part of the northern boundary of the site and road access to the site is via Gillard Road and the Sturt Highway.

The quarry has been operating at the current location for 23 years producing a range of aggregates, washed and fill sand. Production has slowly increased in accordance with production limits to meet an increasing demand for building and construction materials. Tarcoola has identified that there is a significant underground resource, which would allow the quarry to operate for a further 20-25 years.

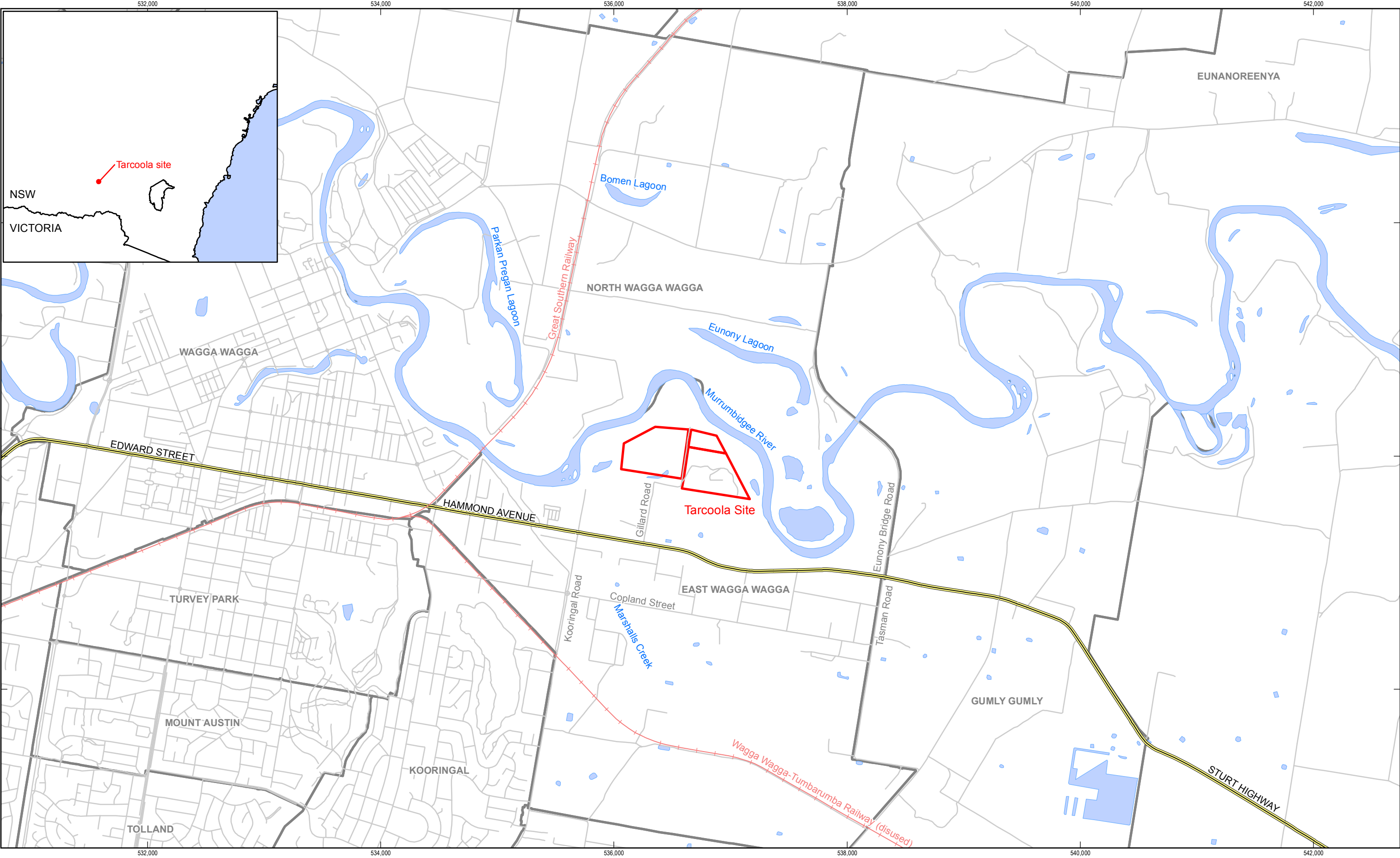
All quarry products and material are transport by truck to local and regional areas.

## 1.2 Purpose of this report

The purpose of this Annual Environmental Management Report (AEMR) is to provide a summary of the environmental performance, statutory compliance and community relationships associated with the quarry operation during the last 12-month reporting period between 1 January 2016 and 31 December 2016. This is the first AEMR prepared for the quarry.

The AEMR has been prepared in accordance with the requirements of Condition 42 of the Development Consent (DA13/0307) which requires the AEMR:

- Identify the standards and performance measures that apply to the development
- Describe the works carried out in the last 12 months
- Describe the works carried out in the next 12 months
- Include a summary of the complaints received during the past year, and compare this to the complaints received in the previous year
- Include a summary of the monitoring results for the development during the past year
- Include an analysis of these monitoring results against the relevant:
  - Impact assessment criteria/limits
  - Monitoring results from previous years; and
  - Predictions in the EIS
- Identify any trends in the monitoring results over the life of the development
- Identify any non-compliance during the previous year
- Describe what actions were, or are being, taken to ensure compliance
- The AEMR shall be place on the proponent's website. If no such site exists, the AEMR shall be made available on Councils website.



1:30,000 @ paper size A3

0 250 500 1,000

Metres

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

LEGEND

	Drainage line		Waterbody
	Railway line		Suburb
	Road		Tarcoola Site
	Highway		

CLIENTS | PEOPLE | PERFORMANCE

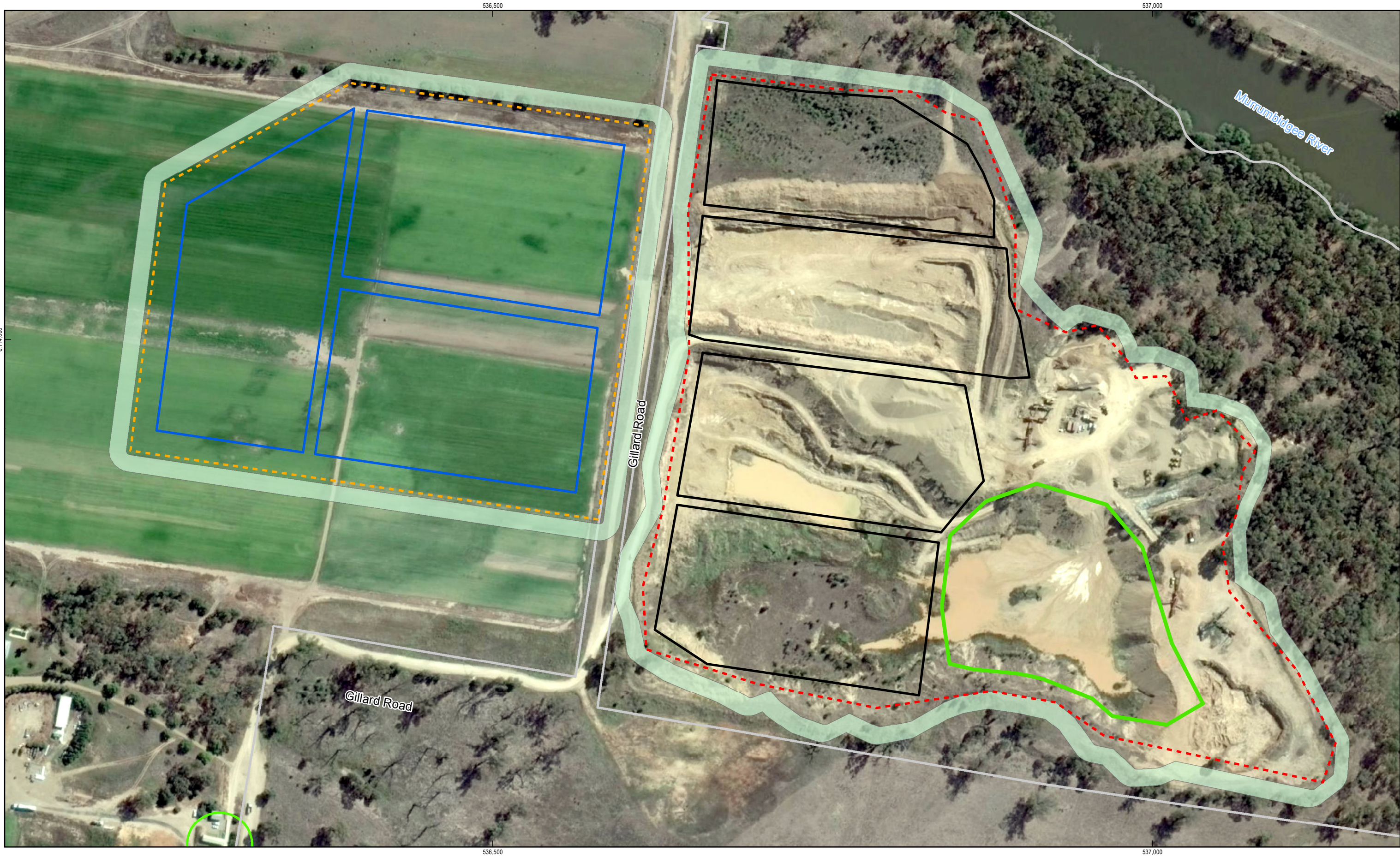
Tarcoola Quarries  
AEMR

Job Number 23-15786  
Revision 0  
Date 07 Feb 2017

Locality Plan

Figure 1





Paper size A3

0

50

100

200

Metres

N

LEGEND

Sediment Basin

Pit Layout Stage 1

Pit Layout Stage 2

Stage 1 boundary

Stage 2 boundary

Site office and weighbridge

Property boundary

Flood Levee

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

Sediment Basin

Pit Layout Stage 1

Pit Layout Stage 2

Stage 1 boundary

Stage 2 boundary

Site office and weighbridge

Property boundary

Flood Levee

CLIENTS|PEOPLE|PERFORMANCE

Tarcoola Quarries  
AEMR

Job Number	23-15786
Revision	0
Date	07 Feb 2017

## Key features of Tarcoola Site

Figure 2



### 1.3 Regulatory Framework

Tarcoola operates in accordance with the compliance requirements of a number of statutory instruments, including development consent, NSW EPA Environment Protection Licence (EPL) and NSW Department of Primary Industry – Water (formerly NSW Office of Water) water licence. Further details relating to these instruments are provided in the following sections.

#### 1.3.1 Development Approval

The quarry was issued an original Development Consent (DA292/88), on the 23 March 1989. An request for extension was submitted in mid-2013, where the quarry was issued with a Development Consent (DA13/0307) on 1 December 2014 for the extension of the quarry by the Wagga Wagga City Council (WWCC) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

#### 1.3.2 NSW EPA Environmental Protection Licence

The quarry operation is subject to compliance requirements under a NSW EPA Environmental Protection Licence (EPL 20543). The EPL was granted on 2 March 2015 and is issued for the scheduled activity of extractive activities for 100,000 – 500,000 tonnes of extracted, processed or stored material per annum.

#### 1.3.3 Water Licences

Tarcoola maintains a number of water access licences granted by the DPI Water, under the *Water Management Act* 2000. The licences are for the extraction of water from the Murrumbidgee River for use in processing and also for dewatering of groundwater from the excavations. The current works approvals and water access licences applicable to the quarry are provided in Table 1-1.

**Table 1-1: Tarcoola water licences**

Licence ID	Allocation	Source	Average annual usage	Purpose
40AL401316 (WA: 40CA403274)	50 ML	Murrumbidgee Regulated River Water Source	0	Supply for gravel crushing plant and quarry operations
40AL401317 (WA: 40CA403274)	282 ML	Murrumbidgee Regulated River Water Source	0	For watering of the Turf Farm
40AL412769 (WA:40WA412770)	249 ML	Wagga Wagga Alluvial Groundwater Sources	New meter installed	Dewatering groundwater from excavations

#### 1.3.4 Regulatory Compliance

The key compliance requirements associated with the Development Consent, EPL and Water Licences are summarised in Table 1-2 and Table 1-3 below. Reference is provided to the relevant section of this AEMR, which provide further detail on environmental management, performance and compliance of the quarry.



**Table 1-2: Key Compliance Requirements – Development Consent**

Compliance condition	Compliance Requirement (DA13/0307)	See AEMR Section
6	Detailed Landscape plan	5
12	A Dust Management Plan	3.2
13	Progressive Rehabilitation Plan	5
14	Environmental Monitoring Program	3.1
15	Environmental Management Strategy	3.1
15A	Measure of daytime background noise level at R1, R2, R4 and R5	3.3
16	Evidence of extraction limit	2.1
19	Monthly extraction reports	2.1
27	All chemicals/fuel store 500 mm above the 1:100 ARI level	2.3
33	Landscape plan – implemented and maintained	5
38	Noise emissions shall comply with Industrial Noise Policy	3.3
39	No process water to be discharged to Murrumbidgee River	3.4
42	Annual Environmental Management Report	This report
43	Notification of exceedances	3.2
44	Independent Environmental Audit	Required December 2017
46	Rehabilitation works	5
47	Airy quality monitoring consistent with condition M2.3 (of consent document or M2 of EPL)	3.2
48	Hours of operation	2.1.2

**Table 1-3: Key compliance Requirements – EPA Environment Protection Licence**

Compliance Condition	Requirement (EPL 20543)	See AEMR Section
P1.2, L3, M6, E1	Noise monitoring, limits, management plan and reporting requirements	3.3
O4, M4	Pollution Incident Response Management Plan and complaints	4
O5	Refuelling of plant and equipment	2.3
L4	Hours operation	2.1.2
M5	Complaint telephone line	4
R1	Annual return	3.1
P1.1, O3, M2,	Air Quality monitoring, limits and reporting requirements	3.2

### 1.3.5 AEMR Distribution

Copies of the AEMR will be submitted to:

- Wagga Wagga City Council
- NSW Environment Protection Authority (EPA)
- NSW Office of Water.

This report will also be available on the Tarcoola turf website: <http://tarcoolaturf.com.au/quarry/>

## 1.4 Scope and limitations

This report: has been prepared by GHD for Tarcoola Quarries and may only be used and relied on by Tarcoola Quarries for the purpose agreed between GHD and the Tarcoola Quarries as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Tarcoola Quarries arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Tarcoola Quarries and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report, which were caused by errors, or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

## 1.5 Quarry Contacts

Contact Person	Position Title	Contact Details
Ken Tyson	Quarry Owner/Manager	Mob: 0417 482 162 Tel: (02) 6921 5403 Email: <a href="mailto:admin@tarcoolaturf.com.au">admin@tarcoolaturf.com.au</a>

## 2. Summary of 2016 Operations

### 2.1 Quarry Operation

#### 2.1.1 Production

The quarry extraction operations are conducted through a number of stages:

- Topsoil and overburden removal and stockpiling
- Free dig extraction of material and stockpiling
- Screening, crushing, washing and stockpiling of processed material
- Loading of material for transport offsite to clients.

Overburden is progressively stripped in layers and hauled to dedicated areas for levee construction where required. The remaining material is either stockpiled or used directly on progressively rehabilitated areas.

Two quarry pits of up to five hectares in area are available for extraction at any time throughout the operations to allow access to either shallow or deeper sand resources.

In 2016, extraction operations were conducted from Pit 1 cell B and Pit 2 cells A and B. Extraction from Pit 1 cell A was undertaken prior to 2016 and the cell is no longer in use and rehabilitation has commenced. Extraction within Pit 1 cell B finished at the end of the reporting period as the product was depleted. Rehabilitation within Pit 1 cell B is yet to commence.

Use of the sediment pond within the riparian zone ceased during the reporting period as requested by the EPA in early 2016.

The amount of material extracted for the period of January 2016 to November 2016 was 107,342.60 tonnes with a breakdown detailed in Table 2-1.

**Table 2-1: Material extracted for 2016**

Material	Amount (tonnes)
Aggregate	27,947.78
Fill sand	24,409.53
Washed sand	50,567.93
Loam	157.86
Other material	3,463.94
Total	106,547
Overburden	795.57

#### 2.1.2 Hours of Operation

The quarry operating hours are:

- 7 am to 6 pm Monday to Friday
- 8 am to 6 pm Saturday

With processing and crushing only occurring between:

- 8 am to 4 pm Monday to Friday
- 8 am to 12 noon Saturday

There were no exceedances of these operating times during the reporting period.



### 2.1.3 Land Preparation

Land preparation prior to extraction of material requires planning and implementation of controls associated with dust management, erosion and sediment control, preserving cultural heritage and the stripping and stockpiling of topsoil and overburden.

As a requirement of the development consent, the quarry has developed a Landscape Plan and Progressive Rehabilitation Plan that provide the framework to ensure the land development activities are undertaken in an environmentally appropriate manner (GHDe, 2016 and GHDF, 2016).

A total of 12.85 ha is disturbed within the operational boundary including the processing area. During the 2016 AEMR period, 5.21 ha of quarry land was disturbed of which 2.06 ha was rehabilitated (see Table 2-2). Figure 2 presents the locations and areas of disturbance to the end of 2016.

**Table 2-2: Areas of Disturbance and Rehabilitation during 2016**

Quarry Areas	Proposed Area (ha)	Disturbed (ha)	Rehabilitated (ha)
Stage 1, Pit 1, Cell A	2.32	2.32	0.70
Stage 1, Pit 1, Cell B	2.38	2.38	-
Stage 1, Pit 2, Cell A	2.33	2.33	-
Stage 1, Pit 2, Cell B	1.88	0.5	-
Stage 2, Pit 3, Cell A	2.50	0	-
Stage 2, Pit 3, Cell B	2.53	0	-
Stage 2, Pit 4	2.48	0	-
Sediment Basin	2.34	2.34	0.67
Processing	2.98	2.98	0.69

### 2.1.4 Construction

No major construction activities were undertaken in 2016.

### 2.1.5 Material Processing

Extracted material from the pit is progressively processed through the following facilities:

- Crushing and Screening – 5 mm to 20mm aggregates
- Washing.

The processing is undertaken within a laydown area within Stage 1, north of the sediment basin. The material is also stockpiled and loaded to transport off-site at this location.

Once the trucks are loaded they exit the quarry over the weigh bridge where the following information is captured:

- Weight (tare and gross)
- Date and time
- Number of truck movements.

### 2.1.6 Stockpile Management

Topsoil and overburden is separately stripped and will be used to construct a bund around the periphery of the pit to provide a 10 year ARI level flood protection to the operations, as required by the Soil and Water Management Plan. Any excess material will be used in the rehabilitation of the pits being decommissioned in the sequence of operations.

Stockpiles are located well away from areas of frequent inundation.

Permanent stockpiles are aligned to flood flows and temporarily stabilised with vegetation.

## 2.2 Waste Management

The quarry did not receive or process any waste materials during the reporting period. In previous reporting periods, building and demolition material were stockpiled on site, however this material was disposed to a licenced waste facility during this reporting period.

## 2.3 Hazardous Material Management

Large volumes of fuel are delivered to site in a portable tanker. Refuelling of equipment and machinery is undertaken in the designated refuelling area located near processing plant. This area is appropriately bunded.

Spill kits are maintained onsite to ensure any minor spills are contained and removed.

## 2.4 Meteorological Summary 2016

A review of the Bureau of Meteorology weather data for 2016 was undertaken noting the monthly rainfall and average predominant wind direction (see Table 2-3). This information was included as rainfall can influence dust generation and the need for surface water sampling and wind speed direction can influence the direction of the depositional dust and the distance in which noise from operations travels.

**Table 2-3: Weather observations for 2016 – Wagga Wagga**

Month	Monthly Rainfall (mm)	Predominant wind direction
January	55.2	NE
February	16.2	W – SW
March	33.4	W – NW
April	10.8	W – SW
May	110.6	W – SW
June	84.6	W – SW
July	92.6	W – SW
August	58.8	W – NW
September	170.6	W – NW
October	64	W – SW
November	25.2	W - SW
December	42.2	W - NW

Bureau of Meteorology (BOM) Wagga Wagga AMO site (072150).

## 2.5 Environmental Management Summary 2016

In 2016, Tarcoola undertook the following environmental monitoring and reporting:

- Air quality monitoring
- Noise monitoring
- Hazardous material management
- Aboriginal heritage conservation
- Environmental Protection Licence reporting.

## 3. Environmental Management, Monitoring and Performance

### 3.1 Review of Environmental Management Plans and Programs

Tarcoola have an Environmental Management Strategy (EMS) and range of management plans. The management plans include:

- Landscape plan
- Dust management plan and monitoring program
- Transport management plan
- Noise management plan and monitoring program
- Flood management plan and evacuation
- Pollution Incident Response Management Plan (PIRMP)
- Stormwater and erosion and sediment control plan
- Rehabilitation plan.

An Environmental Monitoring Program was also developed to summarise the quarry's monitoring and reporting requirements and frequency for easy reference.

This is the first year of monitoring resulting in limited information for comparative analysis or identification of trends.

An Annual Return was submitted to EPA in March 2016 for the period 2 March 2015 to 3 May 2016. The remainder of the reporting period (March 2016 to December 2016) will be covered by the 2017 Annual Return.

### 3.2 Exceedances and notifications

There were a number of other exceedances of the monthly dust limit (4 g/m<sup>2</sup>/month) at Residence 1 (August, September and October 2016), Residence 4 (October 2016) and Residence 5 (October and November 2016).

The October 2016 depositional dust results for Residence 5 indicated dust results (56.8 g/m<sup>2</sup>/month) that were significantly greater than the monthly limit of 4 g/m<sup>2</sup>/month. An analysis of previous months and November 2016 dust results indicated that the October 2016 results for Residence 5 represented an anomaly.

The dust depositional gauge that presented the highest results is accessible and visible to the public. The following measures were implemented by Tarcoola to assess the dust sampling results, climate conditions and potential for tampering of the sampling bottles:

- Have open discussions with any land holders in regards to any noticeable dust plumes
- Have an open discussion with the Laboratories to ensure there is correct QA/QC processes in place
- Note observations when exchanging the bottles
- Take visual observations of the sample itself.

If any exceedances continue or are noted further measures or additional monitoring will be implemented as required.



The October 2016 exceedance was reported as an incident to the EPA and WWCC on Monday 12 December 2016.

### 3.3 Air Quality Management

#### 3.3.1 Air Quality Performance Criteria

The Notice of Determination of Development Application DA13/0307 and EPL 20543 specify the following conditions:

##### Condition O2 – Dust

- O2.1 - Activities occurring at the premises must be carried out in a manner that will minimise emissions of dust from the premises
- O2.2 - Trucks entering and leaving the premises that are carrying loads must be covered at all times, except during loading and unloading
- O2.3 - All mitigation measures identified in the Environmental Impact Statement for the control of dust must be fully implemented at all times

##### Condition M1 – Monitoring records

- M1.1 - The results of any monitoring required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with the load calculation protocol must be recorded and retained as set out in conditions M1.2 and M1.3.
- M1.2 - All records required to be kept by the licence must be:
  - In a legible form, or in a form that can readily be reduced to a legible form;
  - Kept for at least 4 years after the monitoring or event to which they relate took place; and
  - Produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 - The following records must be kept in respect of any samples required to be collected:
  - The date(s) on which the sample was taken;
  - The time(s) at which the sample were collected;
  - The point at which the sample was taken; and
  - The name of the person who collected the sample.

##### Condition M2 - Requirements to monitor concentration of pollutants discharged

- M2.3 - For each monitoring/ discharge point or utilisation area specified below (by a point number), the applicant must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1 The applicant must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns. Dust monitoring must be undertaken at the following receptors R1, R2, R4 and R5

**Table 3-1: Deposition dust criteria**

Pollutant	Unit of measure	Frequency	Sampling Method
Deposited Matter	g/m2/Month	Quarterly	Australian Standard AS 3580.10.1

#### Condition M4 - Testing methods – concentration limits

- *M4.1 - Monitoring for the concentration of a pollutant emitted to the air required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with a relevant local calculation protocol must be done in accordance with:*
  - *Any methodology which is required by or under the POEO Act 1997 to be used for the testing of the concentration of the pollutant; or*
  - *If no such requirement is imposed by or under the POEO Act 1997, any methodology which the general terms of approval or a condition of the licence or the protocol (as the case may be) requires to be used for that testing; or*
  - *If no such requirement is imposed by or under the POEO Act 1997, or by the general terms of approval or a condition of the licence or the protocol (as the case may be), any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.*

#### Condition R1 - Annual return documents

- *R1.1 The applicant must provide an annual return to the EPA in relation to the development as required by any licence under the Protection of the Environment Operations Act 1997 in relation to the development. In the return the applicant must report on the annual monitoring undertaken (where the activity results in pollutant discharges), provide a summary of complaints relating to the development, report on compliance with licence conditions and provide a calculation of licence fees (administrative fees and, where relevant, load based fees) that are payable. If load based fees apply to the activity the applicant will be required to submit load-based fee calculation worksheets with the return.*

Air quality impact assessment criteria were developed by the Environment Protection Authority and documented in *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Department of Environment and Conservation August 2005) (Approved Methods).

To ensure that dust environmental outcomes are achieved, emissions from the Tarcoola quarry must meet the criteria in Table 3-2 at all sensitive receptors to meet the requirements of Administrative Condition A1.1.

**Table 3-2: Assessment criteria for Deposited Matter**

Pollutant	Averaging Period	Criteria
Deposited Matter	Annual	2 g/m <sup>2</sup> /month*

\* Maximum Increment. Maximum cumulative impact of 4 g/m<sup>2</sup>/month.

The above criteria are provided as cumulative (incremental plus background) concentration levels. (DA, 2014)

#### 3.3.2 Air Quality Results

The air quality monitoring program is set out in Tarcoola Dust Management Plan (GHD, 2015). Monitoring commenced in June 2016, with July being missed.

Table 3-3 presents the exposure period for each month. The measured deposited dust levels for each month as well as the average is presented at each monitoring location in Table 3-4 and Table 3-5. The criterion is a yearly averaging period, however the rolling average gives an indication on how the site is tracking in regards to dust management and compliance with the 4

g/m<sup>2</sup>/month criterion. The deposited dust criterion is for insoluble solids, however results also include soluble solids, combustible matter and ash for comparative purposes.

**Table 3-3: Exposure periods**

Month	Exposure period
June	1/6/2016 – 30/6/2016
August	1/8/2016 – 1/9/2016
September	1/9/2016 – 28/9/2016
October	28/9/2016 – 26/10/2016
November	26/10/2016 – 25/11/2016
December	25/11/2016 – 23/12/2016



Table 3-4: Table of results from June to December 2016

Parameter	Units	Residence 1						Residence 2						Residence 4						Residence 5					
		Jun	Aug	Sep	Oct	Nov	Dec	Jun	Aug	Sep	Oct	Nov	Dec	Jun	Aug	Sep	Oct	Nov	Dec	Jun	Aug	Sep	Oct	Nov	Dec
Insoluble Solids	g/m²	1.3	8.3	8	12.9	1.2	2.4	1.3	0.3	1.5	3.6	1.4	1.8	0.3	1.3	1.1	9.1	2.6	1.8	0.5	0.5	0.7	56.8	6.8	0.7
Soluble Solids	g/m²	0.6	1.7	7.4	10	1.4	2.7	0.6	0.5	1.1	2.8	1.1	0.9	0.1	0.2	1	10.6	1.3	0.8	0.8	<0.2	1.1	27	2.6	0.8
Combustible Matter	g/m²	0.2	2.1	3.1	3.5	0.6	0.9	0.1	<0.2	0.4	2.4	0.6	<0.2	0.1	<0.2	0.3	3.8	1.2	0.4	0.4	<0.2	0.2	13.6	3	<0.2
Ash	g/m²	1.0	6.2	5	9.3	0.6	1.5	1.1	0.3	1.1	1.2	0.8	1.8	0.1	1.2	0.8	5.3	1.4	1.4	0.1	0.5	0.4	43.2	3.7	0.6
Total Matter	g/m²	1.9	10	15.4	22.9	2.6	5.1	1.9	0.9	2.5	6.4	2.6	2.8	0.4	1.5	2	19.7	3.9	2.6	1.3	0.3	1.7	83.7	9.5	1.5

Table 3-5: Average of Insoluble Solids results from June to December 2016

Parameter	Units	Residence 1	Residence 2	Residence 4	Residence 5
Insoluble Solids	g /m2	5.6	1.6	2.7	11

### **3.3.3 Air Quality Results Interpretation**

The results for Residence 1 and 5 have been influenced by an anomaly result received in October. This has been managed and monitored closely each month.

The results at Residence 1 are elevated compared to the other sites even though it is the furthest away from the current quarry activities. The average measured insoluble solids at Residence 1 over the six months is 5.6 g/m<sup>2</sup>/month.

During the monitoring period, Tarcoola observed that construction materials were stockpiled near Residence 1 for road upgrade works. There is a potential that dust generation from this external source may have contributed to elevated dust results at Residence 1 during the reporting period, although this could not be confirmed by Tarcoola.

The average measured insoluble solids at Residence 2 and 4 over the six-month period were below the maximum total criterion of 4 g/m<sup>2</sup>/month.

Residence 5 average of measured insoluble solids were skewed by an anomaly set of results received in October 2016. These results were excessive and have been reported to EPA and WWCC with further investigation being undertaken by Tarcoola as detailed in Section 3.2 above. The levels are now however coming back within the limit and comparable to the first quarter. The average measured insoluble solids at Residence 5 over the six months is 11 g/m<sup>2</sup>/month, which is above the maximum total criterion of 4 g/m<sup>2</sup>/month. If you excluded the anomaly from October this figure would be drastically decreased to 1.84.

### **3.3.4 Prediction in the EIS**

This EIS assessed the air quality for PM<sub>10</sub>, TSP and dust deposition. The EPL only states to measure dust deposition.

The cumulative impact of predicted incremental impacts and adopted background levels were assessed for all sensitive receivers in the EIS. The EIS predicted that air quality monitoring levels should be below the criteria for PM<sub>10</sub>, TSP and dust deposition at the sensitive receivers (Residence 1, Residence 2, Residence 4 and Residence 5). . At the most exposed sensitive receiver (R1), the maximum predicted PM<sub>10</sub> level in the EIS was 45.6 µg/m<sup>3</sup> which is lower than the criteria of 50 µg/m<sup>3</sup>.

Although it cannot be confirmed that the monitoring is comparable to the EIS predictions, the results are being measured against the EPL criteria.

## 3.4 Noise Monitoring

### 3.4.1 Noise Performance Criteria

The Notice of Determination of Development Application DA13/0307 specifies the following conditions in relation to noise:

#### DA Condition 15A

Condition 15A prior to carrying out any development, the proponent shall engage a suitably qualified acoustic practitioner to measure daytime background L90 levels at each of residences R1, R2, R4 and R5. The background readings shall be taken with no activities occurring at the quarry, including no product deliveries. The daytime  $L_{Aeq, 15 \text{ minute}}$  shall be limited to 5 dB(A) above the measured background or condition L6.1, whichever is the lower.

#### DA Condition L6 Noise limits

- L6.1 - Noise from the premises must not exceed the sound pressure level (noise) limits presented in the Table below. Note the the limits represent the sound pressure level (noise) contribution, at the nominated receiver locations in the table.

**Table 3-6 L6.1 Noise Limits (dB(A))**

Noise Assessment Location	Day ( $L_{Aeq}(15 \text{ minute})$ )
R1	43
R2	42
R3	43
R4	43
R5	43

- L6.2 - For the purpose of Condition 6.1:
  - Day is defined as the period from 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sundays and Public Holidays,
  - Evening is defined as the period from 6 pm to 10 pm,
  - Night is defined as the period from 10 pm to 7 am Monday to Saturday and 10 pm to 8 am Sundays and Public Holidays.
- L6.3 - Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition L6.1 unless otherwise stated.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the DEC may accept alternative means of determining compliance. See chapter 11 of the NSW Industrial Noise Policy.

The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- L6.4 - The noise emission limits identified in condition L6.1 apply under meteorological conditions of:
  - Wind speed up to 3 m/s at 10 metres above ground level; or
  - Temperature inversion conditions of up to 3°C / 100 m and wind speed up to 2 m/s at 10 metres above the ground.
- L6.5 - Noise Management Plan

The proponent must prepare and implement a Noise Management Plan to the satisfaction

of the EPA that covers all quarry extraction, processing and transport operations. The plan must include but need not be limited to:

- Ongoing assessment of feasible and reasonable noise mitigation measures to achieve the noise limits in L6.1 at all times
  - Where the limits in L6.1 exceed the Project Specific Noise Levels (PSNLs) (as identified in the Noise and Vibration Assessment by GHD), reducing noise emissions over time to satisfy the PSNLs
  - A system that allows for periodic assessment of Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) to minimise noise impacts over the life of the proposal
  - Measures to monitor noise performance and respond to complaints
  - Measures for community consultation including site contact details
  - Noise monitoring, and reporting procedures.
- L6.6 - Road Traffic Noise  
The proponent must prepare and implement a Traffic Noise Management Plan (TNMP), prior to commencement of operation activities, to ensure that feasible and reasonable noise management strategies for vehicle movements associated with the quarry are identified and applied, to include but not necessarily limited to the following:
  - Driver training to ensure that noisy practices such as the use of compression engine brakes are not unnecessarily used near sensitive receivers
  - Best noise practice in the selection and maintenance of vehicle fleets
  - Movement scheduling where practicable to reduce impacts during sensitive times of the day (e.g. school bus times)
  - Communication and management strategies for vehicles not owned and operated by the licensee to ensure the provisions of the TNMP are implemented
  - A system of audited management practices that identifies non-conformances, initiates and monitor corrective and preventative action (including disciplinary action for breaches of noise minimisation procedures) and accesses the implementation and improvement of the TNMP
  - Specific procedures for drivers for minimising road traffic noise impacts;
  - Clauses in conditions of employment, or in contracts, of drivers that require adherence to the noise minimisation procedures and facilitate effective implementation of the disciplinary actions for breaches of the procedures.
- L6.7 - Noise Compliance Monitoring  
A noise compliance assessment shall be undertaken within three months of commencement of operations at the premises. The assessment shall be prepared by a suitably qualified and experience acoustical practitioner and shall assess compliance with the limits presented in L6.1.
- L6.8 - Hours of operation - All construction work at the premises must only be conducted between 10 am to 3 pm Monday to Friday.
- L6.9 - Activities at the premises, other than construction work, may only be carried on between 7 am to 6 pm Monday to Friday and 8 am to 6 pm Saturday excluding Sundays and public holidays.
- L6.10 - This condition does not apply to the delivery of material outside the hours of operation permitted by condition L6.8 or L6.9, if that delivery is required by police or other authorities for safety reasons; and/or the operation or personnel or equipment are



endangered. In such circumstances, prior notification is provided to the EPA and affected residents as soon as possible, or within a reasonable period in the case of emergency.

- L6.11 - The hours of operation specified in conditions L6.8 and L6.9 may be varied with written consent if the EPA is satisfied that the amenity of the residents in the locality will not be adversely affected.

#### ***DA Condition M1 - Monitoring records***

- M1.1 The results of any monitoring required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with the load calculation protocol must be recorded and retained as set out in conditions M1.2 and M1.3.
- M1.2 All records required to be kept by the licence must be:
  - In a legible form, or in a form that can readily be reduced to a legible form;
  - Kept for at least 4 years after the monitoring or event to which they relate took place; and
  - Produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected:
  - The date(s) on which the sample was taken
  - The time(s) at which the sample were collected
  - The point at which the sample was taken
  - The name of the person who collected the sample.

#### ***DA Condition M2 - Requirements to monitor concentration of pollutants discharged***

- M2.2 - 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.

#### ***DA Condition M4 - Testing methods – concentration limits***

- M4.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with a relevant local calculation protocol must be done in accordance with:
  - Any methodology which is required by or under the POEO Act 1997 to be used for the testing of the concentration of the pollutant; or
  - If no such requirement is imposed by or under the POEO Act 1997, any methodology which the general terms of approval or a condition of the licence or the protocol (as the case may be) requires to be used for that testing; or
  - If no such requirement is imposed by or under the POEO Act 1997, or by the general terms of approval or a condition of the licence or the protocol (as the case may be), any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

### **3.5 EPL Noise Conditions**

The following noise requirements are detailed in the EPL:

### ***EPL Condition L3 Noise limits***

- L3.1 - Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.

Point 1,3,4,5

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	LAeq (15 minute)	Continuous	43

Point 2

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	LAeq (15 minute)	Continuous	42

Note: For the purpose of the condition above;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
  - Evening is defined as the period 6pm to 10pm.
  - Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.
- L3.2 - The noise limits set out in L3.1 apply under meteorological conditions of:
    - Wind speeds up to 3 metres/second at 10 metres above ground level; or
    - Temperature inversion conditions of up to 3°C/100m and wind speeds up to 2 metres/second at 10 metres above the ground.
  - L3.3 - Determining compliance

To determine compliance:

- with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
  - approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
  - within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
- with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.
- with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
  - at the most affected point at a location where there is no dwelling at the location; or
  - at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

#### **EPL Condition L4 – Hours of operation**

- L4.1 - Activities covered by this licence must only be carried out between the hours of 7:00am to 6:00pm Monday to Friday, and 8:00am to 6:00pm Saturday, and at no time on Sundays and Public Holidays

#### **EPL Condition M6 - Noise Monitoring**

- M6.1 - To assess compliance with the noise limits specified with this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.

Point 1, 2, 4, 5

Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period
Day	Special frequency 1	24 hours	1 operation day

Note: Special frequency 1 referred to in the noise monitoring table above is defined as a frequency of once every two years.

- M6.2 - A noise compliance assessment shall be undertaken within three months of commencement of operations at the premises. The assessment shall be prepared by a suitably qualified and experienced acoustical practitioner and shall assess compliance with noise limits presented in L3.1.

#### **3.5.1 Noise Monitoring Results**

Compliance noise monitoring was undertaken at four locations to satisfy EPL Condition M6.1 and 6.2. Compliance monitoring was conducted to ensure noise level contributions from operation of the quarry did not exceed the limits specified in EPL Condition L3.1 (Conditions L3.1 in the EPL and L6.1 in the DA state the same limits).

Compliance noise monitoring was undertaken on 14 April 2016 using a SVAN 977 sound level meter during Tarcoola Quarries operational hours of 7 am – 4 pm (GHDd, 2016). The noise monitoring equipment was programmed to accumulate environmental noise data continuously over sampling periods of 15 minutes. Noise levels were assessed at the most affected point on or within the residential property boundary within 30 metres of the residence in accordance with the *Industrial Noise Policy* (INP).

A calibration check on the noise monitoring equipment was performed prior to deployment using a sound level calibrator with a sound pressure level of 94 dBA at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The sound level meter was found to be within the acceptable tolerance of  $\pm 0.5$  dBA.

Weather conditions were suitable for noise monitoring as wind speeds were under the prescribed limit of 3 metres per second as set out in EPL Condition L3.2.

A summary of the measured background  $L_{A90(\text{day})}$  and ambient noise levels  $L_{Aeq(\text{day})}$  at each receiver location is provided in Table 3-7. Noise contribution limits during operation of the quarry for each receiver was provided in DA Condition L6.1.

The measured day-time background and ambient levels do not represent the noise levels generated from the quarry as the main sources of noise throughout the day was due to birds and road traffic. A quarry contribution level was calculated for a period of 15 minutes, as per EPL condition L3.1, to determine the noise levels experienced due to the quarry. This level was

calculated by finding a period where the noise from the quarry was audible and extrapolating this level to find the equivalent noise level over 15 minutes,  $L_{Aeq}(15 \text{ mins})$ . The results indicate that there were no exceedances of the noise limits detailed in the Development Consent or EPL where the quarry noise contribution is taken into account.

A summary of the noise sources at each residential receiver is provided below.

#### **Summary of levels at R1**

The dominant noise sources at R1 were road traffic travelling on the Sturt Highway, located approximately 390 metres to the south, and wildlife noise. Reversing beepers, truck horns and load dumping from the quarry were audible at this site.

The noise levels from the quarry was found to be below the noise level contribution limit.

#### **Summary of levels at R2**

The dominant noise source at R2 was wildlife noise, in particular birds and insects. Operational noise audible from the quarry included reversing beepers, truck horns and load dumping.

The noise level from the quarry was found to be below the noise level contribution limit.

#### **Summary of levels at R4**

The dominant noise source at R4 was road traffic travelling on Sturt Highway located approximately 50 metres to the south. Additional sources of noise that contributed to the background noise levels were wildlife noise and occasional dogs barking. Operational noise audible from the quarry included reversing beepers and load dumping.

Noise level contributions from the quarry at this site were considered negligible due to the residences proximity to Sturt Highway.

#### **Summary of levels at R5**

The dominant noise source at R5 was wildlife noise. A distant hum from the Sturt Highway, located 415 metres to the south, contributed to the background noise levels at this site. Operational noise audible from the quarry included reversing beepers and truck horns.

The noise level from the quarry was found to be below the noise level contribution limit.

**Table 3-7 Summary of noise monitoring results (dBA)**

Receiver ID	Address	Noise limit (day)	Background level $LA_{90}(\text{day})$	Ambient level $LA_{eq}(\text{day})$	Quarry contribution $LA_{eq}(15 \text{ mins})$
R1	45 Koorungal Road	43	34.9	46.1	31.9
R2	80 Hinkler Street	42	34.5	51.7	34.5
R4	Lot 213 – 215 Hammond Avenue	43	43.5	51.6	n/a
R5	Lot 273 Hammond Avenue	43	37.6	53.7	33.6

### **3.5.2 Noise Monitoring Results Interpretation**

An annual noise audit of equipment and compliance noise monitoring at four locations was undertaken by GHD for Tarcoola in June 2016.

Plant and equipment noise levels measured for the noise audit were found to be below the equipment noise levels specified within the EIS and AS 2436-2010.



Noise level contributions from the quarry at the four identified sensitive location receivers were found to comply with the limits specified in the Development Consent. The dominant noise sources at each residence were a combination of road traffic and wildlife noise.

### **3.5.3 Prediction in the EIS**

Analysis of the noise model results indicated that the dominant noise source on site would be from the crushing/screening plant, front end loader, excavator and haul trucks. The model was assessed against the worst-case scenario of noise location and environmental factors such as temperature and wind. The EIS predicted that noise levels would not exceed limits at all sensitive receivers (R1, R2, R4 and R5) where recommended mitigation measures were implemented. However, during the Stage 2 development the EIS predicted that noise levels at sensitive receiver (R2) would exceed the criteria without mitigation, that is, construction of a five-metre high noise mound.

The Noise monitoring results are consistent with these predictions.

## **3.6 Surface Water Monitoring**

A surface water monitoring program has not yet been agreed between Tarcoola and WWCC. Surface water runoff is managed on site through erosion and sediment controls and a sediment basin and no process water is discharged to the river. Surface water monitoring is not possible at the designated locations near the Murrumbidgee River when it is in flood.

## **3.7 Erosion and Sediment Management**

Sediment trapped behind any sediment fences must be regularly cleaned out and stockpiled in an appropriate area. Special consideration and controls will be made to areas where there is a potential for sediment to migrate off the site for example at the base of any notable erosion.

Permanent stockpiles are aligned to flood flow and temporarily stabilised with vegetation to prevent erosion.

## **3.8 Aboriginal Heritage Conservation**

The quarry is located on the floodplain adjacent to the Murrumbidgee River. Due to the proximity to the River and potential flooding events it is likely that the area is not suitable for Aboriginal occupation, but rather for resource gathering (OzArk, 2016)

In November 2012 (outside of the reporting period) two representatives from the Wagga Wagga Local Aboriginal Land Council (WWLALC) accompanied by an archaeologist were invited to the quarry for an inspection to determine Aboriginal cultural heritage consultation requirements and the need (or otherwise) for a detailed survey of the quarry site. A single artefact was found within the quarry footprint triggering the need for consultation with the Aboriginal community as part of the Aboriginal Heritage Impact Permit (AHIP) application process. This was undertaken outside of the reporting period.

After a full site survey the site assessment revealed the single artefact (a small quartz tertiary flake with a distal break) was an isolated artefact within the Stage 1 area at GDA Zone 55H at 0536748 E and 6114143 N.

Based on the location of the artefact within the Stage 1 zone of impact, Tarcoola applied to the NSW Office of Environment and Heritage for an AHIP to collect and remove the artefact for safe-keeping. The AHIP was granted on the 23 November 2015 for the salvage of the artefact and reburial outside the area of impact within the riparian woodland. The salvage was undertaken during the reporting period on 7 September 2016.

From the time of discovery to the salvage works on the 7 September 2016 the area was designated as a no-go area, however no fence or signage was put in place. A copy of the AHIP is provided with this AEMR as Attachment A.

### 3.9 Water Extraction

A water meter was fitted in December 2016 to measure the amount of groundwater extracted during operations (Figure 3-1). The water amounts will now be recorded for reporting during the next reporting period.



**Figure 3-1: Water Meter**

### 3.10 Lighting

Four 150 watt LED flood lights are operational within the quarry. Two are facing to the west and two are facing south. These lights are mounted approximately 5 metres off the ground and at a 45-55-degree angle to the ground.

The distance and direction of any sensitive receivers is presented below:

- Neighbour 5 is 630 m southeast
- Neighbour 4 is 790 m south
- Neighbour 2 is 1.1 km west.

The above information was modelled in a lighting simulation programme, AGI32. In the model, no vegetation was included between the quarry site and the sensitive receivers in question. Also, it was assumed that the elevation difference between the site and the houses was negligible.

Based on the information provided, and the technical data gained from the luminaire manufacturer, the lighting simulation indicated that there appears to be no illumination from the flood lights within the quarry that fall onto the vertical surfaces of the houses modelled.

Consequently, based on the outcome of the lighting model, the proposed lighting installation meets the compliance lighting performance requirements of AS 4282.

## **4. Community Relations**

### **4.1 Environmental Complaints**

Tarcoola established a 24-hour telephone complaints line which is advertised on their website. Any complaints received are documented on a register where the following information is noted:

- Complainant name and contract details
- Nature of the complaint
- Date of the complaint
- Specifics of the complaint
- Outcome of the investigation of the complaint
- Actions implement to resolve the complaint
- Details of reporting if required.

No complaints were received during the reporting period.

### **4.2 Community Consultation**

Tarcoola has actively engaged with the local community since the commencement of the 2013 Environmental Impact Statement for the expansion of the quarry. A consultation plan was developed and implemented between November 2012 and May 2013, which focused on capturing comments and concerns specifically related to the EIS.

## **5. Rehabilitation Activities**

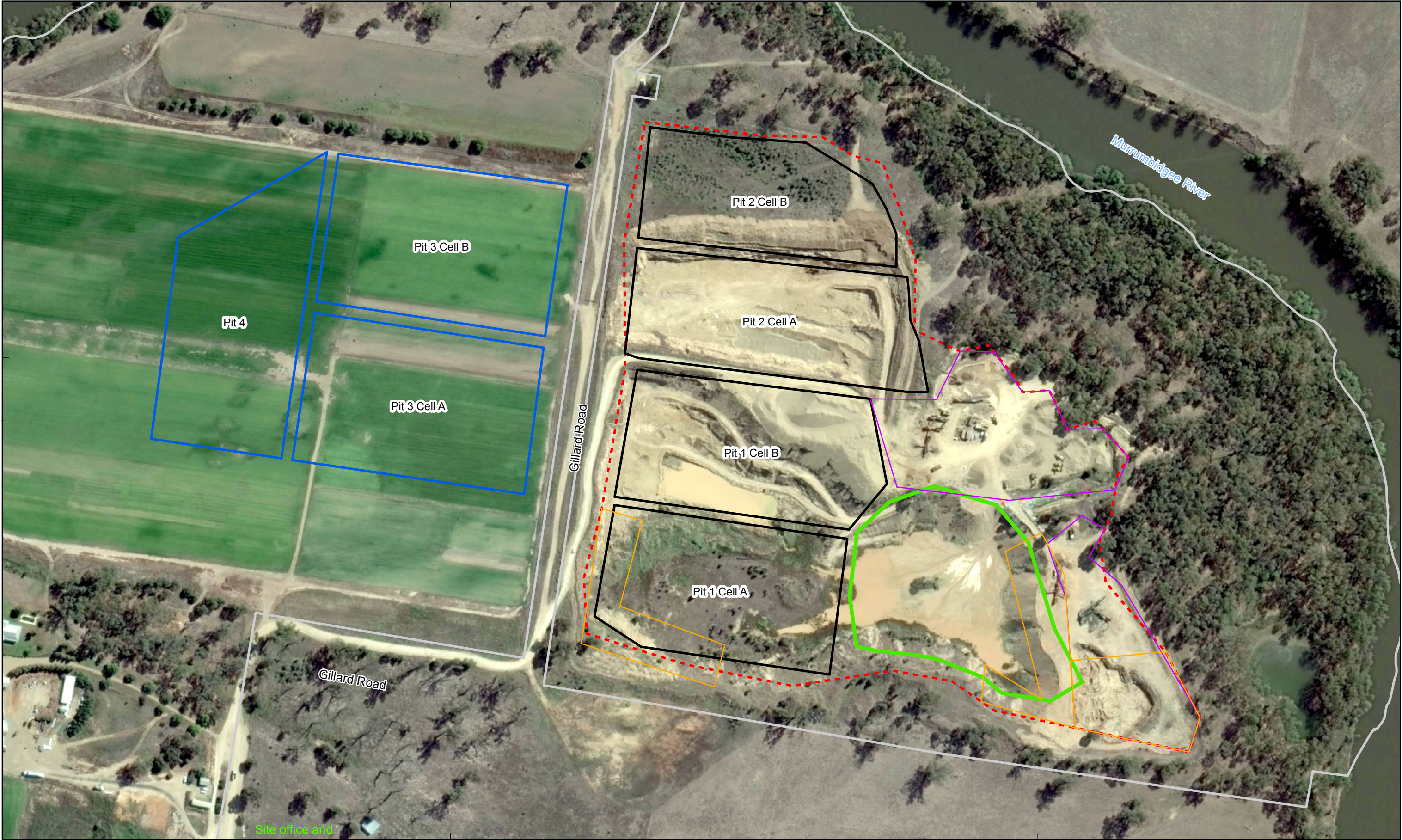
A progressive rehabilitation plan has been developed for the rehabilitation requirements for the quarry. Final earthworks have been undertaken during the reporting period on the west and southern side of Pit 1 cell A and in the south-eastern corner of the sediment basin (Figure 5-1). No other rehabilitation activities were undertaken during the reporting period.

Monitoring and reporting is planned once planting activities commence. Monitoring is planned quarterly for a two-year period. The rehabilitation program includes weed monitoring and control.

Targeted weed spraying was undertaken in 2016.

The areas that have also been part of the beginning of rehabilitation are also part of the landscape plan.





Paper size A3

0 25 50 100 150

Metres

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

N

LEGEND

- Sediment Basin
- Pit Layout Stage 1
- Pit Layout Stage 2
- Stage 1 boundary
- Property boundary
- Rehab 2016
- Processing disturbance

CLIENTS | PEOPLE | PERFORMANCE

Tarcoola Quarries  
Rehabilitation

Job Number 23-15786  
Revision 0  
Date 07 Feb 2017

Rehabilitation 2016

Figure 3



## **6. Activities Proposed for 2017**

Progressive rehabilitation will continue of Pit 1 cell A, B and the sediment basin.

Extraction will be undertaken in Pit 2 A and B during 2017.

## 7. References

Development Application (2014), DA 13/0307, City of Wagga Wagga

Environmental Protection Licence (2015), EPL 20543, EPA

GHDa (2013) Extension of Tarcoola Quarry EIS Volume 1 and 2

GHDb (2015), Dust Management Plan

GHDC (2016), Noise Management Plan

GHDD (2016), Noise Compliance monitoring and site audit

GHDe (2016), Landscape plan

GHDF, (2016), Rehabilitation plan

OzArk (2016), Aboriginal Heritage Impact Permit #C0001377 Post Activity Report

## **Appendices**



# **Appendix A** – OzArk Aboriginal Heritage Impact Permit Post Activity Report

c

Belinda Fourie  
GHD Wagga Wagga  
P: 6923 7423  
Belinda.fourie@ghd.com

14 November 2016

**Re: Aboriginal Heritage Impact Permit #C0001377 Post Activity Report.**

## **1 BACKGROUND**

Tarcoola Turf and Quarries (TTQ) are proposing an extension of their quarry operations at Lot 4, DP 740222, East Wagga Wagga, NSW. The Stage 1 extension area was previously utilised as a turf farm, which is the current use of the Stage 2 area. The Murrumbidgee River forms part of the northern boundary of the Subject Area and flows west adjacent to the township of Wagga Wagga. The Subject Area is on an alluvial terrace with no major undulations.

The field survey was undertaken by Nick Harrop, OzArk Senior Archaeologist, and two Aboriginal community representatives from the Wagga Wagga Local Aboriginal Land Council (Wagga Wagga LALC) on Thursday 22 November 2012. One isolated artefact was identified within the Stage 1 extension area. TQ-IF1 (AHIMS ID #56-1-0124) was located at GDA Zone 55H at 0536748E and 6114143N. The artefact was a small quartz tertiary flake with a distal break within a disturbed context. The flake was amongst a collection of river pebbles, generally small in size, which were interpreted as being deposited during a flood event. Based on the location of #56-1-0124 within the Stage 1 zone of impact, TTQ applied to the Office of Environment and Heritage (OEH) for an Aboriginal Heritage Impact Permit (AHIP) to collect and remove the artefact to safe-keeping.

AHIP #C0001377 was granted to TTQ on 23 November 2015 for the salvage of #56-1-0124 and reburial of the isolated artefact outside the area of impact within a riparian woodland bounding the activity area.

## **2 ABORIGINAL COMMUNITY HERITAGE CONSULTATION REQUIREMENTS (ACHCRs)**

As per Condition 13 of AHIP #C0001377, a copy of the AHIP was sent to the two Registered Aboriginal Parties (RAPs), Wagga Wagga LALC and Wiradjuri Culture & Heritage Aboriginal Corporation on 17 August 2016 by OzArk.

A copy of this AHIP Post Activity Report and a summary of the report in plain English will be sent to the RAPs as per Condition 21 and 22 of AHIP #C0001377.

## **3 SALVAGE AUTHORISED BY AHIP #C0001377**

As per Condition 7 of AHIP #C0001377 and also described in Schedule B1, harm authorised to #56-1-0124 included the movement of Aboriginal objects only.

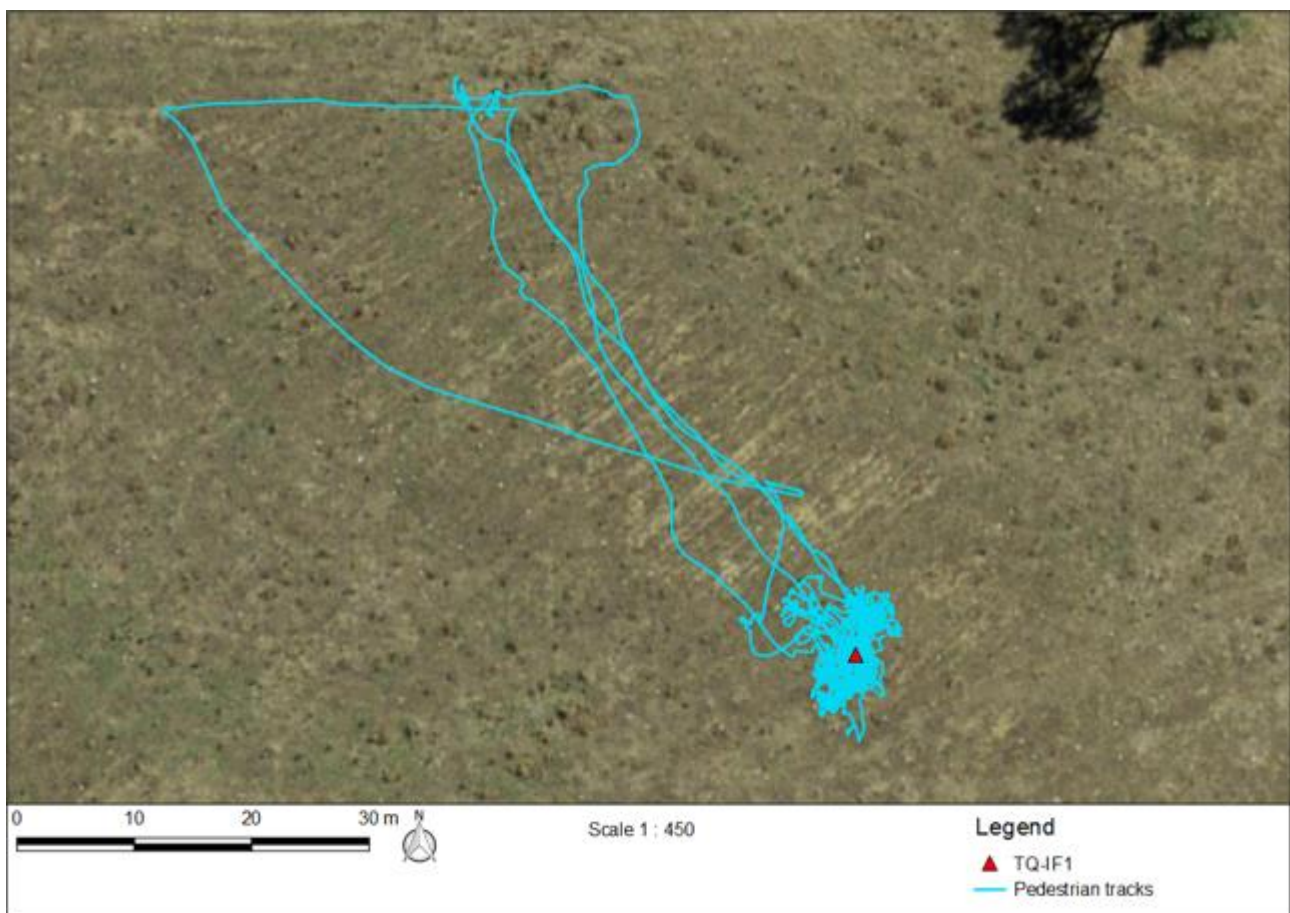
Given that the registered site comprised a single artefact, an invitation of community collection of #56-1-0124 was not provided to the RAPs.

Management and mitigation measures implemented to protect TQ-IF1 (AHIMS Site ID #56-1-0124) from the time of assessment to salvage works involved a no-go zone, however, no fencing or signage was erected around the recorded location.

The location of TQ-IF1 (AHIMS Site ID #56-1-0124), identified from the coordinates provided in OzArk 2012, was thoroughly investigated by pedestrian means on 7 September 2016, OzArk Senior Archaeologist Chris Lovell (**Figure 3-1**). GSV at the time of the salvage was noted as being very low (10%) in the vicinity of the site. Due to the low GSV at the site, Mr Lovell used a rake to decrease the amount of vegetation present within 5m of the GPS coordinates provided. GSV was subsequently increased to 80% following this, however, the artefact was not re-located. As such, artefact analysis was unable to take place.

No salvage excavations were authorised by this AHIP as natural erosion or turf-farming were determined likely to have removed pre-existing evidence of any possible Aboriginal occupation of the area along the floodplain landform.

**Figure 3-1: View of pedestrian tracks at and surrounding the location of TQ-IF1.**



#### **4 MANAGEMENT AND CONCLUSION**

Reasonable effort has been made locate #56-1-0124. A combination of low GSV and the amount of time which has passed since its recording in November 2012 are attributed to the isolated artefact not being able to be

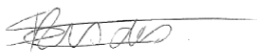
located. As such this site must be considered to be 'destroyed'. As the site was not located long term management for the Aboriginal object is not required.

An Aboriginal Site Impact Recording Form (ASIRf) for #56-1-0124 was submitted to the Aboriginal Heritage Information Management System (AHIMS) register on Monday 26 September 2016.

Schedule A refers to Aboriginal objects which must not be harmed, specifically human remains. As the proposed work is yet to be completed, management of those Aboriginal objects described in Schedule A is ongoing. Should human remains be encountered, the Unanticipated Finds Protocol in OzArk (2012) must be followed.

Should further advice or information be required, please do not hesitate to contact the OzArk office (02) 6882 0118.

Regards



**Stephanie Rusden**

Archaeologist



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OzArk and staff respectfully acknowledge the Traditional Owners and Custodians of the country on which we work.

## 5 REFERENCES

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OzArk 2012                      OzArk EHM 2012, *Archaeological Cultural Heritage Assessment, Tarcoola Quarry Extension Project*, report to GHD.



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