

PF FORMATION



HITCHCOCK ROAD SAND EXTRACTION AND REHABILITATION PROJECT, MAROOTA

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT
2016 - 2017



PF Formation

HITCHCOCK ROAD MAROOTA

Sand Extraction and Rehabilitation Project

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016-2017

Prepared by:



ABN 13 927 340 723
72 Mitchells Road
Sackville North
NSW 2756

Document Reference	Version	Date	Prepared by	Reviewed by	Approved
AEMR – PF Formation	1	11/09/2017	South East Environmental	Josh Graham	
AEMR – PF Formation	2	21/11/2017	South East Environmental	Josh Graham	Melissa Mass

PF Formation

1 Patricia Fay Drive
Maroota, NSW 2756
Telephone: (02) 4566 8257
Facsimile: (02) 4566 8349

Name of operation	Hitchcock Road Sand Project
Name of operator	PF Formation
Development consent/project approval #	06_0104
Name of holder of development consent/project approval	PF Formation
Mining lease #	N/A
Name of holder of mining lease	N/A
Water licence #	Approval #10WA114809 WAL #24156 Reference # 10AL114808
Name of holder of water licence	PF Graham (No 2) Pty Ltd
MOP/RMP start date	3 rd February 2009
MOP/RMP end date	30 th November 2028
Annual review start date	1 st July 2016
Annual review end date	30 th June 2017
<p>I, Melissa Mass, certify that this audit report is a true and accurate record of the compliance status of Hitchcock Road Sand Project for the period of July 2016 until June 2017 and that I am authorised to make this statement on behalf of PF Formation.</p> <p><i>Note.</i></p> <p><i>a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p><i>b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Melissa Mass
Title of authorised reporting officer	Senior Ecologist
Signature of authorised reporting officer	<i>M. Mass</i>
Date	22 nd November 2017

Executive Summary

South East Environmental has been engaged by PF Formation to prepare this Annual Environmental Management Report as per the Project Approval Conditions. This document reviews the project criteria and reports on the project performance and compliance from July 2016 until June 2017.

The Hitchcock Road Sand Extraction and Rehabilitation Project was approved in 2009 with an expected and approved life span of 20 years. The 100 hectare site has a yearly extraction approval of 400,000 tonnes per annum. Total sales from the site for the reporting period was 224,031 tonnes, far less than the approved extraction tonnage.

Sand extracted from the Hitchcock Road Project is washed and sold from the Patricia Fay Drive Sand Processing Plant directly to wholesalers and the public.

Noise

Noise compliance testing and reporting was conducted by Koikas Acoustics Pty Ltd during the 2016-2017 period. The report concluded that the project complied with the nominated noise levels set by the EPA for the project approval. Natural noises and other un-natural noises, such as traffic, were the main contributing factors to noise at the monitoring sites.

No noise complaints were received in 2016-2017.

Air

Air quality testing was undertaken by Boral Materials Testing and Environmental Services throughout 2016-2017. Results showed a slight increase in recorded solids at 2 of the 3 monitoring sites although none of the sites exceed the nuisance criterion annual monthly average of 4 g/m²/month.

No dust complaints were received in 2016-2017.

Water

Ground water levels are monitored continuously throughout the year at 4 separate licenced bore locations using a Solinst datalogger. Pumping did occur from 2 licenced bores on lot 198 throughout the year however the annual allocation of 60ML was not exceeded. Water pumping also took place from licences spring POR 167 however the annual allocation of 50ML from this spring was not exceeded.

The ground water analysis met all requirements necessary for the year 2016-2017 and showed no abnormalities.

Rehabilitation

Rehabilitation of the site is in line with the targets previously set for the long term success of the project, although targeted weeding is recommended for continued success.

Social Impacts

The Community Consultative Council met twice during the reporting period of 2016-2017 with no matters arising concerning social impacts on the community at large.

Overall

The Hitchcock Road Sand Extraction Project is currently working within the existing approvals based on the project conditions. Although there are some compliance issues during the year, these have all been addressed to bring the operation back into compliance quickly. Monitoring during the next 12 month period will determine if further action is required. Targeted weed management within the rehabilitation areas has been recommended for the next 12 month period to improve the success of the project.

PF Formation aim to maintain or enhance the sand extraction projects environmental performance at Hitchcock Road in the following 12 month period in order to uphold their exceptional record of compliance.

Introduction

PF Formation operate a sand quarry at Hitchcock Road Maroota within The Hills District of the Sydney Basin in New South Wales. The Hitchcock Road Sand Extraction and Rehabilitation Project has approval to extract 400,000 tonnes of sand per annum over a period of 20 years.

Following the lodgement of a Development Application (DA) and associated Environmental Assessment (EA) under Part 3A of the *Environmental Planning and Assessment Act 1979*, the present development was approved by the Minister for Planning on 3 February 2009 (**Attachment 1**). The conditions attached to the approval required, among other things, the preparation of five management plans/monitoring programs:

- Environmental Strategy
- Noise Management Plan
- Air Quality Monitoring Program
- Water Management Plan
- Landscape Management Plan

The first revision of these Plans occurred in 2011 and the Department of Planning and Environment (DPE) approved the revised Plans on 15 November 2011. The Plans have since been updated with the most recent approval given on the 21st of July 2016.

Each of these documents sets out the various monitoring programs required to comply with the requirements of the approval conditions. The monitoring results are summarised in an annual report known as the Annual Environmental Management Report (AEMR). This is submitted 12 months from the date of approval and every year thereafter to the Director-General, relevant agencies and the Community Consultative Committee (CCC).

This AEMR will:

- identify the standards and performance measures that apply to the project
- describe the works that will be carried out in the next 12 months
- include a summary of the complaints received during the past year and compare this to complaints received in previous years
- include a summary of the monitoring results for the project during the past year from July 1 to 30 June
- include an analysis of these results against the relevant
 - impact assessment criteria/limits
 - monitoring results from previous years
 - predictions in the EA
- identify any trends in the monitoring results over the life of the project

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

- identify any non-compliance during the previous year; and
- describe what actions were, or are being, taken to ensure compliance.

The Approval requires the project to have an Independent Environmental Audit within 12 months of the date of approval and every three years thereafter. The audit will:

- be conducted by a suitably qualified, experienced and independent person(s) whose appointment has been approved by the Director-General;
- include consultation with the relevant agencies;
- assess the environmental performance of the project and its effects on the surrounding environment;
- assess whether the project is complying with the relevant standards, performance measures and statutory requirements; and
- review the adequacy of any strategy/program required under this approval and, if necessary, recommend measures or actions to improve the environmental performance of the project and/or any strategy/plan/program required under this approval.

Further information on the Independent Environmental Audit can be found in Chapter 10 of this Annual Environmental Management Report.

The location of the Hitchcock Road Sand Extraction Project is shown in Figure 1 with Figure 2 demonstrating the lots entailed in the project.

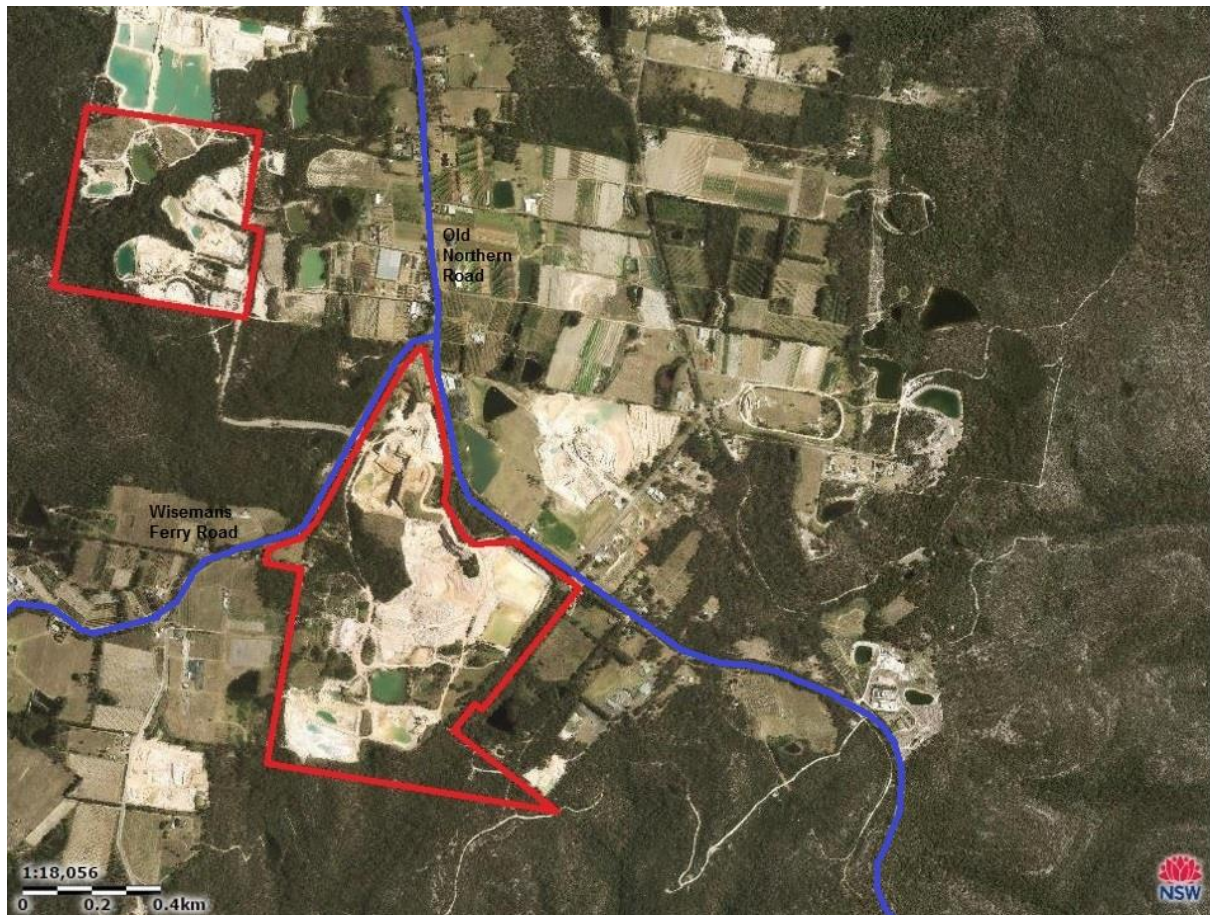


Figure 1. Hitchcock Road Sand Extraction Project location

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

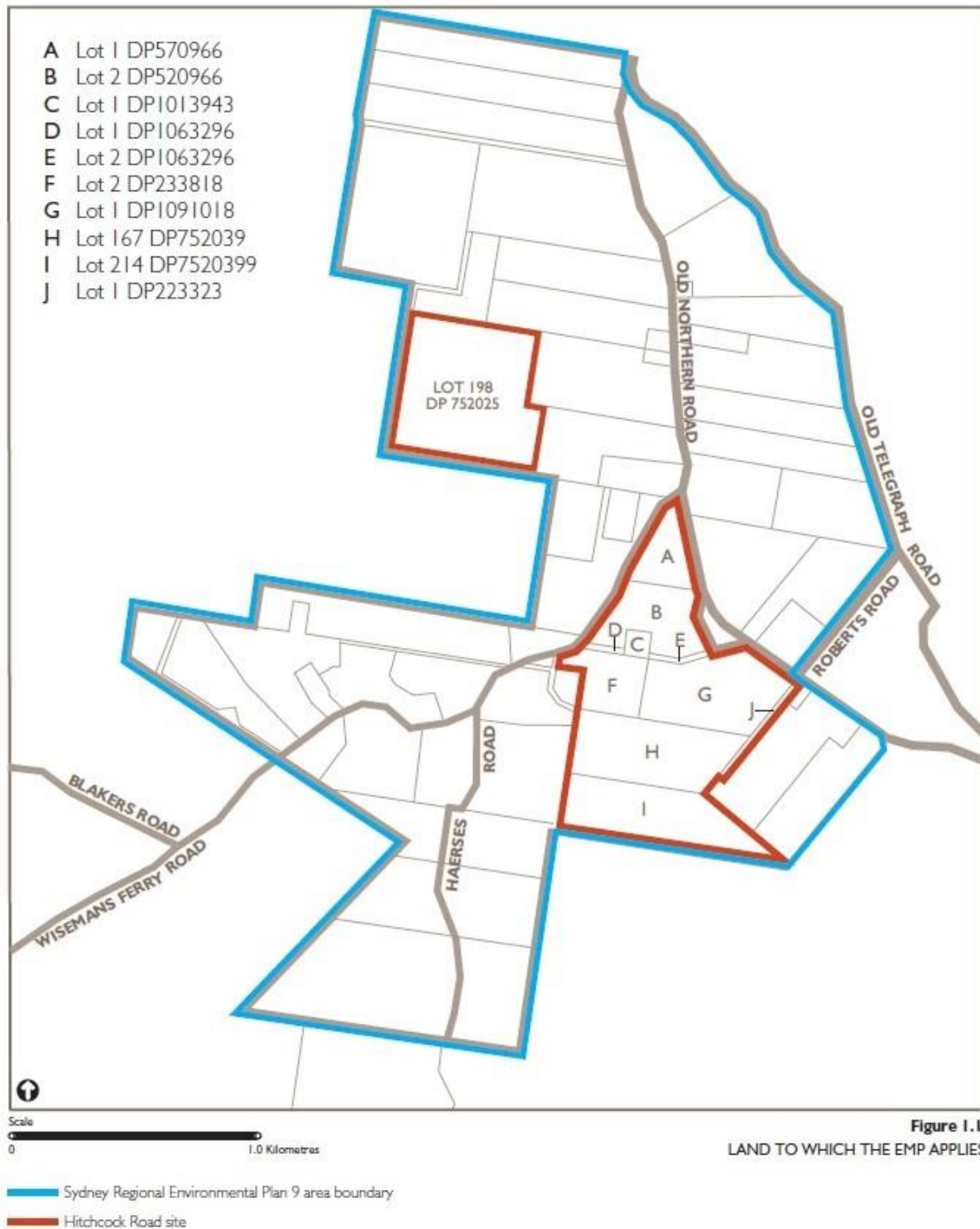


Figure 2. Lots within the Hitchcock Road Sand Extraction Project

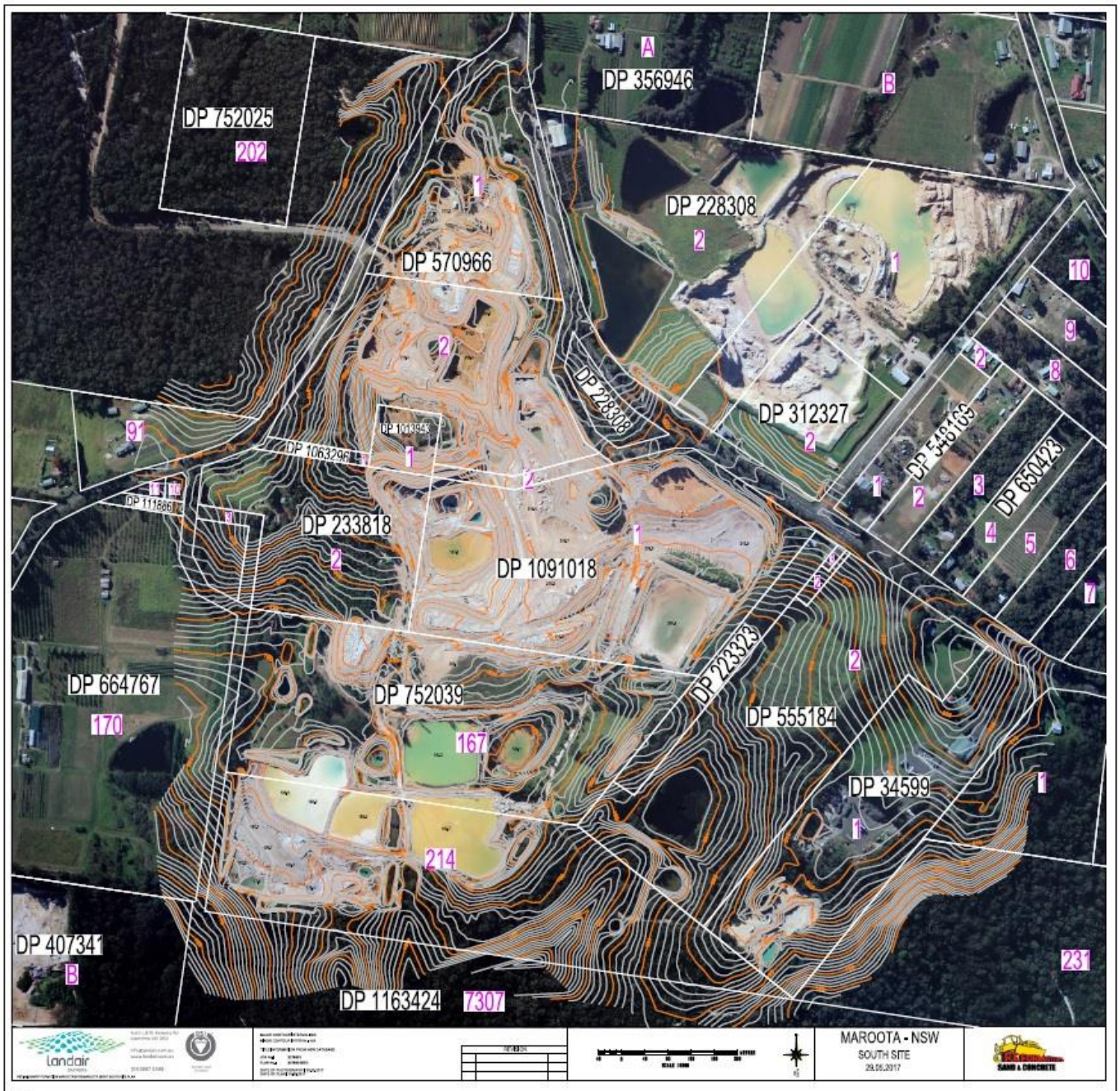
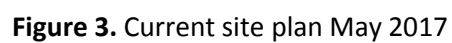


Figure 3. Contour map of lots within the Hitchcock Road Sand Extraction Project

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA



ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Statement of compliance

Compliance of the project is paramount to the continuation of operations. Development consent and the environmental protection license has provided enforceable compliance outcomes which are regularly checked via in house monthly assessments, 3 yearly independent audits and random Government compliance audits.

During the previous 12 month period an independent environmental audit was undertaken by Environmental Planning Pty Ltd in April 2017. This audit found the compliance of the operation to be satisfactory with some non-compliance issues assessed as low. All recommendations following the audit have been addressed or are currently being addressed.

Furthermore the Department of Planning and Environment has undertaken an investigation to the extraction depths in the Hitchcock Road quarry. They found that PF Formation had failed to comply with Schedule 3, condition 3, of the development consent by exceeding their maximum extraction depth. The consent states that extraction shall not be undertaken within 2 metres of the established wet weather groundwater level. PF Formation was extracting sandstone underlying the tertiary sand and believed the regional water table was much deeper in that area and planned to install a monitoring well in the pit then update the Maximum Depth of Extraction Map accordingly. In hindsight an application to the Department of Planning and Environment should have been submitted, notifying the Department of the intention to extract deeper in that area. PF Formation were given a penalty notice and an official caution for the offence and agreed to a Voluntary Undertaking to backfill the areas and install RL Markers in all extraction pits.

Table 1. Statement of compliance

Were all conditions of the relevant approvals complied with?	
Development consent 06_0104	NO
Mining Lease	YES
Environmental Protection Licence 3407	YES

Table 2. Non-compliance issues in the proceeding 12 month period

Relevant approval	Condition #	Condition description	Compliance status	Comment	Where addressed in Annual Review
DC 06_0104	Schedule 2 Condition 4	Reporting	Non-compliant	Update AEMR based on the October 2015 NSW	Entire document revised

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

				Government publication Annual Review Guideline	
DC 06_0104	Schedule 3 Condition 3	Maximum extraction depth map	Non-compliant	Extraction depth exceeded without approval	
DC 06-0104	Schedule 3 Condition 12	Air quality	Non-compliant	Air monitoring station moved to comply with monitoring standards	
DC 06_0104	Schedule 3 Condition 20	Water management and monitoring	Non-compliant	Additional monitoring bore is required within the main pit	
DC 06_0104	Schedule 3 Condition 23	Landscape Management	Non-compliant	Long term security for the offset areas not agreed	
DC 06-0104	Schedule 3 Condition 36	Dangerous goods	Non-compliant	Update hazardous substance and safety data sheet registers	
EPL 3407	Condition 4.1	Operating conditions	Non-compliant	Tracking dirt and mud onto public road	
ML					

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Approvals

Current approvals held by the operator which are relevant to the operation of the Hitchcock Rd Sand Project include the following:

- Project consent issued by the Minister for Planning under section 75J of the Environmental Planning and Assessment Act 1979,
- Environmental Protection Licence issued by the Environmental Protection Authority

Operation summary

Mining Operation

The Hitchcock Road Sand Extraction and Rehabilitation Project was approved in 2009 with an expected and approved life span of 20 years. The 100 hectare site has a yearly extraction approval of 400,000 tonnes per annum. Total sales from the site for the reporting period was 224,031 tonnes, far less than the approved extraction tonnage.

Sand extracted from the Hitchcock Road Project is washed and sold from the Patricia Fay Drive Sand Processing Plant (Lot 198) directly to wholesalers and the public.

Table 3. Production summary

Material	Approved limit (DPE)	Previous reporting period	This reporting period	Next reporting period (forecast)
Waste rock/overburden	N/A	N/A	N/A	N/A
Coarse reject	N/A	N/A	N/A	N/A
Fine reject (tailings)	N/A	N/A	N/A	N/A
Saleable product	400,000 tonne	275,924 tonne	224,031 tonne	250,000 tonne

Other Operations

The Hitchcock Road Project has approval to operate between 7am and 6pm Monday to Saturday. Product transportation into and out of the site can begin at 6am Monday to Saturday although truck movements are limited to 10 per day between 6am and 7am. For the combined operations based at

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Maroota, PF Formation have approval for 200 truck movements per day. The Hitchcock Road Project averaged 26.1 truck movements per day for the 12 month reporting period of 2016-2017.

Next Reporting Period

No significant changes are forecast to take place within the next reporting period. Operations will remain as they are within the approval guidelines.

Actions required from previous Annual Review

A request to develop a new Groundwater Management Plan from the Department of Primary Industries Water was made following last year's Annual Review.

Table 4. Actions from the previous Annual Review

Actin required from previous Annual Review	Requested by	Action taken by the Operator	Where discussed in Annual Review
Update Ground water Management Plan	Department of Primary Industries Water	Request contractor update or develop new Groundwater Management Plan	Water Management Pg. 15

Environmental performance

The Environmental Operational Procedures detail actions and responsibilities, performance indicators, monitoring and reporting requirements. To document the adherence to this environmental monitoring from an operational viewpoint a monthly Environmental Operations Procedure checklist is undertaken which addresses all the relevant environmental performances that occur each month. Annually, the actions required by the Environmental Operations Procedures are reviewed and signed. In the 12 month period of this review there were no environmental performances that required immediate action other than the compliance breach discussed on page 10. There were no other complaints from community, stakeholders or staff.

Specific monitoring of water and rehabilitation are discussed in more detailed in the following chapters.

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Table 5. Environmental performance

Aspect	Approval criteria/EIS prediction	Performance during the reporting period	Trend/key management implications	Implemented/proposed management actions
Noise	35dB at all locations during 15min night test. 45dB at all locations during 1min night test. 36-42dB at varied locations during 15min day test.	Low quarry noise maintained at all locations.	Vehicle traffic at all monitoring locations remains the dominant background noise.	Continue to keep quarry operation noise to a minimum.
Air Quality	Deposited dust 4g/m ² /month annually. Total Suspended Particulate matter 90 µg/m ³ annually. Particulate matter <10 µm (PM10) 30 µg/m ³ annually.	All criteria met for monthly and annual allowances.	Maintain low air quality pollution, particularly in dry weather.	Continue current actions. Use of water cart when necessary to minimise traffic dust.
Social Impact	A Community Consultative Committee meeting biannually. Availability of information on public website.	The committee met twice during the year. All updated plans and reports uploaded to website.	Ensuring transparency of business and operations.	Maintain current consultation and availability of information.
Heritage	Immediately contact OEH should Aboriginal relics or skeletal remains be discovered during operation.	No Aboriginal relics or skeletal remains were discovered during the reporting period	Cease all work in the immediate area and report.	None taken during the reporting period. Report as necessary.

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Noise

The Project Approval for the Hitchcock Road development requires the preparation and implementation of a Noise Management Plan in order to demonstrate that compliance with the relevant noise impact assessment listed in the approval has been achieved.

The objectives of the Annual Environmental Management Report on noise issues are therefore;

- identify the environmental noise emission criteria nominated in the relevant approval

Table 6. Noise impact assessment monitoring locations

Noise assessment location	Other locations covered	Day	Night ¹	
		LAeq (15 minute)	LAeq (15 minute)	LA1 (1 minute)
1. R9 – Young, Hitchcock Road	R10- Tornatola	39	35	45
2. R5 - Pignataro	R6 Camilleri	42	35	45
3. R3 – Firestation/Jurd	R1 Hammond & R2 Hitchcock	40	35	45
4. R7 – Maroota Public School	R6 Camilleri & R8 Portelli	36(LAeq(1 hour))	N/A	N/A

Note 1: Night time is defined as the period between 10.00pm and 7.00am. Activities on the site start at 6.00am and are completed by 6.00pm. There is no activity on the site during the evening period

documents;

- document the results of environmental noise monitoring conducted in the 12 months ended June;
- assess the measured noise emissions levels against the relevant criteria; and
- nominate existing noise emission monitoring methodology and establish routine measurement procedures.

Noise emission criteria

The Noise Management Plan requires the noise criteria set out in Table 6 to be applied to the impact assessment. These assessment locations as shown on Appendix 1 of **Attachment 9** were selected because they are representative or closer to the quarry than the Noise Assessment Locations identified in Table 1 of Schedule 3 to the Notice of Project Approval.

The following noise parameters are measured at the nominated monitoring locations.

- LAeq(15 minute) noise level measured at an appropriate free-field location close to the façade of the relevant residence or other building during day time and evening hours.
- LAeq(1 minute) noise level measured at an appropriate free-field location close to the façade of the relevant residence during night time hours.

Operator-attended noise survey results

In accordance with the Noise Management Plan PF Formation conducted its quarterly operator attended daytime noise surveys at each of the four test locations. An external Noise Consultant was employed to prepare a report to assess and review the results against the noise criteria. The report prepared by Koikas Acoustics Pty Ltd is attached as **Attachment 9**.

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Chart 1. Daytime noise result trends over time

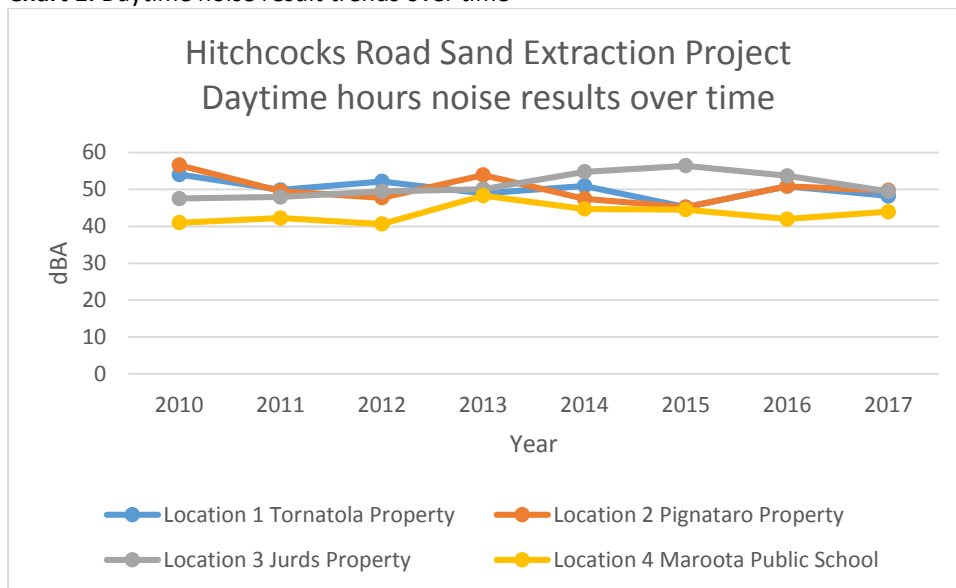
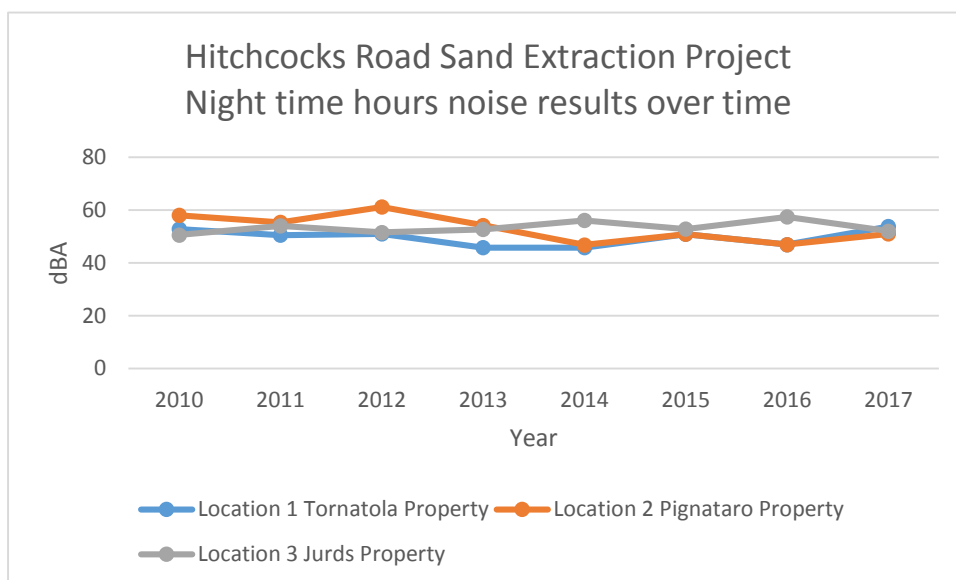


Chart 2. Night time noise result trends over time



Koikas Acoustics concluded that at most sites the quarry noise was either just audible or inaudible. The site complies with the nominated noise criteria.

Air Quality

The Project Approval (Schedule 3 Condition 12) for the Hitchcock Road development required the preparation and implementation of an Air Quality Monitoring Program. The objectives of the Annual Environmental Management Report on air quality issues are therefore:

- identify the dust deposition criteria nominated in the relevant approval documents and listed in the Air Quality Monitoring Program;

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

- document the results of dust deposition monitoring conducted in the 12 months ended June;
- assess the measured dust deposition levels against the relevant amenity criteria; and
- nominate existing dust deposition monitoring methodology and establish routine measurement procedures.

Dust impact assessment criteria

The proponent will ensure that dust generated by the project does not cause exceedances of the criteria listed in **Tables 7.1** and **7.2** at any residence or on more than 25 per cent of any privately owned land.

Table 7.1

Impact Assessment Criteria for Particulate Matter		
Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90µg/m ³
Particulate matter < 10µm (PM10)	Annual	30µg/m ³
	24 hour	50µg/m ³

Table 7.2 Impact Assessment Criteria for deposited dust			
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2g/m ² /month	4g/m ² /month

Note - Deposited dust is assessed as insoluble solids as defined by Standards Australia 1991 AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric

Dust monitoring

PF Formation maintained a program of continuous monthly dust deposition monitoring. This is in compliance with the requirements of the Air Quality Monitoring Program. The locations of the monitoring stations are shown in Appendix 1 of Attachment 10.

Analysis of the dust composition measurements was carried out independently by Boral Materials Testing and Environmental Services. The analysis procedure was in accordance with AS3580.10.1-1991 Methods for Sampling and Analysis of Ambient Air Method 10.1: Determination of Particulate Deposited Matter – Gravimetric Method.

Monitoring results

A summary of the monthly dust deposition monitoring results and the detailed measurement and analysis results by month as prepared by Boral Materials Testing and Environmental Services are summarised in **Attachment 10**. Location 4 in the Test Reports is not relevant to the Hitchcock Road site.

In general, dust monitoring procedures were guided by the requirements of AS2724.1-1984

Ambient Air Particulate Matter, Part 1 – Determination of Deposited Matter Expressed as Insoluble Solids, Ash, Combustible Matter, Soluble Solids and Total Solids.

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Chart 3. Dust monitoring results at Site 1 – Maroota Public School

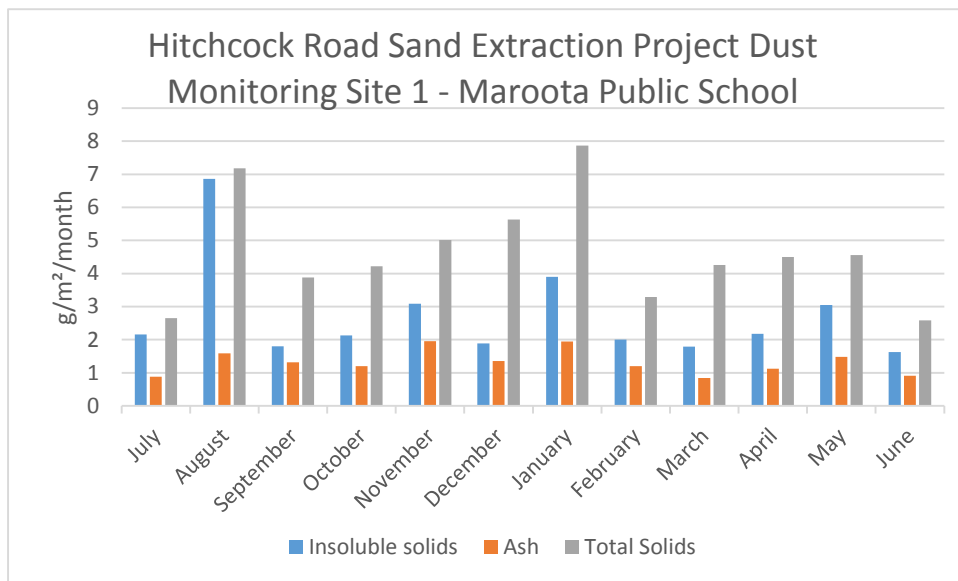


Chart 4. Dust monitoring results at site 2 – Hitchcocks Road

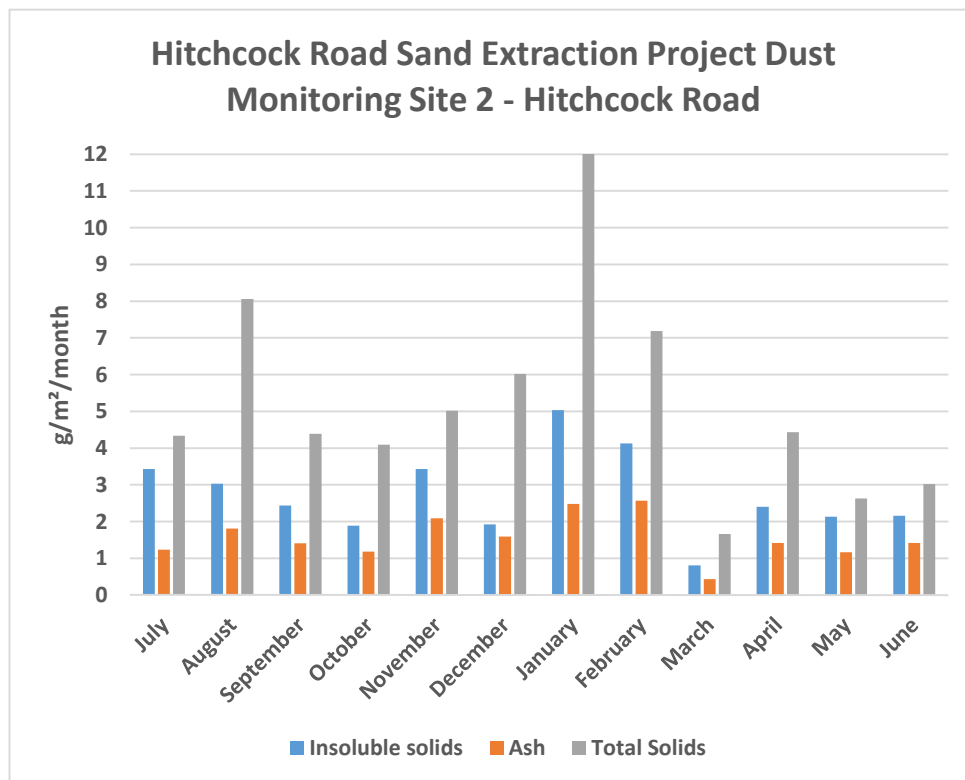


Chart 5. Dust monitoring results at Site 3 – Jurds House

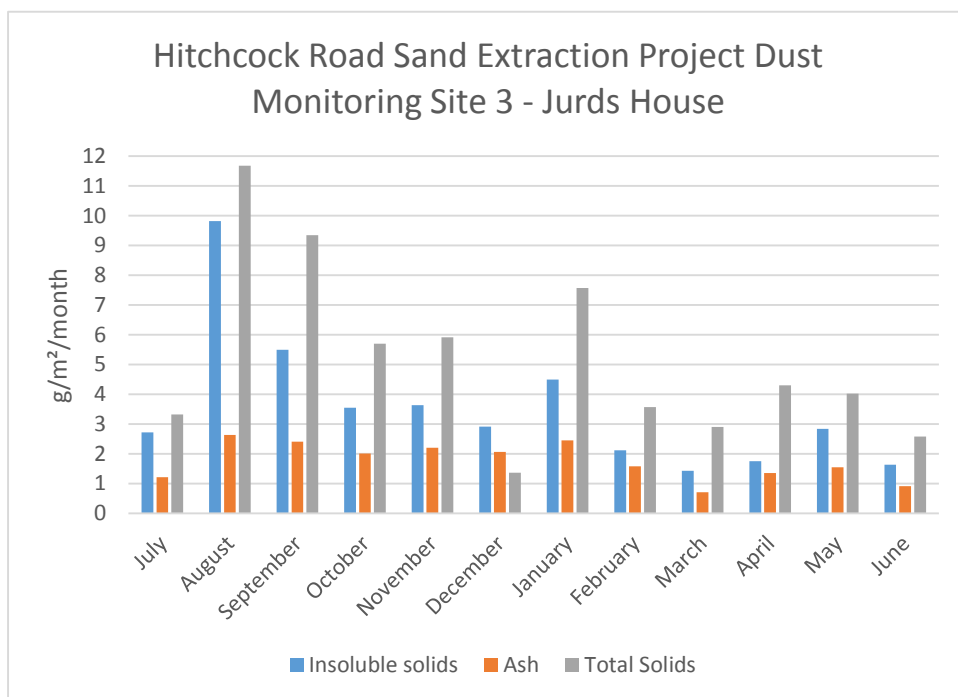
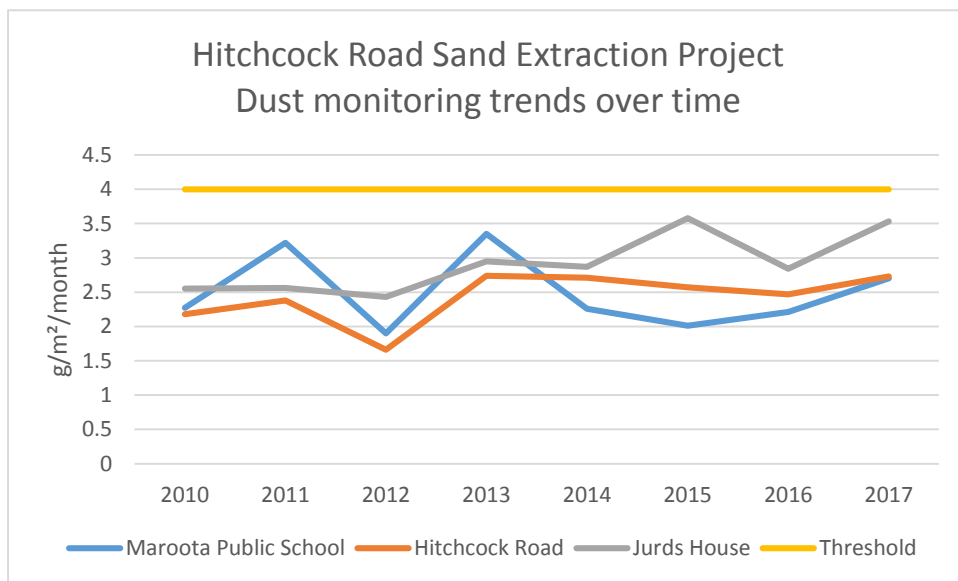


Chart 6. Dust monitoring trends over time – Insoluble Solids



The following information can be derived from these results in relation to the dust nuisance criterion.

- The insoluble solids portion of deposited dust is expected to be mineral matter with the ash content indicating the level of solid dust particles of inorganic origin such as soil/dust that could be derived from a source such as sand extraction and processing operations.
- The monitoring results are characterised by generally low average levels over extended periods with an occasional spike when high levels are experienced. As the operations from the site are

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

very consistent the dust generated from the site is consistent subject to weather impacts. Spikes are usually caused by factors unrelated to the quarry such as mowing or horticultural activities near the monitoring station or regional issues such as bush fires.

- The annual average ambient dust deposition rate (insoluble solids) considered a nuisance criterion is $4 \text{ g/m}^2/\text{month}$. All sites monitored had annual averages below this level. Location 1 – Maroota School average was $2.7 \text{ g/m}^2/\text{month}$ while Location 2 – Hitchcock Road was $2.73 \text{ g/m}^2/\text{month}$.
- The annual average ambient dust deposit rate (insoluble solids) at Location 3 – Jurd's House was $3.53 \text{ g/m}^2/\text{month}$ (2.87 in 2014). This is less than the dust nuisance criterion of $4 \text{ g/m}^2/\text{month}$ but higher than it has been in past years. August experienced a spike in levels which may have been attributed to dry windy weather.
- The results of the dust deposit gauges were very good for the year being below the nuisance criterion. Because of the distances from the quarry operations and the significant other factors impacting the dust deposit gauge results high recordings are not necessarily a result of quarry operations. It is reassuring when all locations have relatively low results in the last few years.
- PF Formation and Dixon Sand (a neighbouring operator) have an agreement whereby if the rolling 24-hour PM10 average recorded by the TEOM reaches $42.5 \mu\text{g/m}^3$, PF Formation would be notified. The wind direction would then be assessed and measures to reduce any dust impacts affecting the TEOM readings would be implemented. At no time in the last 12 months have the results derived from the TEOM reached the designated trigger.
- There have been no complaints concerning dust generation over the past year.
- A summary of the weather conditions recorded on-site are in **Attachment 5**.

Conclusions

In accordance with the requirements of the Project Approval, PF Formation has implemented a program of dust deposition monitoring. The results of the regular monthly dust deposition monitoring conducted over the past year and analysed externally by Boral Materials Testing and Environmental Services show that deposition rates from all sources are well below the maximum levels criteria.

Social Impact Management

Community representatives participate in the Community Consultative Committee which has met twice during the year. Minutes of these meetings are included as **Attachment 14**.

Aboriginal Heritage Management

There are no known Aboriginal Heritage sites within the operation area of the Hitchcock Road Sand Project. No Aboriginal relics or skeletal remains were discovered during the reporting period.

Conclusion

All environmental monitoring indicated that the quarry operations are within the defined limits and no indicators of new potential issues were identified, other than that discussed on page 10.

From the procedure conducted there were no trends identified as yet and no areas of non-compliance, other than that discussed on page 10.

Water Management

The groundwater monitoring program included in the Water Management Plan approved by the Director-General of the Department of Planning and Environment includes:

- provision of additional monitoring bores around the periphery of the site;
- detailed baseline data on groundwater levels, flows and quality in the region and particularly any groundwater bores, springs and seeps (including spring and seep fed dams) that may be affected by operations on site;
- groundwater assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts;
- a program to monitor:
 - groundwater levels and quality in new and existing monitoring bores;
 - impacts of the project on any groundwater bores, springs and seeps (including spring and seep fed farm dams) on privately-owned land and any groundwater dependent ecosystems; and
 - a protocol for further groundwater modelling to confirm the limits to excavation depth across the site permitted in accordance with Condition 9 of Schedule 2.

A summary of water taken by the operation in the 12 month reporting period can be seen in Table 8.

Table 8. Water use summary for 2016-2017

Water Licence #	Water sharing plan, source and management zones	Entitlement	Passive take/inflows	Active pumping	TOTAL
Approval #10WA114809 WAL #24156 Reference #10AL114808	Greater Metropolitan region groundwater sources, Maroota tertiary sands groundwater source	50 units	N/A	38.407ML	38.407ML

Groundwater management

An updated Water Management Plan was developed during the 12 month reporting period. At the time of this report being prepared the draft plan was under revision by the DPI Water. The revised Water management Plan is addressing the issues raised by DPI Water and is being reviewed and revised as result of the Independent Environmental Audit. The plan will be made available to view on the PF Formation website once approved. The report attached to this AEMR is the annual Groundwater Report which includes updated groundwater monitoring data collected throughout the reporting period.

The Groundwater Report has been prepared by Earth2Water and their full report follows in **Attachment 11**.

URS Australia had previously prepared the map of the wet weather groundwater level for the site based on all available site specific groundwater monitoring data they have reviewed over the years. This map is located in the Groundwater Report found in **Attachment 11**.

From the wet weather groundwater levels URS Australia has prepared the Maximum Extraction Depth Map for the project and this is located in the Groundwater Report found in **Attachment 11**.

Surface water management

Current site conditions

The location of the current extraction areas, tailings ponds and sediment basins is shown on the figure at **Attachment 7**. No significant changes have occurred in these areas in the last year.

The following points respond, where appropriate, to the specific surface water issues listed in the Water Management Plan.

Treatment of sediment-laden water

Sediment-laden water is treated by the use of a series of tailings ponds which enable the sediment to progressively settle out of suspension with the resulting clean water returned to the processing cycle.

Stormwater runoff from disturbed areas flows to these ponds and other sediment basins across the site to maximise reuse of all water. Prior to overflow and discharge from the spillways and the site, the stormwater runoff is treated where necessary.

The clean water supply dam, located close to the southern boundary of the southern catchment, comprises the final sediment basin before any discharge of stormwater from the Hitchcock Road site. It is included in the process water cycle and, at the time of the inspection, was estimated to be using about 67 percent of its calculated capacity of 25,000 cubic metres.

The clean water supply dam is connected by pipe to the clean water dam on Lot 198 DP 752025 below the central processing plant (sand washplant). A sediment trap system has been built in front of the dam to pump the washplant sediment back into the washplant. The system is working well and minimal operational sediment now enters the clean water dam. The capacity is 50,000 cubic metres and was estimated to be using 75% at the time of inspection. Water can be balanced between the two sites as necessary.

Maintaining/monitoring current surface water quality

The site does not have any permanently flowing surface waters. Existing surface water is limited to a supply sump in an area of previous extraction and a number of small farm dams. The existing tailings ponds and sediment basins will maintain the quality of the intermittent surface water flows experienced on the site.

Monitoring of surface water quality will be achieved by the visual inspection of waters within the sediment basins allowing treatment to take place if necessary prior to overflow and discharge from the site.

No discharges from the site occurred but quarterly samples were taken from an existing monitoring site on the creek below Lot 198 DP 752025. The results from these samples are in **Attachment 12**. The PH, electrical conductivity and oil and grease results were all within the expected ranges.

Dewatering of water pits

Of the commissioned ponds, Numbers 1 and 2 are currently in the tailings stream cycle. Ponds 3, 9, 10 and 12 are not currently being used allowing the sediment to settle in preparation for capping.

All other tailings ponds have been fully capped.

Decant water from the tailings ponds flows to the clean water supply dam and then to the slurry plant and the processing/wash plant on Lot 198.

Destination points for waters collected within the extraction areas

In the southern catchment, the collected waters flow to the tailings ponds and the clean water dam (southern sediment basin) and thence to the slurry plant and the main process plant on Lot 198.

In the northern part of the Hitchcock Road site they flow to the northern sediment basin and thence (if not recovered and reused) via the overflow spillway, and two further minor sediment traps to the Wisemans Ferry Road surface drains. There are no indications that any surface water has been discharged from the Hitchcock Road site and all available water is used in the processing cycle.

On-site reuse of collected waters

All collected waters are reused in the processing cycle during the operational stage of the extraction works.

Water levels within the existing water sump

Water levels and volumes within the sump are detailed in the Ground Water Report **Attachment 11**. The sump (dam) is located at the lowest point- in the south-eastern corner of the existing pit on Portion 167 on the eastern side of the clean water dam. The capacity of this area is essentially the full extent of the existing pit and would greatly exceed that calculated in the Rehabilitation Plan as necessary for the total capture of runoff from the 100 year time of concentration storm event (19,400 m3).

Significant site features, recharge areas and natural areas

The main extraction area changes within the site but only impacts internal water flows.

Groundwater recharge areas, outside the current extraction areas remain essentially unaltered and the groundwater management plan has concluded that there has been no apparent impact on the sustainability of the groundwater. (see **Attachment 11**)

Conclusion

Groundwater and surface water levels have been monitored and water samples tested with no abnormalities noted. The upgrade of ground water monitoring across the site has occurred with additional monitoring wells installed in May 2017. The backfilling of two pit extraction areas has occurred for the operation to meet compliance with the buffer area to the high water table. Permanent markers have been installed in these locations to assist with the identification of extraction depths in the future.

Rehabilitation

A Landscape Management Plan has been prepared in compliance with the requirements of the current Project Approval and was approved by the Department of Planning. The following section therefore describes the current phase of site rehabilitation. Reference is also made to the biodiversity offset strategy which is described in more detail in the Landscape Management Plan.

Rate of rehabilitation

Rehabilitation of the site is taking place generally in phase with the overall staging program. The removal of material from the first phases has been completed and extraction has continued as shown on the Site Plan at Attachment 2A.

Rehabilitation of the project is dependent on three main factors:

- Material for backfilling does not become available until topsoil and overburden are removed from later phases as similar material from the first phase area is used to form peripheral mounds and the earthworks required for the tailings dams.
- Substantial parts of the operational area are occupied by a series of basins required for surface water treatment. These require capping prior to any major rehabilitation-taking place in the area. This cannot be undertaken until new basins are developed as part of the next phase development which in turn serve the whole project. In addition, capping cannot take place until the ponds are sufficiently dry to accommodate heavy vehicles with safety. This can take up to three years.
- The timing of the rehabilitation of the initial phases is therefore dependent on a substantial start being made on the next phase. Activity to date has focused on the provision of the peripheral mounds which are required for acoustic and visual reasons. These have been constructed, so far, in those areas particularly sensitive to these impacts. This work has now been completed.

A number of the early tailings dams have been capped and the area is in the process of rehabilitation. This is particularly the case in the western part of the site immediately to the south of the former Crown Road where several silt ponds have been capped and the ground contours reconfigured. 4 hectares of the eastern part has been seeded under the guidance of Greening Australia and Parsons Brinckerhoff.

Final Landform (Strategy A)

Two options for the final landform were incorporated in the planning documents. Strategy B was based on final landforms if PF Formation was unable to get approval from the Director General to disturb the Sydney Hinterland Transition Woodland (SHTW) in the middle of the site. On 15 March 2013 the NSW Department of Planning and Infrastructure gave approval to proceed with the clearing of the SHTW. Therefore the final landform will be based on Strategy A from the planning documents.

Maintenance of vegetated conservation zones and rehabilitated areas

Conservation zones identified in the Landscape Management Plan are regularly inspected as required in the Environmental Strategy (Strategy 7.1). These areas are signposted and the areas suitably protected. All existing vegetation around the periphery of the site will be protected within setbacks and buffer zones.

The peripheral bunds constructed to date have been planted. These are regularly inspected and the area maintained.

Retention and protection of vegetation within buffer zones

All existing vegetation within the defined buffer zones will be retained and protected. A setback with a minimum depth of 30 metres is being maintained along Hitchcock Road and all existing vegetation within this area will be retained.

Integration of the site rehabilitation with the surrounding terrain

Operations have been undertaken on the Hitchcock Road site under the previous consent since November 1998. These have inevitably concentrated on the site works required for the development including retention basins and the construction of the peripheral bunds. It is too early in the life of the development, with more than 10 years of life remaining, to consider the establishment of the final landform in any detail. The area in the south has been reformed with final batter slopes which give an indication of the way in which the final landform will integrate with the surrounding area.

The final landform of the Hitchcock Road site will be influenced by the depth of extraction, the location of commercially available resource and the volume of overburden, mainly clay, available for re-contouring the extracted areas. Sand has been extracted from part of the site to the depth allowed in the previous consent and part of this area has been rehabilitated. The existing topography and setbacks is also shown on the Site Survey Plan. The final landform has been developed in response to the requirements of the proposed biodiversity offset strategy.

The final landform (Strategy A) comprises a large gently sloping basin with steeper side slopes along the boundary to Old Northern Road. Some of the levels have been amended to reflect changes in the extraction areas to minimise vegetation removal.

Vegetative cover

In 2010 Greening Australia were commissioned to prepare a plan of management for the rehabilitation area of 2.4 hectares previously planted and for the additional area of 1.6 hectares to be rehabilitated. Based on that plan of management the additional area was planted in Spring 2011 to give an area subject to SHTW rehabilitation exceeding 4 hectares.

Flora and fauna monitoring program

Regular monitoring of flora and fauna is a requirement of the Environmental Strategy. Results to date are encouraging. A report prepared by Parson Brinkerhoff was completed in December 2013 and is appended as Attachment 7A. The report states that 'the rehabilitation of the area is progressing well and is generally meeting or exceeding the targets set'. Parson Brinkerhoff have been commissioned to conduct their next further site inspection. This work has not been done at the time of completing the 2015 AEMR and will be placed on the website when received.

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

Conservation of threatened species, populations and ecological communities

It is a requirement of the Environmental Strategy that all those areas to be retained and defined as needing protection will be clearly identified. Signs have been placed at intervals around the areas needing protection.

Construction of acoustic and visual bunding

Construction of the peripheral bunds has already been noted. Improvements are required along Old Northern Road to better screen the sand slurry plant.

Compliance with current environmental laws, standards and practices

All the necessary management controls and related actions are in conformity with all relevant current laws, standards and practices as indicated in the document.

Actions for the next reporting period

Ongoing maintenance of weed control within the rehabilitation areas will continue. Furthermore it is likely capped tailings ponds will be rehabilitated to their final form as indicated in the Final Landform Strategy A.

Table 9. Rehabilitation status

Mine Area Type	Previous reporting period 2015-2016	This reporting period 2016-2017	Next reporting period 2017-2018
Total mine footprint	32.45 hectares	34.625 hectares	35.85 hectares
Total active disturbance	5.46 hectares	3.175 hectares	3.0 hectares
Land being prepared for rehabilitation	1.42 hectares	1.43 hectares	1.45 hectares
Land under active rehabilitation	4.12 hectares	4.12 hectares	5.55 hectares
Completed rehabilitation	3.7 hectares	3.7 hectares	N/A

Community

Two meetings were held during the reporting period for the Community Consultative Committee. There were no complaints received during the reporting period so therefore no actions undertaken in response to complaints. There were no community contributions received. The minutes to the CCC meetings can be viewed as **Attachment 14**.

Independent audit

The approval of the Hitchcock Road Sand Extraction and Rehabilitation Project facilitates the independent audit of operations each three year period since the approval date, 3rd February 2009. Since the project commencement an independent audit has been completed in 2011, 2014 and the most recent in April 2017. The following demonstrates the key audit outcomes completed in 2017 which were deemed to need attention by Environmental Planning Pty Ltd.

Audit recommendation for non-compliance results

1. The Wisemans Ferry Road access road entry/exit to the site needs to be checked daily for mud and dirt and cleaned off as per the environmental commitments
2. A breach in the landscaped bund along the Hitchcock Road frontage providing access to the site needs to be filled in and access provided either over the bund or a new offset bund provided behind the existing bund to allow vehicular access.
3. The dust gauge located on Jurd's property needs relocation to meet the requirements of AS/NZS 3580.1.1:2016 Methods for sampling and analysis of ambient air Part 1.1: Guide to siting air monitoring equipment.
4. A permanent survey marker showing AHD needs to be established within the main pit so that maximum extraction levels can be surveyed from the benchmark as required. The maximum extraction depth levels for the project need to be monitored at least monthly to ensure compliance with the approved maximum extraction depth plan and the results recorded in future AEMRs.
5. A ground water monitoring well needs to be established within the main pit with monthly monitoring of groundwater levels to ensure maximum extraction levels are at least two metres above the established wet weather groundwater level. The groundwater levels need to be recorded in future AEMRs.
6. The existing offset areas of rehabilitation need to be pegged out and established on a survey plan and shown in future AEMRs.
7. The long term security of the off-set strategy needs to be resolved and agreed with the Department of Planning and Environment.
8. The December 2015 aerial photograph of the site shown in Figure 1 should be updated to show contours with one metre intervals and this data and any future updates used to amend the Site Plan shown in Figure 2 and in future AEMRs.
9. The Department of Primary Industries – Water issues outlined in February 2017 need to be addressed and new information included in a revised Water Management Plan. The revised Water Management Plan also needs to include procedures for monthly monitoring of maximum extraction depth levels and levels from the ground water monitoring well within the main pit.
10. The pollution incident response management plan should be amended to include a Hazardous Chemicals Register plus another Safety Data Sheet Register.
11. Both the Dangerous Hazardous Substance and Non Dangerous Hazardous Substance Registers located in the weighbridge office need to be updated with nomenclature, a list of hazardous chemicals and safety data sheets to conform with the pollution incident response management plan.

12. Future AEMRs should be based on the October 2015 NSW Government publication Annual Review Guideline.

All recommendations have been addressed at the time of writing this report.

The next independent audit is scheduled for 2020.

Incidents and non-compliances during the reporting period

Other than the non-compliance issues addressed in the above chapter, PF Formation were issued with a Penalty Notice and Official Caution for the expansion of the Hitchcock Road Sand Quarry by the Department of Planning and Environment. The DPE found that PF Formation had failed to comply with the following conditions of PA_0104 as modified:

1. Schedule 3, Condition 3(d) – failure to comply with the extraction depths specified in the Maximum Extraction Depth map for the North-Western Pit,
2. Schedule 3, Condition 3(d) – failure to comply with the extraction depths specified in the Maximum Extraction Depth map for the South-Western Pit.

The DPE made the following comments:

- The DPE has clear evidence that material in the North-Western Pit was extracted below RL 188 AHD when the maximum depth for this area, as determined by the Maximum Extraction Depth Map, is between RL 188 AHD and RL 190 AHD. This evidence comes in the form of an email from PF Formation on 11 May 2017, containing survey results showing recorded depths between RL 179 AHD and RL 188 AHD;
- The potential for environmental harm to occur is significant given that the maximum extraction depth for the North-Western Pit has been exceeded by approximately 10 metres;
- The DPE has clear evidence that material in the South-Western Pit was extracted from below the maximum extraction depth of RL 182 AHD, as the survey demonstrates that the actual pit depth is between RL 177 AHD and RL 178 AHD. This evidence comes in the form of an email from PF Formation on 30 May 2017;
- The potential for environmental harm to occur is significant given that the maximum extraction depth for the South-Western Pit has been exceeded by approximately 4 to 5 metres;
- Furthermore, there are identified areas within both pits where water resembles groundwater. Within the Maroota area, groundwater is a known issue and has been conditioned via way of a Maximum Extraction Depth Map: and
- The fact that no extraction depth markers could be located during the site inspections on 2 and 30 May 2017 is not considered appropriate and is regarded as a failure in site management systems.

PF Formation have since installed a permanent survey marker showing AHD in the main pit so that maximum extraction levels can be surveyed from the benchmark. A monitoring bore has been

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2016 - 2017

PF FORMATION HITCHCOCK ROAD SAND EXTRACTION PROJECT MAROOTA

installed within the main pit to enable further monitoring of ground water levels and quality. A dataflow datalogger, Solinst Levellogger, has been installed to allow for monthly data to be recorded.

Activities to be completed in the next reporting period

It is expected that the following work will have been undertaken by the next reporting period:

- DPE Undertaking completed and accepted by Department
- Preparation and compliance with a Pit Shell Plan
- Resolve long term security of offset areas matter with DPE.
- Assessment of SHTW rehabilitation areas to be carried out by WSP in Oct/Nov 2017
- DPE and DPI Water to approve the revised WMP and all matters DPI Water to be resolved.
- The IEA action plan to be developed and completed then approved by DPE.
- Start importing VENM material from Maroota Lodge. (113 Old Telegraph Rd Maroota)