Grants Road Sand Quarry
Annual Review

1 January 2016 to 31 December 2016

PROJECT APPROVAL 08_0099

paa DESIGN
architecture
planning
urban design
landscape architecture
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PTY LTD

March 2017

Document History and Status

Project: 16_012

Client: GR & AK Jones - Grants Road Sand Quarry

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Version	Date issued	Purpose	Author
A	29/03/2017	Draft issue to Client for signoff	Vanessa Colclough
B	30/03/2017	Annual Report to the Department of Planning and Environment	Vanessa Colclough

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APPENDICES

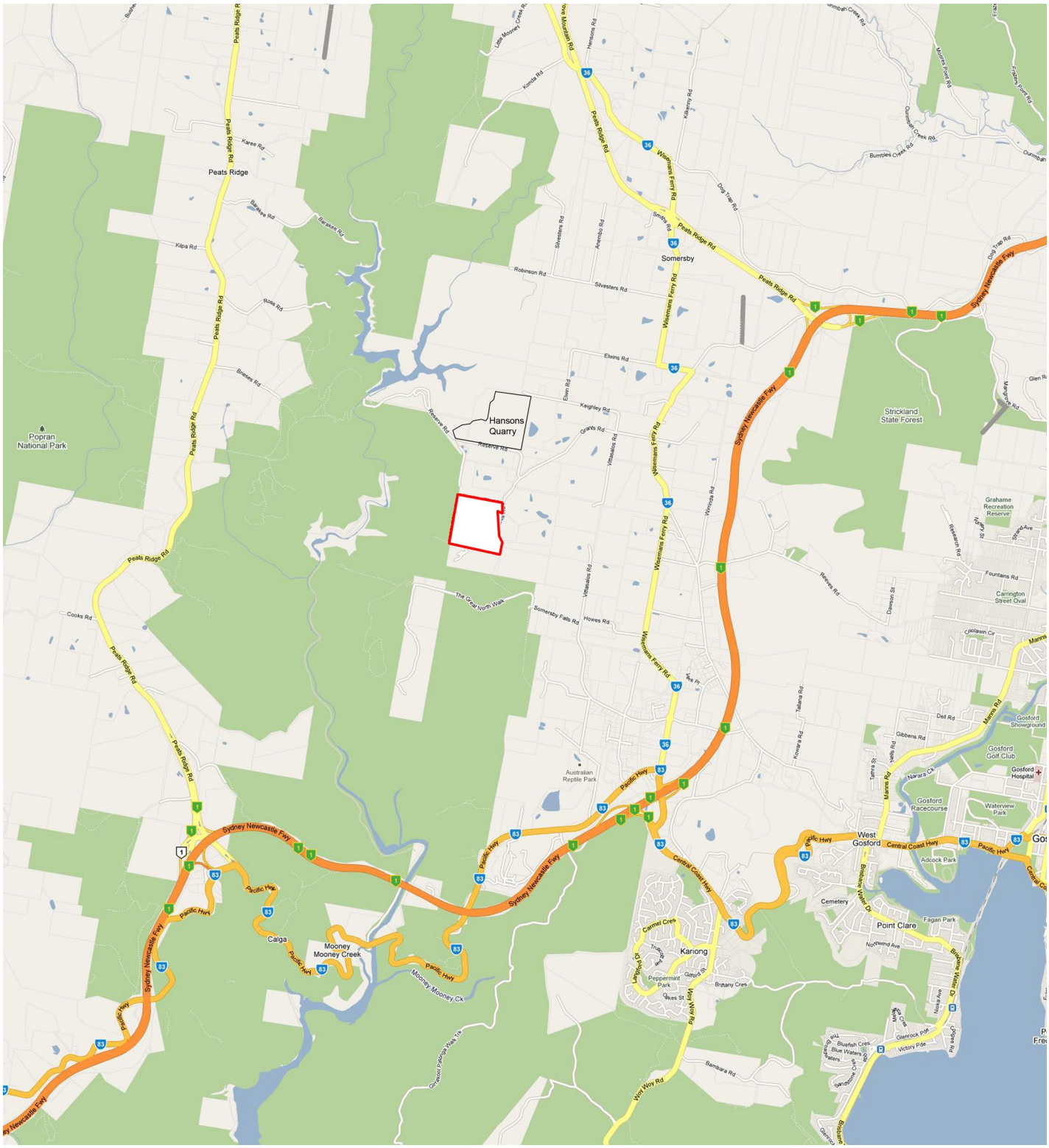
1. Introduction

This Annual Review has been prepared for the Grants Road Sand Quarry located at 270 Grants Road, Somersby in accordance with Condition 4 Annual Review of Schedule 5 Environmental Management, Reporting and Auditing of the Project Approval 08_0099 dated 25 July 2014. The Annual Review is for the period from 1 January 2016 to 31 December 2016 (the reporting period). Figure 1 shows the location and extent of the quarry. The Project Approval is included in Appendix 1.

The Environmental Management Plan and the supporting Management Plans were finalised and approved by the Department within the reporting period. Quarrying under the Project Approval 08_0099 also commenced within the reporting period. This Annual Report provides a review of the activities that have occurred during the reporting period and also documents the activities and environmental monitoring undertaken at the Quarry in 2016.

Schedule 5 condition 4 of the Project Approval requires that an Annual Review be undertaken by the end of March each year to review the environmental performance of the project. The Annual Review must:

> *(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;*
>
> *(b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the:*
>
> - *relevant statutory requirements, limits or performance measures/criteria;*
> - *requirements of any plan or program required under this approval;*
> - *monitoring results of previous years; and*
> - *relevant predictions in the EA;*
>
> *(c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;*
>
> *(d) identify any trends in the monitoring data over the life of the project;*
>
> *(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and*
>
> *(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.*



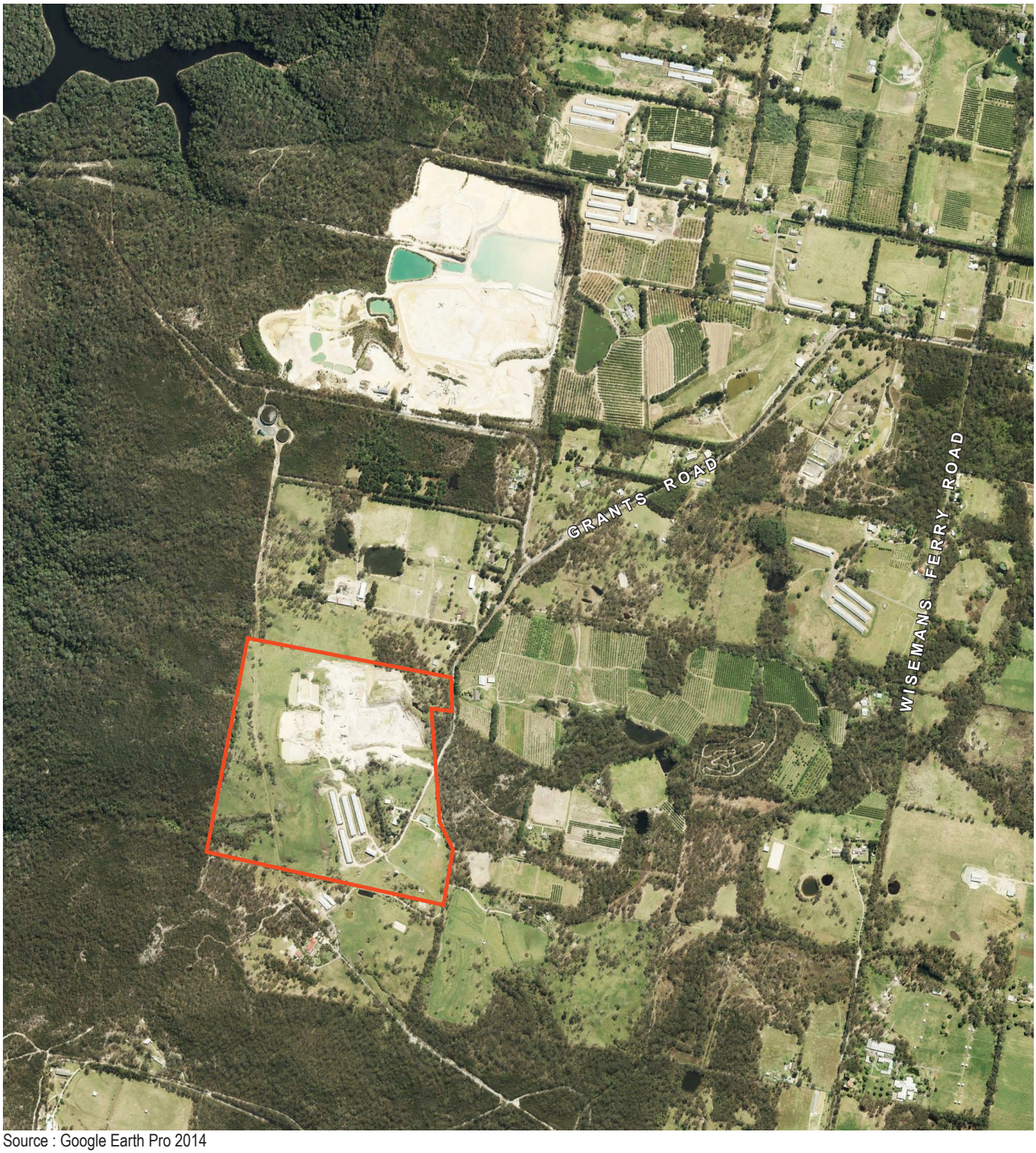
Source : Google Maps

Legend

The Site

North

Figure 1 - Locality Plan



Source : Google Earth Pro 2014

Legend

The Site

North

Figure 2 - Aerial Photograph

2. Performance Requirements

2.1. Management

Grants Road Sand Quarry is under the management of Quarry Manager, Mr. Steven Jones. Whilst, all employees and contractors/suppliers have a responsibility for the effective and ongoing management of environmental impacts at the quarry, the Quarry Manager has specific duties and responsibilities including:

- Day to day implementation of the EMP.
- Ensuring site personnel have undertaken appropriate environmental awareness training and are observing all necessary management requirements.
- Ensure all required environmental auditing/monitoring is undertaken.
- Consultation with relevant stakeholders and complaints handling.

2.2. Hours of operation

The hours of operation for the quarry and for construction activities are:

- Monday to Friday 7.00am to 6.00pm; and
- Saturdays from 7.00am to 1.00pm.

Other activities, e.g. maintenance carried out on site may be conducted outside the above hours if conducted in a manner that is inaudible at all privately-owned residences.

The following activities may be carried out on the site outside the above hours:

- Delivery or dispatch of materials as requested by the Police or other authorities; and
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

In such circumstances, the Proponent shall notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter. No such circumstances occurred during the reporting period.

2.3. Licences

The Licences held for the quarry during the reporting period are listed in the following table.

Table 1 – Licences

Approval / Licence	Approval / Licence Number	Issue Date	Expiry Date
Project Approval	08_0099	25 July 2014	30 June 2044
Environment Protection Licence	11240	13 October	
Water Licence	WAL 17474	11 December 2012	
Water Licence	WAL3569	23 July 2013	
Water Licence	WAL36455	1 November 2013	
Water Licence	WAL 17440	24 April 2014	
Water Licence	WAL 36988	13 January 2015	

2.4. Environmental Performance Conditions

The environmental performance requirements under the Project Approval include:

Table 2 – Environmental Criteria

Control Measure	Timing / Frequency
Soil and Erosion Measures	
1. Erosion control and water management structures will remain in place until slopes and exposed areas are fully stabilised and revegetated. Dams will be retained as pollution control devices.	As required
Groundwater Impact Monitoring	
1. Water level monitoring Automatic water level measurements in water level data loggers installed in monitoring bores.	• Initial 4-hourly (1 sample every 4 hours) • Assess data after 12 months • Depending on results and trends, decrease frequency to 8-hourly (1 sample every 8 hours) • Downloaded initially at 1 month intervals
2. Water Quality Monitoring Groundwater sampling in representative monitoring bores.	• Initial 3-monthly (1 sample per bore every 3 months) for 12 months • Assess data after 12 months • Depending on results and trends decrease frequency to 6-monthly (1 sample every 6 months)
3. Rainfall Monitoring Automatic rainfall measurements in tipping bucket rain gauge data logger on site.	Continuous logging at every 0.2 mm tip with time/date stamps
4. Ground Water Reporting • A complete set of water level data and groundwater quality monitoring results will be recorded, collated and reported including a statistical analysis and a comparison of water level monitoring results.	Six-monthly basis for the first 12 months then on an annual basis
Surface Water Impact Monitoring	
1. Surface Water Monitoring Undertake surface water sampling at the following monitoring sites: • W1 – Process water dam; • W4 – Culvert on south-west waterway. • S1 – South-west waterway on western boundary of Lot 1.	• Monthly (1 sample per monitoring site every month) for 12 months • *Assess* data after 12 months *Depending* on results and trends decrease frequency to quarterly (1 sample every 3 months) • Within 12 hours prior to any controlled discharge; and • Weekly during any discharge
2. Rainfall Monitoring Automatic rainfall measurements in tipping bucket rain gauge data logger on site.	Continuous logging at every 0.2 mm tip with time/date stamps
3. Surface Water Reporting • Surface water quality monitoring results will be recorded, collated and duly reported in-house • review of results and any exceedances.	Six-monthly for the first 12 months then on an annual basis
Noise Impact Monitoring	
1. Noise Monitoring The Proponent shall ensure that the construction and operational noise generated by the project does not exceed the following:	Six monthly for the first two years

<table>
<tr><th>Control Measure</th><th>Timing / Frequency</th></tr>
<tr><td>

Receiver Location	LAeq,15min dB(A)
All privately owned residences	40

Monitoring procedures will include:
- Attended noise measurements over fifteen (15) minutes at each receiver noting aural observations, recording LA90 and LAeq noise levels and weather conditions (specifically wind speed and direction);
- Determination of LAeq,15min noise contribution from Grants Road Sand Quarry activities for each receiver location;
- Review of Grants Road Sand Quarry contributions compared to noise criteria;
- Attended nearfield or midfield measurements of individual site plant and equipment to confirm operating noise levels and sound power levels;
- Conduct second round of attended noise measurements at the reference monitoring locations over fifteen (15) minutes at each receiver noting aural observations, recording LA90 and LAeq noise levels and weather conditions (specifically wind speed and direction);
- Determination of LAeq,15min noise contribution from Grants Road Quarry activities at receivers.

</td><td></td></tr>
<tr><td>2. Noise level testing of all plant or machinery to ensure acoustic performance compliance.</td><td>Six monthly for the first two years</td></tr>
<tr><td colspan="2">Air Quality Impact Monitoring</td></tr>
<tr><td>1. Meteorological Monitoring
Parameters to be measured include:

Parameter	Units	Averaging Period	Sampling Method
Rainfall	mm	1-hour	AM-4
Temperature @ 2 m	ºC	15 minute	AM-4
Temperature @ 10 m	ºC		AM-2 and AM-4
Wind Speed @10 m	m/s		AM-2 and AM-4
Wind Direction @ 10 m	Degrees		AM-2 and AM-4
Sigma Theta	Degrees		AM-2 and AM-4
Solar Radiation	W/m2		AM-4

</td><td>Continuous</td></tr>
<tr><td>2. Air Quality Monitoring
Monitoring PM_{10} at the most affected off-site location. High Volume Air Sampler (HVAS) for long term compliance monitoring at the most affected receptor.
Air Quality Standards / Goals for Particulate Matter

Pollutant	Averaging Period	Standard / Goal	Agency
Particulate matter with an equivalent aerodynamic diameter less than 10 μm (PM_{10})	24-hour maximum	50 μg/m³	EPA impact assessment criteria; NEPM reporting goal (allows five exceedances per year for bushfires)
	Annual mean	30 μg/m³	EPA impact assessment criteria

Notes: μg/m³ – micrograms per cubic metre, μm – micrometre.

</td><td>As noted and reviewed on an as needs basis and for the annual review</td></tr>
</table>

Control Measure	Timing / Frequency
3. Greenhouse Gas Monitoring Primarily monitoring the use of: • Diesel • Oil • Grease • Electricity. Monitoring will be undertaken in accordance with the requirements of the National Greenhouse and Energy Reporting Act 2007 and the National Greenhouse and Energy Reporting Regulations 2008.	Annually
Transport Impact Controls	
1. Minimising impact on surrounding road network • Project related heavy vehicles trucks will enter and exit the site in a forward manner. • All loads will be covered prior to leaving the site. • All laden vehicles leaving the site are cleaned of and other material that may fall on the road, before leaving the site.	At all times
2. Monitoring of product transport The quarry will keep accurate records of the following and publish the records on its website: • Amount of quarry products transported from the site (per calendar month and year) and • Number of laden vehicle movements from the site (per hour, day, week, calendar month and year).	Biannually
3. Traffic Management • Ensure all visitors, customers and contractors are inducted in regards to the traffic management requirements. • All hazards and incidents to be reported immediately and appropriate action implemented.	At all times
GDE Monitoring	
1. GDE monitoring surveys	Annually
Monitoring of Somersby Mintbush	
1. Somersby Mintbush monitoring surveys Areas of Somersby Mintbush are to be sampled by undertaking counts of the baseline populations identified. The outer extent of each population is to be mapped with the aid of a hand-held GPS device.	Annually
2. Somersby Mintbush Management Plan Undertake an internal review of the Management Plan.	As required
Biodiversity Impact Monitoring	
1. Biodiversity Offsets monitoring Monitoring of biodiversity offsets is to be undertaken initially prior to and then following vegetation clearing operations under the approval. Monitoring is required to assess the establishment and maintenance of at least 4 hectares of moderate – good quality Scribbly Gum Woodland vegetation and report on any nest box maintenance or replacement necessary over 10 years during stage 2 works. Biodiversity offset areas are to be monitored annually with fixed 400m^2 monitoring quadrats. The following is to be assessed for each quadrat: • Floristics; • Native plant cover; • Exotic plant cover; • Plant regeneration (including percentage survival for plantings); • Condition of deer exclusion fencing;	Annually

Control Measure	Timing / Frequency
• Signs of surface erosion and sedimentation; • Presence of feral animals; • Natural Disturbance; • Fixed photo point observations; and • Nest box condition.	
Landscape and Rehabilitation Monitoring	
1. Monitoring the effectiveness of the measures and progress against the performance and completion criteria.	To be determined
2. Update of the Landscape and rehabilitation management Plan.	Every three years
3. Conservation and rehabilitation bond Lodgement of a conservation and rehabilitation bond with the Department.	Within six months of approval of the Landscape and rehabilitation management plan
Heritage Impact Monitoring	
1. Inspection An inspection will be carried out one year post approval (25th July, 2015) or post fencing and at the time of inspection of the biodiversity area, which ever arises first.	Completed
2. Biodiversity Offset Area The Biodiversity Offset Area will be inspected by an archaeologist and the RAPs prior to any revegetation or other works.	Prior to any works within the Biodiversity offset area
3. Howes Aboriginal Monitoring Program The site 45-3-3343 will be incorporated into the Howes Reserve Aboriginal Monitoring program.	Five yearly
4. Consultation with the RAPs The quarry will issue a newsletter or other relevant correspondence to the RAPS informing of the progress of the quarry site and of any relevant monitoring results.	Six monthly
Visual Impact Monitoring	
Monitoring of the management measures to minimise the visual impact would be undertaken as part of the annual review.	Annually
Waste Management Impact Monitoring	
Monitoring of the management measures to minimise waste would be undertaken as part of the annual review.	Annually
Bushfire Impact Monitoring	
Monitoring of the management measures to manage bushfire would be undertaken as part of the annual review.	Annually

2.5. Other Performance Conditions

Other performance requirements outlined in the Project Approval include:

- The annual quarry production data is to be provided to the Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services) in the form required and this data to be included in the Annual Review.
- An Independent Environmental Audit is to be carried out by 30 June 2015 and every three years thereafter. The Independent Environmental Audit was carried out in 2015. The next Independent Environmental Audit will be required to be undertaken by 30 June 2018.

3. Activities undertaken during the Reporting Period

3.1. Site Inspection

A site visit and meeting with the Quarry Manager, Steven Jones and Directors of Grants Road Sand Quarry Leanne Jones and Graham Jones was carried out on 29 March 2017. The site visit was undertaken later than normal due to the extent of wet weather in 2017 and getting access to the quarry site. The purpose of the site visit was to undertake a visual assessment of the site.

3.2. Activities

The following outlines the key activities undertaken at Grants Road Sand Quarry during the reporting period. As previously noted, there was quarrying undertaken under the previous DA and the Project Approval.

Table 3 – Key Activities

Month	Activities
January	• Updating the website throughout the year as reports were approved by the Department. • Weed management undertaken throughout the year. • Undertake six monthly Noise Assessment. • Maintaining equipment and implementing improvements to machinery to reduce any impacts.
February	
March	• Preparation of the 2015 Annual Report and submission to the Department. • New water level sensors installed in the four monitoring bores.
April	
May	• Lodgement of the Environmental Management Plan, Air Quality Management Plan, Noise Management Plan, Traffic Management Plan, Aboriginal Cultural Heritage Management Plan, Surface Water Management Plan, Groundwater Management Plan to the Department of Planning & Environment. • Acquire and install new stainless steel automated water level sensors and data recorders (with telemetry) in four groundwater monitoring bores (BH3, BH4 (G4), DDH1 and DDH2. Abandon monitoring site BH1 (G1). The rationale is site inaccessibility, active quarry operations and close proximity to the site boundary. Installation of new generation water level sensors with telemetry will enable continual assessment of logger integrity, performance and collection of continues real-time reliable data.
June	• Preparation of the Bond Calculation Report and submission to the Department of Planning & Environment.
July	• Approval of the EMP and Management Plans by the Department. • Lodgement of revised Bond Calculation Report to the Department.
August	• Lodgement of revised Bond Calculation Report to the Department. • Request received by the Department to make amendments to the approved Air Quality Management Plan. • Undertake six monthly Noise Assessment.
September	• Lodgement and approval of the revised Air Quality Management Plan.
October	• Construction of the fence around the water data loggers. • Payment to Council for the retarring of Grants Road. Retarring of Grants Road.
November	
December	• Newsletter sent to the Aboriginal Land Councils.

Source: Grants Road Sand Quarry 2016

3.3. Quarrying and Extraction

Quarrying was undertaken in the appropriate area in accordance with the DA consent 22952/1998 from Gosford City Council. Quarrying also commenced under the Project Approval. It was reported that 59,094 tonnes were extracted during the period from July 2015 to June 2016. Refer to Resource Data attached in Appendix 2.

Figures 3 to 7 provide images of the quarry site taken on 19 March 2017.

Figure 3 – Quarry Entrance

Figure 4 – Eastern Noise and Sound Mound

Figure 5 – Western Mound

Figure 6 – Upgraded Washer and Stacker

Figure 7 – Water Data logger

4. Environmental Monitoring

Grants Road Sand Quarry engaged the various consultants in January 2017 to undertake the environmental monitoring of the quarry site in accordance with Project Approval 08_0099. The following provides a summary and the environmental monitoring reports are attached in the relevant appendices.

4.1. Water Quality

The Water Quality Monitoring Report including surface water and ground water has been prepared by Larry Cook Consulting Pty Ltd and is attached in Appendix 3.

Water level monitoring is undertaken in four (4) dedicated monitoring bores. Water quality sampling and testing is carried out in two of these monitoring bores and at three surface water monitoring sites. The Water Monitoring Sites are identified in the following table. Regular water sampling was undertaken from 1 January 2015 to 31 December 2015.

Table 4 – Register of Water Monitoring Sites

Monitoring Site	Monitoring Type	Location	Monitoring
W1	Surface Water	North-west discharge point	Water quality
W4	Surface Water	Culvert on south-west waterway	Water quality
S1	Surface Water	South-west waterway on western boundary of Lot1	Water quality
G4 (BH 4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
G3 (BH 3)	Groundwater	Bore in NW corner of Lot 1 (control bore)	Water quality and automated water level
DDH 1	Groundwater	Northern central part of Lot 1	Automated water level
DDH 2	Groundwater	Southern central part of Lot 1	Automated water level

A summary of the results are:

GEOCHEMISTRY

- The pH of the surface water sampled is slightly acidic to near neutral that reflects rainwater recharge over the quarry precinct and potential mixing with local groundwater hosted by the Hawkesbury Sandstone.
- The concentrations of Total Suspended Solids (TSS) recorded in groundwater samples were at low levels with even lower levels recorded in the surface water samples.
- Low levels of nutrients likely reflect the agricultural history of the district (fertilisers and chicken growing),
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

WATER LEVEL MONITORING

- The close correlation between several rain events and water level rise recorded in shallow monitoring bores suggests relative rapid recharge of the shallow aquifer system. This is consistent with the results of extensive groundwater investigations over the Site and surrounding district.
- The hydrograph for relatively deeper monitoring bore also shows a direct response to rainfall events but with a more subdued magnitude.
- No potential impacts from approved quarrying activities on this aquifer system were detected.

4.2. Noise

Site attended noise audits were undertaken of the quarry in January 2016 and August 2016. The Noise audit was undertaken by Atkins Acoustics and Associates Pty Ltd and is attached in Appendices 4 and 5. The results of the audits are as follows.

January 2016

Site inspections during the audit identified that onsite extraction and processing was established in Area A. Activities included:

- Wet Sand Wash Plant in western portion of Area A.
- Commander Screen and Loader 1 on upper processing area within western portion of Area A.
- Truck 1 route between upper processing area and site entry.
- Stone saw in central portion of Area A.

Site inspection and attended noise audits were conducted between 8.30am and 1.45pm on Monday 18 January 2016. Weather conditions during the audit were clear and dry with calm to light breeze from the south (1-2m/sec).

The site attended sound pressure level measurements were conducted at three (3) locations selected to represent the residential receivers identified in Grants Road Sand draft Noise Management Plan dated September 2015.

The reference measurement locations are:

- Location 1: 'Ibels' - 380 Somersby Falls Road
- Location 2: 'McGregor' - 239 Grants Road
- Location 3: 'Sammut' - 210 Grants Road

The noise measurement instrumentation selected comprised a SVAN949 Sound and Vibration Analyzer. Measurements were conducted over fifteen (15) minute periods, noise sources identified and measured during the audit where appropriate were used to assess source noise contributions from the Grants Road Sand Quarry operations. A summary of the measurement results and calculated contributions are outlined in the following table.

Table 5 – Audit Measurement Results – January 2016
dBA re: 20 x 10^{-6} Pa

Measured Ambient Sound Pressure Levels dBA				Grants Road Sand Contribution	Comments
L_{Aeq}	L_{A10}	L_{A90}	L_{A1}	$L_{Aeq, 15min}$*	
Location 1: Ibels Residence – 380 Somersby Falls Road					
40.4	40.6	29.8	53.9	<30	Local domestic, birds, distant traffic, insects; GRS inaudible,
41.2	41.3	29.6	51.3	<30	Local domestic, birds, distant traffic, insects; GRS inaudible.
Location 2: McGregor Residence – 239 Grants Road					
42.1	44.6	34.7	53.0	<35	Local domestic, Motorway traffic, insects, Hanson trucks; GRS inaudible,
44.8	47.5	39.0	53.7	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS occasionally audible (saw cutting).
Location 3: Sammut Residence – 210 Grants Road					
51.5	56.0	38.6	62.5	<35	Local domestic, birds, insects, Hanson trucks; GRS inaudible. (noise controlled by birds),
38.5	41.5	35.2	45.8	<35	Local domestic, distant traffic, insects. Hanson trucks; GRS inaudible.
Location 4: National Park					
39.3	40.9	37.2	44.0	<40	Birds, Hansons processing plant; GRS dam and wash plant power plants (diesels) audible, Plane,
38.5	39.8	37.0	42.4	<40	Birds, Hansons processing plant; GRS dam and wash plant power plants (diesels) audible, Plane.

Onsite measurements were also conducted to confirm sound power levels for the plant and equipment.

The audit measurements have confirmed that operational noise contributions from Grants Road Sand Quarry operations satisfies the *Approval 08_0099* dated 25 July 2014 project noise goal LAeq,15min 40dBA and the draft Noise Management Plan's recommended limit for the National Park LAeq,15min 50-55.

August 2016

Site inspections during the audit identified that onsite extraction and processing was established in Area A. Activities included:

- McCloskey Screen in western portion of Area A
- Loader 1 feeding McCloskey Screen western portion of Area A.
- Truck loading upper processing area southern portion Area A.
- Stone saw cutting central lower portion of Area A.

Site inspection and attended noise audits were conducted between 8.30am and 1.15pm on Monday 8 August 2016. Weather conditions during the audit were clear and dry with calm to light breeze from the west to south-west (1-2m/sec).

The site attended measurements were conducted at three (3) locations selected to represent the residential receivers identified in Grants Road Sand Noise Management Plan dated June 2016.

The reference measurement locations are:

- Location 1: 'Ibels' - 380 Somersby Falls Road
- Location 2: 'McGregor' - 239 Grants Road
- Location 3: 'Sammut' - 210 Grants Road

The noise measurement instrumentation selected comprised a SVAN949 Sound and Vibration Analyzer. A summary of the measurement results and calculated contributions are outlined in the following table.

Table 6 – Audit Measurement Results – August 2016
dBA re: 20 x 10^{-6} Pa

Measured Ambient Sound Pressure Levels dBA				Grants Road Sand Contribution	Comments
L_{Aeq}	L_{A10}	L_{A90}	L_{A1}	$L_{Aeq,\ 15min}$*	
Location 1: Ibels Residence – 380 Somersby Falls Road					
39.4	40.5	33.5	49.4	<35	Birds, distant traffic, insects. GRS inaudible.
47.4	49.4	35.3	59.8	<35	Local domestic activities, birds, distant traffic, insects. GRS inaudible.
Location 2: McGregor Residence – 239 Grants Road					
44.3	46.1	39.0	55.7	<38	Local domestic activities, Motorway traffic, insects, GRS McCloskey Screen audible at times.
44.8	48.45	39.5	56.7	<38	Local domestic activities, Motorway traffic, insects. Hanson trucks. GRS McCloskey Screen audible at times.
Location 3: Sammut Residence – 210 Grants Road					
44.3	46.1	39.0	55.7	<38	Local domestic activities, Motorway traffic, insects, GRS McCloskey Screen audible.
40.5	44.5	38.5	53.8	<38	Local domestic activities, Motorway traffic, insects, Hanson trucks. GRS McCloskey Screen audible.

Location 4: National Park					
40.9	42.6	36.9	48.4	<40	Hansons trucks, GRS McCloskey Screen audible, GRS Loader feeding McCloskey Screen, Birds, Plane.
38.5	39.8	37.0	42.4	<40	GRS McCloskey Screen audible, GRS Loader feeding McCloskey Screen, Birds, Plane.

Onsite measurements were also conducted to confirm sound power levels for the plant and equipment.

The audit measurements have confirmed that operational noise contributions from Grants Road Sand Quarry operations satisfies the *Approval 08_0099* dated 25 July 2014 project noise goal LAeq,15min 40dBA and the Noise Management Plan's recommended limit for the National Park LAeq,15min 50-55.

4.3. Air Quality

Baseline air quality and meteorological reporting has been undertaken for the site by Pacific Environment Limited and is attached in Appendix 6. All monitoring for air quality is conducted in accordance with the NSW Environmental Protection Agency (EPA).

The automatic weather station (AWS) and High Volume Air Sampler (HVAS) are located onsite and are used to provide the baseline monitoring for the quarry site.

The wind rose for the annual period indicates that the winds from the west are dominant. The average wind speed for the period was 2.1 m/s and the percentage occurrence of calm wind conditions (less than or equal to 0.5 m/s) was 1.2 %.

July was the coldest month on average with February the hottest month on average. A maximum daily average of 28°C was recorded on 14 February 2016.

June recorded the highest monthly rainfall of 973 mm.

The results for the available data in 2015/16 are listed in the following table. Of a possible sixty samples (over approximately 12 months), thirty-eight samples are reported, resulting in a data recovery rate of approximately 65%. The average PM10 concentration over the recorded 12 month period was 10.1 µg/m3, which is below the annual EPA impact assessment criterion of 30 µg/m3. All reported results are well within the EPA maximum 24-hour average criterion of 50 µg/m3 for PM10, with a maximum 24-hour average of 25.9 µg/m3 recorded on 1 November 2016.

The dust sample collected by the HVAS monitor includes both dust generated by site activities (incremental dust impact) and dust from all other local sources (background dust levels). However as stated previously, even with the background levels accounted for, the PM10 levels are considerably below their respective 24-hour and annual criterion.

Table 7 – HVAS Monitoring Results for PM_{10},2016

Date	Measured PM_{10} Concentration (µg/m³)
02-Jan-16	5.7
22-Feb-16	3.5
03-Feb-16	16.5
09-Feb-16	16.2
16-Feb-16	23.7
22-Feb-16	13.8
28-Feb-16	14
19-Mar-16	13.4

Date	Measured PM_{10} Concentration (µg/m³)
31-Mar-16	19
17-Apr-16	19.6
17-Apr-16	4.6
24-Apr-16	4.5
22-Jun-16	<0.1
28-Jun-16	1.9
04-Jul-16	5.5
10-Jul-16	3
16-Jul-16	6.1
22-Jul-16	2.6
28-Jul-16	1.3
03-Aug-16	3.4
09-Aug-16	7
15-Aug-16	9
31-Aug-16	14
02-Sep-16	4.2
08-Sep-16	5.7
16-Sep-16	6.2
24-Sep-16	3.6
02-Oct-16	2.4
08-Oct-16	18.3
14-Oct-16	3.1
20-Oct-16	5.7
26-Oct-16	7.7
01-Nov-16	25.9
07-Nov-16	17.4
13-Nov-16	15.5
19-Nov-16	2.5
Annual Average	10.1
Maximum Value	25.9

The Air Quality Assessment (AQA) for the Grants Road Sand Quarry Extension was completed by PAEHolmes in 2013, *Air Quality Impact Assessment – Extension of Grants Road Quarry* (PAEHolmes, 2013). The cumulative results predicted in the assessment indicate that the 24-hour PM_{10} ground level concentrations at the current location of the HVAS would be in the order of 70 µg/m³. The highest measured cumulative 24-hour PM_{10} concentration was 25.9 µg/m³ in 2016) a value considerably lower than the conservative predictions made in the air quality assessment.

The predicted annual average PM_{10} concentration in the AQA was approximately 30 µg/m^3 at the HVAS location, however an annual average concentration of 10.1 µg/m^3 was measured in 2016. This is consistent with the 24-hour results, where the actual concentration has been established to constitute 50% or less than the predicted concentration at the same location.

Given the results of the data during the monitoring period, currently no action is required to control environmental performance. Rather it is recommended that current mitigation processes are sustained.

4.4. Groundwater Dependent Ecosystems

A review of the Groundwater Dependent Ecosystems management protocol was undertaken by Conacher Consulting and is attached in Appendix 7.

Three monitoring quadrats were established at the site as outlined in Table 8.

Table 8 – Groundwater Dependent Ecosystem Patch Sizes

Patch Description	2016 Patch Size
Hawkesbury Coastal Banksia Woodland (Coral Fern Understorey) – Patch 1	0.22ha
Hawkesbury Coastal Banksia Woodland (Coral Fern Understorey) – Patch 2	0.04ha
Sandstone Hanging Swamp – Patch 4	0.24ha

Groundwater dependent ecosystem condition was monitored through sampling of both qualitative and quantitative variables. The following variables were measured:

i. *Native Plant Composition*
The dominant native flora species and projected foliage cover for each vegetation stratum (upper, mid and lower) were recorded for each plot. The dominant native flora species in each vegetation stratum were recorded.

ii. *Exotic Plant Composition*
The dominant exotic flora species and total cover of exotic flora species for each vegetation stratum (upper, mid and lower) was recorded for each plot.

iii. *GDE Extent and Distribution*
Mapping of each GDE was undertaken from a recent aerial photograph from 13 November 2016 (Nearmap 2016).

iv. *Vegetation Photo Point Monitoring*
Photographs were taken for each monitoring quadrat from each cardinal point from the centre point of each monitoring plot.

v. *Surface Erosion and Sedimentation Monitoring*
A visual inspection of each GDE patch downslope of the site was undertaken.

vi. *Comparison of Groundwater Monitoring Data*
The results for the groundwater monitoring levels for the current monitoring period were reviewed.

The review of the Groundwater Dependent Ecosystems concludes that the quarry operations for the 2016 monitoring period have not exceeded the compliance and performance measures for Groundwater Dependant Ecosystems and the implementation of mitigation and response measures in relation to the 2016 quarry operations is considered not necessary.

4.5. Somersby Mintbush Monitoring

The 2016 annual monitoring report for Somersby Mintbush *Prostanthera junonis* has been prepared by Conacher Consulting and is attached in Appendix 8.

Counts of flowering *P. junonis* plants were undertaken on 24 November and 20 December 2016 and at each of the four Somersby Mintbush subpopulation locations adjacent to the quarry allotment identified by NSW NPWS (2000). The results of the counts are provided in Table 9.

Table 9 – Somersby Mint Bush Cumulative Count Results

Sub-Population Number	2015 Count Results	2016 Count Results
1	0	0
2	0	0
3	0	2 flowering plants (several non-flowering juvenile regrowth plants observed)
4	0	No flowering plants. Several non-flowering juvenile plants observed

No visible signs of disturbance to *P. junonis* or its habitats as a result of quarry activities were observed.

The 2015 back burning operations of the NPWS have impacted the habitats of Somersby Mintbush adjacent to the site within the Brisbane Water National Park, which have showed low numbers of flowering plants. These impacts should not be attributed the extraction operations within the site.

4.6. Landscape and Rehabilitation Monitoring

The review of the landscape and rehabilitation activities has been prepared by Conacher Consulting and is included in Appendix 9. The Landscape and Rehabilitation Plan (LRMP) for the project was approved on 11 December 2015. The LRMP separated the management and rehabilitation of the site into the following three distinct components:

- Biodiversity Offset Area Management Plan
- Buffer Area Landscape Management Plan
- Quarry Rehabilitation Plan.

Required works are in progress or have been completed. The monitoring report concludes that no non-compliance matters were observed and additional measures are not required.

4.7. Heritage

The fence was constructed around the Grants Road RE1 Aboriginal Site and the initial monitoring of the site was undertaken in 2015. Monitoring is required to be undertaken every five (5) years and will be undertaken in 2020.

Other inspections will be undertaken once biodiversity works are required.

The six monthly newsletter was sent in December 2016. Newsletters are to be sent every six months.

4.8. Visual

An earth and sound mound has been constructed in the north eastern area of the quarry site by Grants Road Sand Quarry. This mound has been vegetated using existing grasses located on the site to minimise visual impact. This vegetation is to be continuously maintained.

4.9. Waste Management

All waste generated is managed appropriately and no on-site disposal of general waste occurs. Grants Road Sand Quarry is also committed to reducing, reusing and recycling prior to disposal of waste.

4.10. Bushfire

Bushfire management of the quarry site is implemented by the Quarry Manager including maintaining the site and the onsite water cart is set up for fire fighting purposes and also able to provide onsite water for fire brigade tankers. The Quarry Manager is also an active member of the Somersby Rural Fire Service.

5. 2017 Reporting Period

The following identifies the measures and activities that are proposed to be undertaken during the 2017 calendar year.

General

- Maintaining equipment and implementing improvements to machinery to reduce any impacts.
- Research and applying best practice in quarry management.
- Updating of the website to include additional environmental reporting and relevant data from the quarrying activities.

Water Quality

- Continue regular routine surface water and groundwater monitoring in the monitoring network in accordance with the requirements documented in the surface water and groundwater management plans.
- Submit water samples to the project laboratory for analysis, compile results and assess any trends and exceedances and, if required, implement a response and action plan in accordance with the environmental management plans.
- Prepare a report giving the results of the monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH, TSS and Oils and Grease.

Noise Quality

- Implement best management practice to minimise the construction, operational and road noise of the project.
- Assess the noise monitoring data and relocate, modify or stop operations on site to ensure compliance.
- Maintain the effectiveness of noise suppression equipment on plant and equipment on site.
- Minimise the noise impacts of the project during certain meteorological conditions.
- Carry out the six monthly monitoring.

Air Quality

- Current mitigation processes are to be sustained.
- Monitoring for air quality to be conducted in accordance with the NSW Environmental Protection Agency.
- Annual report.

Biodiversity

Groundwater Dependent Ecosystem

- Detailed monitoring and reporting of the Goundwater dependent ecosystems.

Somersby Mintbush

- Further counts of the previously identified locations of *P. junonis*.
- Continuation of suitable erosion and sedimentation controls and maintenance.

Landscape and Rehabilitation

- Undertake the works and monitoring requirements as outlined in the Landscape and Rehabilitation Plan.
- Lodgement of the Conservation and Rehabilitation Bond in accordance with Condition 28 of Schedule 3.
- Annual reporting.

Heritage

- Consultation with the Aboriginal Land Councils through the preparation of newsletters updating on activities of the Quarry.
- Inspection of biodiversity area subject to any works being undertaken.

Waste Management and Minimisation

- Ensuring best practice is implemented throughout the quarry site.

Visual Impact

- Maintaining and improving the vegetation on the mound constructed in the north eastern portion of the site.
- Maintaining and improving the site where appropriate.

Bushfire Management

- Ensuring bushfire management practices are implemented.

6. Community + Complaints

6.1. Complaint Management

The quarry has not received any complaints during the reporting period. Further, it has not received any complaints since the approval of the Project Approval 08_0099.

6.2. Non-compliances

A compliance audit was carried out by the Department of Planning & Environment in July 2015 and an independent environmental audit was carried out in August 2015 in accordance with the Planning Approval. Both audits identified that there were minor administrative non-compliances in regards to the lodgement of the reports required under the Planning Approval. Extensions were granted for various reports by the Department and a follow up telephone call and/or email provided when the reports were delayed. The non-compliance is for a period of 4 days, which occurred over the weekend and as noted in both reports was identified as a minor non-compliance.

The compliance audit also noted two observations, which required attention including:

- The housekeeping in the workshop can be improved (refer to Schedule 2, Condition 13(a) and 13(b)). In its current condition, the workshop presents a fire hazard and the risk of trips and falls.
- Two instances of inappropriate bunding of lubricants were observed (refer to Schedule 3, Condition 34).

Grants Road Sand Quarry has taken into consideration the findings of the two audits and is continuously making improvements to the quarry site and its operations.

6.3. Trends in the monitoring data

Trends in monitoring data will be identified upon once a series of data is available for the quarry expansion.

6.4. Discrepancies between the predicted and actual impacts of the project

There have been no discrepancies identified.

Appendix 1
PROJECT APPROVAL 08_0099

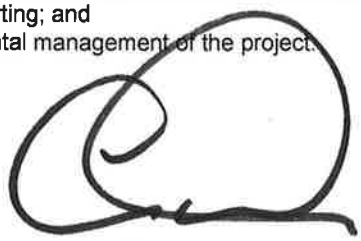
Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

As delegate for the Minister of Planning, I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the on-going environmental management of the project.



Chris Wilson
Executive Director
Development Assessment Systems & Approvals

Sydney 25 July 2014

SCHEDULE 1

Application Number:	08_0099
Proponent:	GR and AK Jones
Approval Authority:	Minister for Planning
Land:	Lot 1 DP358717
Project:	Grants Road Sand Quarry Extension

TABLE OF CONTENTS

DEFINITIONS

Annual Review	The review required by condition 3 of schedule 5
BCA	Building Code of Australia
Biodiversity Offset Strategy	The conservation and management of the Proponent's offset sites on Lot 1 DP358717
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 5 inclusive
Council	Gosford City Council
Department	Department of Planning and Environment
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EA	Environmental Assessment of the project titled *Grants Road Sand Quarry Extension - Environmental Assessment Report* prepared by Peter Andrews and Associates, dated April 2013; and the Proponent's response to the issues raised in submissions, dated December 2013
Environmental Consequences	The environmental consequences of quarrying operations, including erosion, sedimentation and adverse impacts on water quality, water quantity and biodiversity
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the POEO Act
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
GDEs	Groundwater Dependent Ecosystems
High Priority GDEs	GDEs listed in Schedule 5 of the *Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources 2003*, including *Hawkesbury Coastal Banksia Woodland* and *Sandstone Hanging Swamps*
Incident	A set of circumstances that: • causes, or threatens to cause, material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this approval
Land	As defined in the EP&A Act, except where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this approval, where it is defined as the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning, or delegate
Minor	Not very large, important or serious
Mitigation	Activities associated with reducing the impacts of the project
Negligible	Small and unimportant, such as to be not worth considering
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or a mining or quarrying company (or its subsidiary)
Project	The project as described in the EA, including existing quarrying operations and disturbance
Proponent	GR and AK Jones or any person who seeks to carry out the approved project under this approval
Public Infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications etc.
Quarrying operations	The extraction, processing and transportation of extractive materials on the site and the associated removal of vegetation, topsoil and overburden

Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the project to a good condition and for the purpose of establishing a safe, stable and non-polluting environment
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
Site	The land described in Schedule 1
Statement of Commitments	The Proponent's commitments in Appendix 1
VENM	Virgin Excavated Natural Material and/or Excavated Natural Material

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project generally in accordance with the:
   (a) EA;
   (b) Statement of Commitments; and
   (c) conditions of this approval.

   Note: The statement of commitments is reproduced in Appendix 1.

3. If there is any inconsistency between the above documents, the more recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
   (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this approval;
   (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval; and
   (c) the implementation of any actions or measures contained in these documents.

LAPSING OF APPROVAL

5. If the project has not been physically commenced within 5 years of the date of this approval, then this project approval shall lapse.

LIMITS ON APPROVAL

Quarrying Operations

6. The Proponent may carry out quarrying operations on the site until 30 June 2044.

   Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this approval will continue to apply in all other respects other than the right to conduct extraction operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

Production Limit

7. The Proponent shall not extract process and transport more than 250,000 tonnes of quarry products from the site in any calendar year.

SURRENDER OF EXISTING DEVELOPMENT CONSENT

8. By the end of December 2015, or as otherwise agreed by the Secretary, the Proponent shall surrender all existing development consents that it holds for the site in accordance with Section 104A of the EP&A Act.

   Note: This requirement does not extend to the surrender of construction and occupation certificates for existing and proposed building works under Part 4A of the EP&A Act. Surrender of consent should not be understood as implying that works legally constructed under a valid consent can no longer be legally maintained or used.

9. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of that consent.

STRUCTURAL ADEQUACY

10. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works; and*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

11. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures,* or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

12. The Proponent shall:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
    (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Note: This condition does not apply to damage to roads caused as a result of general road usage.

OPERATION OF PLANT AND EQUIPMENT

13. The Proponent shall ensure that all the plant and equipment used at the site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

UPDATING AND STAGING OF STRATEGIES, PLANS OR PROGRAMS

14. To ensure that strategies, plans and programs required under this approval are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the project, the Proponent may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Proponent may also submit any strategy, plan or program required by this approval on a staged basis.

With the agreement of the Secretary, the Proponent may prepare a revision of or a stage of a strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this approval.

Notes:

- *While any strategy, plan or program may be submitted on a staged basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the project to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.*
- *For the avoidance of doubt, existing approved management plans, strategies or monitoring programs for the Grants Road Sand Quarry will continue to apply until the approval of a similar plan, strategy or program under this approval (see condition 8 above).*
- *See also condition 5 of Schedule 5.*

PRODUCTION DATA

15. The Proponent shall:
    (a) provide annual quarry production data to DRE using the standard form for that purpose; and
    (b) report this data in the Annual Review (see condition 4 of Schedule 5).

IDENTIFICATION OF APPROVED EXTRACTION LIMITS

16. By 30 September 2014, unless otherwise agreed with the Secretary, the Proponent shall:
    (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the entire site; and
    (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.

17. While quarrying operations are being carried out, the Proponent shall ensure that these boundaries are clearly marked at all times in a manner that allows operating staff to clearly identify the approved limits of extraction.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

SOIL AND WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project, including in respect of the extraction and/or interception of groundwater.

Water Supply

1. The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations under the approval to match its available water supply, to the satisfaction of the Secretary.

Compensatory Water Supply

2. The Proponent shall provide a compensatory water supply to any owner of a privately-owned groundwater bore where monitoring indicates that the project is causing (or contributing to, in conjunction with another quarry project) a reduction in pumping yield of more than 10%, or a 2 metre decline in the water table, in consultation with NOW, and to the satisfaction of the Secretary.

   The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified.

   If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

   If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.

Pollution of Waters

3. Unless an EPL authorises otherwise, the Proponent shall comply with section 120 of the POEO Act during the carrying out of the project.

Water Management Plan

4. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
   - (a) be prepared by suitably qualified person(s), approved by the Secretary;
   - (b) be prepared in consultation with NOW, and be submitted to the Secretary for approval by the end of November 2014; and
   - (c) include a:
     - (i) Site Water Balance that includes:
       - details of:
         - sources and security of water supply;
         - water use and management on site;
         - any off-site water transfers;
         - reporting procedures; and
       - measures that would be implemented to minimise clean water use on site;
     - (ii) Surface Water Management Plan, that includes:
       - detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the project;
       - a detailed description of the water management system on site, including the:
         - clean water diversion system;
         - erosion and sediment controls;
         - dirty water management system; and
         - water storages;
       - a program to monitor and report on surface water flows and quality in water bodies that could potentially be affected by the project; and

- a comparison of monitoring results with modelled predictions;

(iii) Groundwater Management Plan, that includes:

- detailed baseline data on groundwater levels, yield and quality in local sandstone aquifers, privately-owned groundwater bores and in areas of high priority GDEs that could be affected by the project;
- groundwater impact assessment criteria for local sandstone aquifers, privately-owned bores and high priority GDEs;
- a program to monitor and report on:
  - groundwater inflows to the quarrying operations;
  - the impacts of the project on:
    - local sandstone aquifers;
    - privately-owned groundwater bores; and
    - high priority GDEs,

  including provision for continuous groundwater monitoring; and
- a program to validate the groundwater model for the project, and comparison of monitoring results with modelled predictions;
- a protocol, developed in consultation with Central Coast Sands Quarry, to appropriately apportion responsibility for any potential impacts to privately-owned groundwater bores and/or high priority GDEs that may be affected cumulatively by the project and operations at Central Coast Sands Quarry;
- an investigation of opportunities to maintain ecosystem function in high priority GDEs to the west and northwest of the project through facilitating run-on of clean surface waters; and

(iv) a Surface and Ground Water Contingency Strategy, that includes:

- a protocol for the investigation, notification and mitigation of identified exceedances of the surface water and groundwater impact assessment criteria;
- measures to mitigate and/or compensate potentially affected landowners of privately-owned land, including provision of alternative long-term supply of water to the affected landowner that is equivalent to the loss attributed to the project; and
- the procedures that would be followed if any unforeseen impacts are detected during the project.

Note: In the event that there is a dispute between the Proponent and Central Coast Sands Quarry concerning the development, finalisation or implementation of the above protocol, then either party may refer the matter to the Secretary for resolution. The decision of the Secretary on the matter shall be final.

NOISE

Hours of Operation

5. The Proponent shall only conduct construction activities and quarrying operations on the site:
   (a) between 7.00 am and 6.00 pm, Monday to Friday;
   (b) between 7.00 am and 1.00 pm, Saturday; and
   (c) at no time on Sunday or public holidays.

   Note: The Proponent may carry out other activities e.g. maintenance, on the site provided that these activities are conducted in a manner that is inaudible at all privately-owned residences.

6. The following activities may be carried out on the site outside the hours specified in condition 5:
   (a) delivery or dispatch of materials as requested by Police or other authorities; and
   (b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

   In such circumstances the Proponent shall notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

Noise Impact Assessment Criteria

7. The Proponent shall ensure that the construction and operational noise generated by the project does not exceed the criteria in Table 1 at any residence on privately-owned land.

Table 1: Noise criteria

Receiver Location	***$L_{Aeq\ (15\ min)}$ dB(A)***
All privately-owned residences	40

Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Industrial Noise Policy*. Appendix 2 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 1 do not apply if the Proponent has an agreement with the relevant landowner to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of the agreement.

Operating Conditions

8. The Proponent shall:
   (a) implement best management practice to minimise the construction, operational and road noise of the project;
   (b) regularly assess noise monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the noise criteria in this approval;
   (c) maintain the effectiveness of noise suppression equipment on plant and equipment on site;
   (d) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply (see Appendix 2); and
   (e) carry out regular noise monitoring to determine whether the project is complying with the relevant conditions of this approval,

   to the satisfaction of the Secretary.

Noise Management Plan

9. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of November 2014;
   (b) describe the measures that would be implemented to ensure:
      - compliance with the relevant conditions of this approval;
      - best management practice is being employed; and
      - the noise impacts of the project are minimised during meteorological conditions under which the noise criteria in this approval do not apply;
   (c) describe the proposed noise management system; and
   (d) include a monitoring program that:
      - uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;
      - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
      - defines what constitutes a noise incident at the project, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

AIR QUALITY

Air Quality Impact Assessment Criteria

10. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed the criteria listed in Tables 2, 3, 4 and 5 at any residence on privately-owned land.

Table 2: Long-term criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3

Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3: Short-term criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4: Long-term criteria for deposited dust

Pollutant	***Averaging Period***	***Maximum increase in deposited dust level***	***Maximum total deposited dust level***
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Table 5: Impact assessment criterion for crystalline silica

Pollutant	***Averaging Period***	***Criterion***
[e] Chronic Reference Exposure Level (REL) (PM_4)	Annual	3 µg/m^3

References to Tables 2 to 5:

[a] Total impact (ie. incremental increase in concentrations due to the project plus background concentrations due to all other sources);

[b] Incremental impact (ie. incremental increase in concentrations due to the project on its own);

[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method;

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with the EPA; and

[e] Crystalline silica must be analysed in accordance with a test method approved by the Department of Health.

Operating Conditions

11. The Proponent shall:
    (a) implement best practice management to minimise the dust emissions of the project;
    (b) regularly assess air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this approval;
    (c) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 5);
    (d) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site; and
    (e) minimise the area of surface disturbance and maximise progressive rehabilitation of the site; and
    (f) carry out regular air quality monitoring to determine whether the project is complying with the relevant conditions of this approval,

    to the satisfaction of the Secretary.

Air Quality Management Plan

12. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with the EPA and submitted to the Secretary for approval by the end of November 2014;
    (b) describe the measures that would be implemented to ensure:
        - compliance with the relevant conditions of this approval;
        - best practice management is being employed; and
        - the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;
    (c) describe the proposed air quality management system; and
    (d) include an air quality monitoring program that:
        - is capable of evaluating the performance of the project;

- includes a protocol for determining any exceedances of the relevant conditions of approval;
- effectively supports the air quality management system; and
- evaluates and reports on the adequacy of the air quality management system.

METEOROLOGICAL MONITORING

13. For the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

TRANSPORT

Monitoring of Product Transport

14. The Proponent shall:
    (a) keep accurate records of the:
        - amount of quarry products transported from the site (per calendar month and year); and
        - number of laden vehicle movements from the site (per hour, day, week, calendar month and year); and
    (b) publish these records on its website biannually.

Operating Conditions

15. The Proponent shall ensure that:
    (a) all project-related heavy vehicles enter and exit the site in a forward direction;
    (b) all laden vehicles entering or leaving the site have their loads covered; and
    (c) all laden vehicles leaving the site are cleaned of sand and other material that may fall on the road, before leaving the site.

Grants Road Maintenance

16. The Proponent shall, in conjunction with the operator of the Central Coast Sands Quarry, cause to be prepared a road condition assessment and road maintenance contributions study of Grants Road. The study must:
    (a) be undertaken by a suitably qualified, experienced and independent person(s) endorsed by the Secretary;
    (b) be undertaken in consultation with Council;
    (c) be submitted to the Secretary for approval by the end of March 2015;
    (d) be co-funded by the Proponent and the operator of the Central Coast Sands Quarry on a basis which is proportionate to the maximum number of tonnes of quarry product expected to be dispatched from each quarry over the life of their major project approvals, and the length of Grants Road affected by laden vehicles from each quarry;
    (e) assess current road condition of the length of Grants Road affected by laden vehicles from each quarry, and future road maintenance requirements for this length of road over the life of the major project approvals for both quarries;
    (f) give consideration to the usage of Grants Road by laden vehicles from each quarry over the past five years and the predicted usage of Grants Road by laden vehicles from each quarry over the life of their major project approvals, including any importation of VENM; and
    (g) recommend per tonne/per kilometre road maintenance contributions for the project for the haulage of quarry products and VENM on Grants Road.

    If the Proponent and the operator of the Central Coast Sands Quarry cannot agree on any aspect of undertaking this study or the implementation of its recommendations, then either party may refer the matter to the Secretary for resolution. The decision of the Secretary on the matter shall be final.

17. The Proponent shall pay contributions to Council for the maintenance of Grants Road, in accordance with the study required under condition 16, unless otherwise agreed by the Secretary.

Traffic Management Plan

18. The Proponent shall prepare and implement a Traffic Management Plan for the project, to the satisfaction of the Secretary. This plan must:
    (a) be submitted to the Secretary for approval by the end of November 2014;
    (b) include a drivers' code of conduct to minimise the impacts of project-related trucks on local residences and road users; and
    (c) describe the measures that would be put in place to ensure compliance with the drivers' code of conduct.

BIODIVERSITY

Biodiversity Performance Measures

19. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 6, to the satisfaction of the Secretary.

Table 6: Biodiversity impact performance measures

Feature	***Measure***
High priority GDEs located within 1 kilometre of extraction operations	Minor environmental consequences, including: • negligible erosion of the surface of the GDEs; • negligible sedimentation within the GDEs; • minor changes in the size of the GDEs; • no significant change to the composition or distribution of species within the GDEs.
Somersby Mintbush	Negligible environmental consequences

Offsets

20. If the Proponent exceeds the performance measures in Table 6 and the Secretary determines that:
    (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or
    (b) remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;
    then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

    Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Groundwater Dependent Ecosystem Monitoring and Management Program

21. The Proponent shall undertake additional studies on the high priority GDEs located within 1 kilometre of extraction operations under the approval and potentially impacted by the project. The studies shall be undertaken in consultation with NOW and include:
    (a) a description of the nature and extent of groundwater reliance for each GDE;
    (b) long-term monitoring of the condition of the GDEs;
    (c) performance indicators for project-related environmental consequences on GDEs and trigger levels to initiate mitigation/response measures; and
    (d) mitigation/response measures to ensure minor environmental consequences on the GDEs,
    to the satisfaction of the Secretary.

Somersby Mintbush Monitoring and Management Program

22. The Proponent shall prepare and implement, in consultation with OEH and Council, a Somersby Mintbush (*Prostanthera junonis)* Monitoring Program within the vicinity of the site. This program must include:
    (a) a baseline assessment of the extent and condition of the Somersby Mintbush populations before commencement of quarrying operations under the approval;
    (b) long-term monitoring of these populations;
    (c) establishment of performance indicators for project-related environmental consequences on Somersby Mintbush and trigger levels to initiate mitigation/response measures; and

(d) mitigation/response measures to ensure negligible environmental consequences on the Somersby Mintbush,

to the satisfaction of the Secretary.

Biodiversity Offset Strategy

23. The Proponent shall implement the biodiversity offset strategy described in the EA, as summarised and revised in Table 7, and shown conceptually in Appendix 3, to the satisfaction of the Secretary.

Table 7: Summary of the biodiversity offset strategy

Area	***Offset Criteria***	***Size (hectares)***
On-site Offset Area	Existing vegetation to be enhanced to establish: • at least 4 ha of moderate – good quality Scribbly Gum Woodland and/or another native vegetation community commensurate with the local surroundings; and • suitable habitat for threatened fauna species including the provision of at least 36 nest boxes.	6.37

Note: See condition 26 for additional requirements relating to the management of the biodiversity offset strategy.

Long Term Security of Offset

24. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas prior to the commencement of extraction operations under this approval unless otherwise agreed by the Secretary, to the satisfaction of the Secretary.

LANDSCAPE

Rehabilitation Objectives

25. The Proponent shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EA, and comply with the objectives in Table 8.

Table 8: Rehabilitation objectives

Feature	***Objective***
Site (as a whole)	• Safe, stable and non-polluting. • Minimise the visual impact of the final landforms as far as is reasonable and feasible.
Surface Infrastructure	• To be decommissioned and removed, unless the Secretary agrees otherwise.
Quarry Benches	• Suitably landscaped and revegetated using native species.
Quarry Pit Floor	• Establish land with a level of at least Class 4 agricultural suitability over 80% of the quarry floor.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with quarry closure.

Progressive Rehabilitation

26. The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.

Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.

Landscape and Rehabilitation Management Plan

27. The Proponent shall prepare and implement a Landscape and Rehabilitation Management Plan for the site, including the offset area, to the satisfaction of the Secretary. This plan must:
    (a) be prepared by suitably qualified person(s) whose appointment has been approved by the Secretary;
    (b) be prepared in consultation with OEH, DRE and Council, and submitted to the Secretary for approval by the end of July 2015;
    (c) describe how the implementation of the biodiversity offset strategy would be integrated with the overall rehabilitation of the site;
    (d) describe the short, medium, and long term measures that would be implemented to:
        - manage the remnant vegetation and habitat on the site and in the offset areas;
        - implement the biodiversity offset strategy; and
        - ensure compliance with the rehabilitation objectives and the progressive rehabilitation obligations in this approval;
    (e) include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy and the rehabilitation of the site, including triggers for any necessary remedial action;
    (f) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial preparation of the plan), including the procedures to be implemented for:
        - enhancing the quality of remnant vegetation and fauna habitat;
        - landscaping the site and along public roads to minimise visual and lighting impacts;
        - restoring native endemic vegetation and fauna habitat;
        - maximising the salvage of environmental resources within the approved disturbance area – including tree hollows, vegetative and soil resources – for beneficial reuse;
        - ensuring minimal environmental consequences for threatened species, populations and habitats;
        - minimising the impacts on native fauna, including undertaking pre-clearance surveys;
        - controlling weeds and feral pests;
        - controlling erosion;
        - controlling access; and
        - bushfire management;
    (g) include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;
    (h) identify the potential risks to the implementation of the biodiversity offset strategy and rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate these risks; and
    (i) include details of who would be responsible for monitoring, reviewing and implementing the plan.

Conservation and Rehabilitation Bond

28. The Proponent shall lodge a Conservation and Rehabilitation Bond with the Department within 6 months of the approval of the Landscape and Rehabilitation Management Plan, to ensure that the biodiversity offset strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the Plan. The sum of the bond shall be determined by:
    (a) calculating the cost of implementing the biodiversity offset strategy over the next 3 years;
    (b) calculating the cost of rehabilitating disturbed areas of the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and
    (c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs,

    to the satisfaction of the Secretary.

    Notes:
    - *Alternative funding arrangements for long term management of the biodiversity offset strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond.*
    - *If capital and other expenditure required by the Landscape and Rehabilitation Management Plan is largely complete, the Secretary may waive the requirement for the lodgement of a bond in respect of the remaining expenditure.*

- *If the rehabilitation of the site area is completed to the satisfaction of the Secretary, then the Secretary will release the bond. If the rehabilitation of the site is not completed to the satisfaction of the Secretary, then the Secretary will call in all or part of the bond, and arrange for the completion of the relevant works.*

29. Within 3 months of each Independent Environmental Audit (see condition 9 of Schedule 5), the Proponent shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must:
    (a) consider the performance of the implementation of the rehabilitation of the site to date;
    (b) consider the effects of inflation; and
    (c) calculate the cost of rehabilitating the disturbed areas of the site (taking into account the likely surface disturbance over the next 3 years of quarrying operations.

HERITAGE

Heritage Management Plan

30. The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared by suitably qualified person(s) whose appointment has been approved by the Secretary;
    (b) be prepared in consultation with OEH and local Aboriginal stakeholders;
    (c) be submitted to the Secretary for approval by the end of November 2014;
    (d) include a description of the measures that would be implemented for:
        - protecting, monitoring and managing Aboriginal sites within the site, including the biodiversity offset strategy;
        - maintaining and managing reasonable access for Aboriginal stakeholders to cultural heritage items on site and in the biodiversity offset areas;
        - managing the discovery of any human remains or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notification protocols;
        - ongoing consultation with the local Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on-site and in the biodiversity offset areas;
        - ensuring any workers on site receive suitable heritage inductions prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions; and
        - the long term management of the Aboriginal cultural heritage values of the site post extraction operations and rehabilitation of the site.

VISUAL

30. The Proponent shall implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project to the satisfaction of the Secretary.

31. The Proponent shall:
    (a) vegetate any earthen perimeter bund at the project within 3 months of establishing the bund, using appropriate flora species to minimise the visual and off-site sedimentation impacts of the project; and
    (b) maintain this vegetation in a good condition throughout the remainder of the project,
    to the satisfaction of the Secretary.

WASTE MANAGEMENT

32. The Proponent shall:
    (a) minimise and monitor the waste generated by the project;
    (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of;
    (c) manage on-site sewage treatment and disposal in accordance with the requirements of Council; and
    (d) report on waste management and minimisation in the Annual Review,
    to the satisfaction of the Secretary.

33. Prior to importing any VENM to the site, the Proponent must obtain a 'resource recovery exemption' under the POEO Act and provide evidence of this approval to the Department.

DANGEROUS GOODS

34. The Proponent shall ensure that the storage, handling, and transport of dangerous goods are done in accordance with the relevant *Australian Standards*, particularly AS1940 and AS1596, and the *Dangerous Goods Code*.

BUSHFIRE

35. The Proponent shall:
    (a) ensure that the project is suitably equipped to respond to any fires on site; and
    (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and
   (b) an exceedance of any relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned.

INDEPENDENT REVIEW

2. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.

   If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Proponent shall:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
      - consult with the landowner to determine his/her concerns;
      - conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 3; and
      - if the project is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria; and
   (b) give the Secretary and landowner a copy of the independent review.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. The strategy must:
   (a) be submitted to the Secretary for approval by the end of November 2014;
   (b) provide the strategic framework for environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, record, handle, and respond to complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance;
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring to be carried out under the conditions of this approval.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - effectiveness of any management measures (see c above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
   (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance criteria; and
   (h) a protocol for periodic review of the plan.

   Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Adaptive Management

3. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance

measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:

(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;
(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
(c) implement remediation measures as directed by the Secretary,

to the satisfaction of the Secretary.

Annual Review

4. By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;
   (b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the:
      - relevant statutory requirements, limits or performance measures/criteria;
      - requirements of any plan or program required under this approval;
      - monitoring results of previous years; and
      - relevant predictions in the EA;
   (c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;
   (d) identify any trends in the monitoring data over the life of the project;
   (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
   (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.

Revision of Strategies, Plans and Programs

5. Within 3 months of the submission of an:
   (a) annual review under condition 4 above;
   (b) incident report under condition 7 below;
   (c) audit report under condition 9 below; or
   (d) any modification to the conditions of this approval,

   the Proponent shall review the strategies, plans and programs required under this approval, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.

   Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the project.

Community Consultative Committee

6. If directed by the Secretary, the Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. Any such CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version).

   Notes:
   - *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
   - *In accordance with the Department's guideline, the CCC should be comprised on an independent chair and appropriate representation from the Proponent, Council (if available) and the local community.*
   - *This CCC can be combined with any other CCC established under conditions of consent or approval for State Significant quarry developments on the Somersby Plateau.*

REPORTING

Incident Reporting

7. The Proponent shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

8. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

AUDITING

Independent Environmental Audit

9. By 30 June 2015 and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
   (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
   (b) include consultation with the relevant agencies;
   (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or necessary water licences for the project (including any assessment, strategy, plan or program required under these approvals);
   (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
   (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, strategy, plan or program required under the abovementioned approvals.

   Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Secretary.

10. Within 6 weeks of completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

11. By the end of November 2014, the Proponent shall:
   (a) make copies of the following publicly available on its website:
      - the documents referred to in condition 2 of Schedule 2;
      - all current statutory approvals for the project;
      - all approved strategies, plans and programs required under the conditions of this approval;
      - a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
      - a complaints register, updated monthly;
      - the annual reviews of the project;
      - any independent environmental audit, and the Proponent's response to the recommendations in any audit;
      - minutes of CCC meetings;
      - any other matter required by the Secretary; and
   (b) keep this information up to date,

   to the satisfaction of the Secretary.

APPENDIX 1
STATEMENT OF COMMITMENTS

Subject	Commitments	Timing
1. General Arrangements	The development shall be carried out in accordance with the Environmental Assessment (April 2013) prepared by Peter Andrews + Associates Pty Ltd and this Addendum Report. This Addendum Report will override the Environmental Assessment where there is an inconsistency.	Ongoing
2. Staging	Staging of the development will be in accordance with the staging of works set out in the Environmental Assessment (April 2013).	Ongoing
3. Statutory Requirements	Obtain and maintain all relevant approvals and licences.	As required and continuous
	Comply with all conditional requirements in all approvals and licences.	As required
4. Hours of Operation	7.00am to 6.00pm Monday to Friday 7.00am to 1.00pm Saturday	Ongoing
5. Reporting Requirements	Undertake monitoring for the key areas as identified below.	As required
	Incorporate relevant data/monitoring information in the Annual Reports.	Annually
	Incorporate the management measures into the Environmental Management Plan. The development is to operate at all times within the terms and conditions of the Environmental Management Plan.	Prior to commencement and subject to five yearly reviews
	Update procedures manual for the operation of the quarry with regards to the quarry expansion including the following and ensure all staff are aware of procedures. • Operation of plant and equipment • Environmental monitoring • Restrictions imposed on quarrying • Vegetation removal • Sedimentation and erosion • Transportation	Prior to commencement of the operations
	Provision of the annual production data to the Department of Trade and Investment	Annually
6. Soils and Land capability	Locate areas for acoustic earth mounds.	Prior to topsoil stripping operations
	Maintain topsoil for rehabilitation and minimise soil loss through erosion.	Ongoing
	Vegetate all mounds with Kikuyu grass	As required
	Implement downslope sedimentation controls as required	Until the surface of the mounds are vegetated
7. Groundwater	Undertake automatic water level measurements in water level data logger in monitoring bores	Initially 4-hourly samples. Assess data after 12 months and depending on the results, decrease frequency to 8-hourly samples
	Undertake groundwater sampling in representative monitoring bores	Initially 3 monthly. Assess data after 12 months and depending on the results, decrease frequency to 6

Subject	Commitments	Timing
		monthly samples
	Undertake automatic rainfall measurements in tipping bucket rain gauge data logger on site	Continuous logging at every 0.2mm tip with time/date stamps.
	Preparation of the Groundwater Management Plan, which incorporates the development of a water level and water quality monitoring program and the development of a set of trigger levels and mitigation measures if adverse impacts occur on the environmental and/or neighbouring water users.	Within 6 months of the project approval
	Provide a complete set of results of the production and monitoring program including a review and assessment of the statistical analysis to the *Senior Hydrogeologist NOW* and the quarry owner.	Annually
	Communicate with any landowner if there is a scientifically and independently demonstrated significant impact on any neighbouring water users surrounding the site.	As required
8. Surface Water	Preparation of an Environmental Management Plan for the quarry extension based on a continuation of the current environmental management and mitigation measures for the quarry expansion as outlined in the current EMP.	Prior to the commencement of the quarry operations
	Construct earth bunds and surface water diversion banks and drains around the perimeter of the entire quarry pit void. Bunds and/or diversion drains will require ongoing minor realignments as the quarry pit develops and advances especially through zone 'C'. Bunds can be designed as 'multi-purpose' to provide additional public 'Highwall' safety in addition to surface water flow management.	Prior to the commencement of the quarry operations and ongoing
	Relocate the chicken farming operations storage shed that is currently located on the south west drainage path to the south of the site and bund the storage site to contain runoff while chicken farming is ongoing at the site.	Prior to the commencement of the quarry operations and ongoing
	Construct 'out of pit' containment infrastructure in the south-eastern most section of the property boundary adjacent to Zone E to capture and passively treat contaminated surface water runoff whilst simultaneously providing additional water security. Infrastructure to consist of: 1. One 10 Megalitres (ML) Pollution Control Dam (PC Dam) to receive nitrogen rich runoff from Zones F&G where the existing chicken and machinery sheds are located. This dam will gravity flow via a spillway into a shallow polishing pond. Control structures such as rock 'rip rap' or similar will be required to control water runoff velocity prior to entering the PC Dam. 2. Broad shallow polishing pond/s will receive any water spilled or transferred from PC Dam and provide passive treatment through suitable wetland plant species. 3. Pipeline and pumps for transfer of water each way between the in-pit decant pond and out of pit PC Dam. 4. A floating siphon in the PC Dam to maintain a 5 ML operating level. Ensure PC Dam and pond are located outside of the water pipeline easement and located generally as shown on the plans. Access to the ponds will be along the southern boundary across the water pipeline easement.	Prior to the commencement of the quarry operations and ongoing
	Continue monitoring of surface water at locations W1 and W4	Monitor until stage 2 of the quarry commences.

	After construction of the control pond and polishing pond, it is proposed that the quality of the treated quarry discharge released to the south west waterway is monitored at the future surface water quality monitoring location S1 shown in Appendix 2 of this report. Initially, the control pond and polishing dam will be used mainly to treat runoff from the chicken farming operations, the existing dwelling and a small area of pasture, and will only be used to treat water captured within the quarry during large rainfall events until the commencement of stage 2 of the quarry. As the quarry extends to the maximum quarry footprint in stage 2, pumping out of the quarry may occur as regularly as weekly. Undertake water quality monitoring by a grab sample taken during discharge downstream of the control pond and polishing pond at location S1 on a monthly basis. The parameters will be monitored and compared against the proposed discharge limits as follows: • Suspended solids 40mg/L • Oil and grease – 5 and/or none visible • pH – 6.0-8.0	Monthly water monitoring
9. Biodiversity and Environmental Management	Identify the boundaries of the quarry.	Prior to clearing of vegetation
	Preparation of a detailed Biodiversity Offset Management and Habitat Rehabilitation Plan for areas to be retained as biodiversity offsets within the site.	Prior to the clearing of vegetation
	Biodiversity offsetting will be undertaken to compensate for unavoidable impacts to biodiversity within the site including the removal of 1.5 hectares of Cleared Land with Remnant Trees vegetation and the loss of 18 hollow bearing trees. The areas within the site proposed for biodiversity offsetting are located in the north-eastern section of the site and along the western section of the site. The offsetting strategy proposed will result in the improvement and maintenance of biodiversity values on the site for the medium to long term. A total of 7.1 hectares of land will be retained and managed as a biodiversity offset to compensate for the loss of 1.5 hectares of Cleared Land with Remnant Trees vegetation. Offset areas will be protected in perpetuity and subject to a 10 year rehabilitation and maintenance period. The areas proposed for retention comprise the following: • 0.85 hectares of Disturbed Scribbly Gum Woodland; • 3.5 hectares of Cleared Land with Remnant Trees Vegetation; and • 2.75 hectares of Cleared Land. The areas proposed for offsetting will be subject to protective fencing to exclude livestock and local populations of feral Rusa Deer, intensive replanting of endemic tree and shrub species within cleared areas and weed management of noxious and environmental weeds. A total of 170 hollow-bearing trees will be retained and 36 nest boxes will be erected to compensate for the loss of 18 hollow bearing trees.	The first 10 years of Stage 2
	All hollow-bearing trees to be removed are to be inspected and sectionally dismantled by an arborist, under the supervision and direction of an ecologist. Where possible, escaped fauna is to be caught by the consulting ecologist and transported to a suitable release area. If juvenile or injured fauna are encountered they are to be captured and transported to a wildlife carer or a veterinary surgeon as required. In the case where the arborist declares a tree or stag unsafe to climb, machine removal with a rotating grab or similar will be required.	Prior to removal of the hollow-bearing trees

10. Noise	Incorporate noise reducing measures (upgraded exhausts, enclosures/panels to engines, or localised plant specific shielding*) to achieve the following noise reductions: • Dozer 4db; • Trencor 3dB; • McCloskey 3dB; and • Sandwash Plant 8dB for air cooled 6 cylinder engine* (Smaller 4 cylinder engine is now operating with a purpose designed enclosure and exhaust resulting in an 8dB reduction and does not require further attenuation). All reversing alarms replaced with level varying or broadband "quacker" type alarms.	Prior to the use of the plant equipment.
	Plant and equipment to be maintained to ensure acoustic performance is not de-rated and complies with the recommended limits outlined in the Noise Impact Assessment (NIA) and incorporating the specified noise controls.	Throughout the life of the quarry.
	A Site Operational Management Plan (SOMP) be developed to ensure that the dozer, Trencor and McCloskey do not operate simultaneously.	Throughout the life of the quarry.
	Provision of an earth mounds 3-4 metres high along the southern and south-eastern quarry boundaries as shown on Figure 14 of the Environmental Assessment before commencing Precincts E, F and G.	Prior to quarrying of stage 2.
	The SOMP to document procedures to maximise site shielding and minimise number of plant and equipment on exposed locations, particularly on the eastern and southern portions of the quarry (areas B, C, F and G). That is, where practical and feasible only one (1) item of plant would operate at an exposed level (<8m below ground level) at any one time and extraction to proceed against a working face where practical.	During quarrying of the stage 2.
	A site weather station will be installed and continually monitor ambient weather conditions including wind speed and direction at a height of ten (10) metres above ground level. The current weather conditions would be utilised to manage day to day quarry operations, and the SOMP incorporate strict protocols including: • Cease operations within Precinct F and G during north-north-west or west wind conditions up to 3m/s with respect to the operation of the dozer, Trencor and McCloskey in exposed locations (<8m below ground level); and • Utilise periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels to extract material within exposed locations (Areas B, F and G).	During quarrying of the relevant precincts.
	A Complaints Management Procedure (CMP) be prepared to deal with any noise complaints as follows and include: • Site contact telephone number during business hours to lodge complaints or seek additional information (and message service for out of hours). If phone unattended it should divert to mobile phone of site quarry manager; • Log to record compliant including time of alleged noise issue, duration, description of noise, prevailing weather conditions and complainants contact details; • Complaints to be responded to in a timely manner. Where the noise is currently occurring, Quarry Manager shall investigate and determine noise source is noise is likely to be exceeding Approval Noise Limits. If exceedance is occurring, operations to be amended or ceased; • Audits at sensitive receiver locations to identify noise contributions, compliance and determine if additional procedures or controls to minimise noise from the site are required; • A record of noise investigations to be maintained on site and complainants informed of outcomes of investigations and actions implemented following any noise complaints; and • All site plant including trucks to be regularly inspected and maintained to ensure that the equipment is operating in accordance with specifications and satisfied the noise limits referenced in the NIA (min Annually).	Prior to the commencement of the quarry extensions.

	Undertake an Annual Noise monitoring program that incorporates: • Site attended noise measurements at the three (3) reference locations and record aural observations, statistical noise levels (LA90, LAeq), weather conditions and quarry operations. Typically measurement considering of two (2) 15 minute measurement periods at each receiver; • Attended nearfield or midfield measurements to confirm operating noise levels and determine sound power levels of individual plant and equipment for comparison with source noise data utilised in the EIS Noise Impact Assessment; • Assessment of noise audit measurement results against Conditions of Consent and any pending Licence to determine compliance; • Provide recommendations for ameliorative or management measures for Quarry operator where noise exceedances are identified; • Preparation of Annual Noise Monitoring Report for submission to Consent Authority and/or EPA.	Annually
11. Air Quality	Preparation of an air quality management plan incorporating PM_{10} monitoring at the most affected off-site sensitive location.	Annually
	Minimise dust impacts at sensitive residences through the following onsite management procedures. These procedures to meet the KPIs outlined in this report and be reviewed. • Water of unsealed roads; • Use of wheel-wash and operation of sealed road from wheel-wash to the front gate; • Covering of loads during hauling; • Water of stockpiles when necessary; • Limiting vehicle speed onsite; and	Annually
	• Limiting the area of disturbed land and progressive rehabilitation of completed areas.	
	Carry out campaign monitoring for respirable crystalline silica. The monitoring would assess the exposure of quarry workers to respirable crystalline silica (in accordance with Australian Standard (AS 2985-2009) - Workplace atmospheres - Method for sampling and gravimetric determination of respirable dust.	First year of the quarry extension (on a day of maximum throughput). Monitoring to be repeated quarterly in the first year and if more than two consecutive results demonstrate low risk, monitoring would be discontinued.
	Incorporate greenhouse gas reduction measures for the operation of the project including: • Opportunities to increase energy efficiency will be continuously reviewed including opportunities to minimise haul distances for quarry material, ensuring trucks are fully loaded to maximise productivity and efficiency, reducing trips by coordinating delivery and removal of materials. • Consideration of the use of alternative fuels where economically and practically feasible. • Regular maintenance of diesel powered equipment to ensure operation at peak efficiency. • Consideration of energy efficiency for all electrical equipment, appliances, lighting and hot water system.	Throughout the life of the quarry
12. Roadworks and Traffic Management	All vehicles leaving the site with loads of extracted material are to be sufficiently covered to prevent windblown dust.	Ongoing
13. Heritage	Grants Rd RE1 and RE2 sites are to be preserved.	Continuous
	Incorporate a ten (10) metre buffer on the southern, eastern and western boundary of the anthropomorphic figure (Grants Rd RE1).	For the life of the quarry

	The bund wall for the quarry extension in the area of Grants Rd RE1 to be constructed of block wall rather than earth in between the engraving and the boundary.	Prior to the quarrying of Precinct C
	The engraving (Grants Rd RE1) is incorporated into the monitoring programme currently in place for the adjacent Howes Aboriginal Reserve.	Five yearly
	A protective fence is constructed 8 metres around each side of the Grants Rd RE 1 site to prevent inadvertent damage. The fence should incorporate appropriate signage to ensure the access within the fenced zone is limited to maintenance activities such as grass cutting.	Prior to the quarrying of Precinct C
	Traffic is to be directed around the small mundoe at the Grants Rd RE 2 site to ensure minimal disturbance.	Continuous
	An additional monitoring site visit be undertaken to review the recommendations effectiveness to protect the site.	12 months after the project approval
	The quarry operator to develop and implement an Aboriginal Cultural Heritage Induction Program for all personnel associated with the quarry operations. A register is to be kept off staff/contractors that have been inducted.	Prior to the commencement of the quarry extensions
	Should any materials suspected of being of Aboriginal occupation origin be located during the quarry operations that work cease in that location immediately and that the Office of Environment & Heritage be contacted immediately.	For the life of the quarry
14. Visual Impact	Vegetate all stockpiles and the acoustic earth mounds using appropriate species noting that the current conditions of consent requires the use of Kikuyu grass for the stabilisation of stockpiles.	For the life of the quarry
	Maintain grass covered mounds.	For the life of the quarry
	Maintain the site.	For the life of the quarry
	Keep the site clean and tidy where possible.	Continuous
	Progressively revegetate all areas where quarrying is completed.	Upon completion of quarrying in a precinct
15. Bushfire Protection	Provision of an on-site mobile water pump and tank, with firefighting hose connections to be located on site.	For the life of the quarry
	Management of the site to provide a defendable space to the bushfire hazard. These areas are to be regularly inspected and maintained by the landowners.	For the life of the quarry
16. Waste Management	Keep the site clean and tidy where possible	For the life of the quarry
	Ensure all general waste / garbage is removed by a licensed waste collection contractor at least on a weekly basis.	Continuous
	Preparation of a waste management plan for the demolition of any structures.	Prior to demolition.
17. Mine Rehabilitation	Ensure completed areas of the quarry are revegetated to reduce sedimentation and erosion and dust emissions and visual impact.	As required
	Preparation of a quarry rehabilitation plan to identify staging for rehabilitation.	Within five years of commencement of the quarry extension
	A detailed decommissioning plan will be prepared as part of the review of the Environmental Management Plan.	Towards the end of the life of the Quarry (two years prior)
	A five year monitoring program to be implemented upon completion of the rehabilitation.	Five years after the rehabilitation.

APPENDIX 2
NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 2 is to apply under all meteorological conditions except the following:
   a) during periods of rain or hail; or
   b) wind speeds greater than 3 m/s measured at 10 m above ground level.

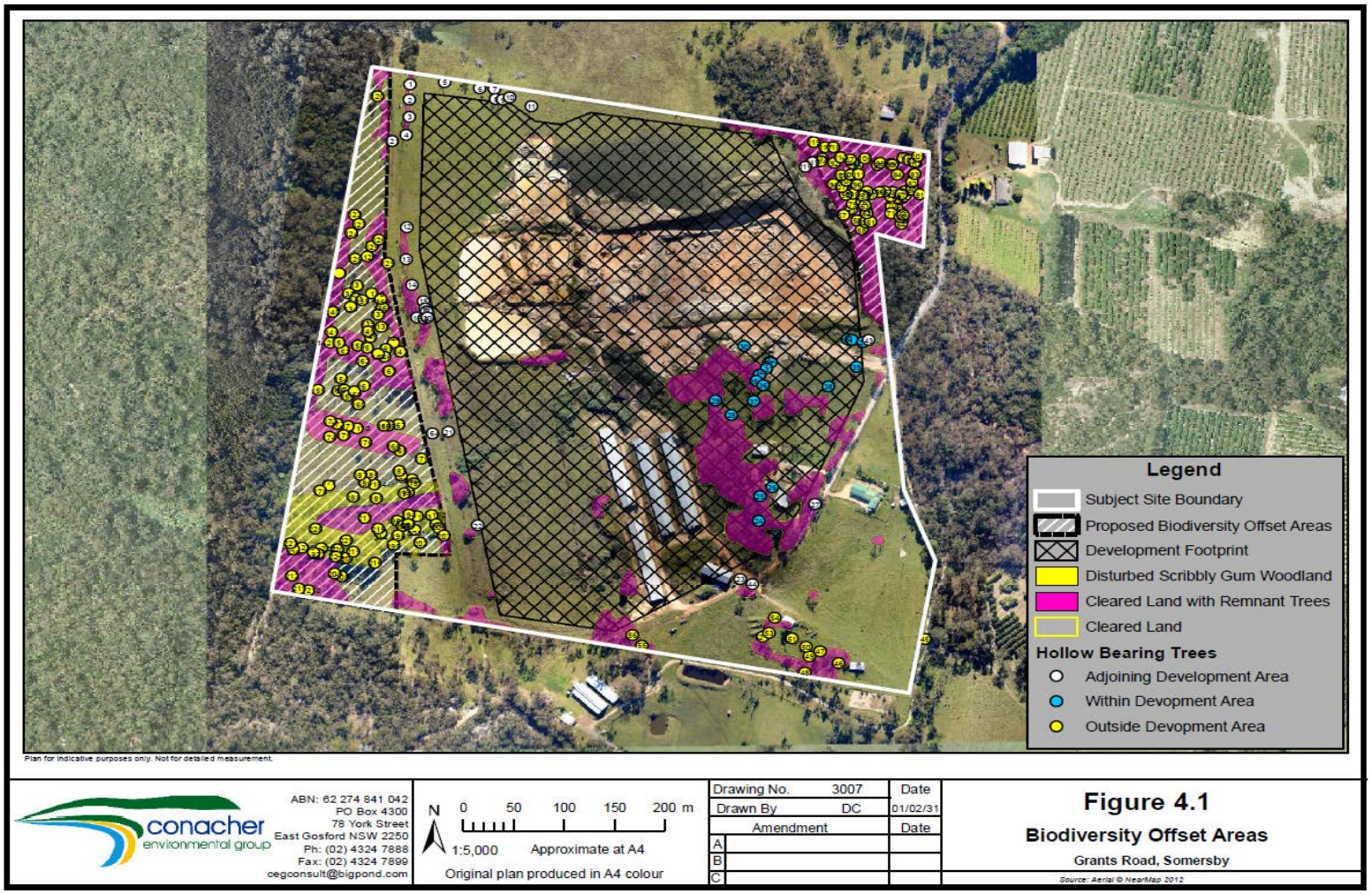
Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station in the vicinity of the site.

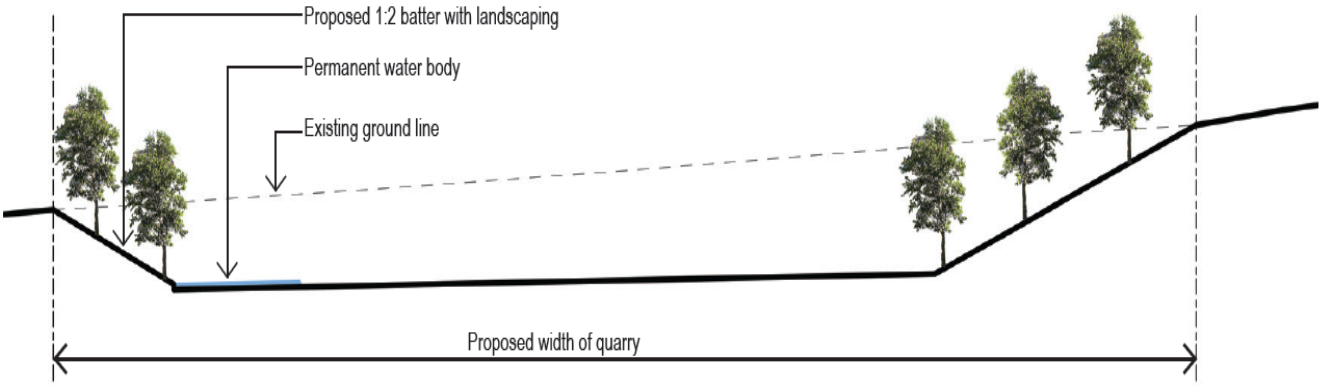
Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.
4. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   a) monitoring locations for the collection of representative noise data;
   b) meteorological conditions during which the collection of noise data is not appropriate;
   c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
   d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 3
BIODIVERSITY OFFSET STRATEGY



APPENDIX 4
CONCEPTUAL FINAL LANDFORM



Appendix 2
QUARRY PRODUCTION DATA

Form S 1

NSW GOVERNMENT | Department of Industry
Resources & Energy

RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2016

Quote RIMS ID in all correspondence

Quarry Id: Rims ID: 400801

Operators Name: GRANTS ROAD SANDS
Address: 270 GRANTS RD
SOMERSBY
NSW 2250

Email: grahanne@bigpond.com,

Quarry Name: GRANTS RD SANDS
Quarry Location: 270 GRANTS RD

Inquiries please telephone:
(02) 4931 6435
Completed or Nil Returns
Email –
mineral.royalty@industry.nsw.gov.au

Please amend name, postal address and location of mine or quarry if incorrect or incomplete

The return should be completed and forwarded to the **STATISTICAL OFFICER, NSW DEPARTMENT OF INDUSTRY RESOURCES AND ENERGY, PO BOX 344, HUNTER REGION MAIL CENTRE NSW 2310 on or before 30 November, 2016.** If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment**, and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature, and whether the area being worked is held under a mining title or otherwise.

Zane West, Royalties and Advisory Services Manager

Please complete the following information to assist in identifying the location of the Quarry

Typical Geology Hawkesbury Sandstone

Nearest Town to Quarry Gosford

Local Council Name Gosford

Deposited Plan and Lot Number/s of Quarry DP 358717 Lot 1 Portion 81

Email Address of Operator info@granterdsand.com.au

Name of Owner or Licensee GR & A.K. Jones.

Postal Address of Licensee 270 Grants Rd, Somersby NSW 2250.

Licence/Lease Number/s (if any)
From Mineral Resources NSW (Industry & Investment NSW) _____

From Department of Lands or other Department _____

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land GR & AK Jones 270 Grants Rd Somersby

---

- To the best of my knowledge, the particulars which have been entered in this return are correct and no blank spaces have been left where figures should have been inserted.
- **SIGNATURE of PROPRIETOR or MANAGER** S Jones **DATE** 25/10/2016
- **PERSON to be contacted if queries arise regarding this return** Steven Jones
- **NAME** (Block letters) STEVEN JONES **Telephone** 0418 116 861
  Manager

SALES During 2015-2016

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		3205
Over 30mm to 75mm		10479
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		2270
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
Recycled Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• **River Gravel**		
Over 30mm		
5mm to 30mm		
Under 5mm		
• **Construction Sand**	Excluding Industrial Washed	34547
• **Industrial Sand**		
Foundry, Moulding		
Glass		
Other (Specify)		
• **Dimension Stone**	Building, Ornamental, Monumental	
Quarried in Blocks		8593
Quarried in Slabs		
• **Decorative Aggregate**	Including Terrazzo	
• **Loam**	Soil for Topdressing, Garden soil, Horticultural purposes)	
• **TOTAL SITE PRODUCTION**		590094
• **Gross Value ($) of all Sales**		$2 961 700.00
• **Type of Material**	Sandstone	
• **Number of Full-Time Equivalent (FTE) Employees**	Employees: 5	Contractors 1

Please Note: A return for clay based products can be obtained by contacting the inquiry number.

SALES During 2015-2016

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		3205
Over 30mm to 75mm		10479
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		2270
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
Recycled Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• **River Gravel**		
Over 30mm		
5mm to 30mm		
Under 5mm		
• **Construction Sand**	Excluding Industrial Washed	34547
• **Industrial Sand**		
Foundry, Moulding		
Glass		
Other (Specify)		
• **Dimension Stone**	Building, Ornamental, Monumental	
Quarried in Blocks		8593
Quarried in Slabs		
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• **Number of Full-Time Equivalent (FTE) Employees**	Employees: 5	Contractors 1

Please Note: A return for clay based products can be obtained by contacting the inquiry number.

Appendix 3
WATER QUALITY MONITORING
Larry Cook Consulting Pty Ltd

Larry Cook Consulting Pty Ltd

WATER MONITORING
PERIOD 1.1.16 – 31.12.16

GRANTS ROAD SAND QUARRY

Grants Road Sand
Lot 1 in DP358717
270 Grants Road Somersby

PREPARED FOR: **GRANTS ROAD SAND**

PROJECT NUMBER: **11017**

DATE: **24TH FEBRUARY 2017**

Larry Cook Consulting
(ABN 27 159 132 055)

PO Box 8146 TUMBI UMBI NSW 2261
Office: 02 4340 0193 Mobile: 0428 884645 Email: larrycookconsulting@gmail.com

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Author and Document Control

Written/Submitted by:	**Reviewed / Approved by:**
Larry Cook *Senior Hydrogeologist & Environmental Scientist* *Larry Cook Consulting Pty Ltd*	

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1 x PDF	11017-F	Rev.1 Ed.1	24th February 2017	Grants Road Sand

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

Grants Road Sand has state government approval to expand the quarrying operations at Lot 1 in DP358717, 270 Grants Road Somersby (the Site) to produce a range of sand products and high quality hard rock.

Larry Cook Consulting Pty Ltd was commissioned by *Grants Road Sand* to prepare an annual Water Monitoring Report documenting the results of ongoing water monitoring in a network of dedicated monitoring bores and surface water monitoring sites strategically located within the *Grants Road Sand* quarry precinct. Monitoring included collection and compilation of automated water level measurements and prescribed water quality testing.

The objectives of the water monitoring are documented in the Groundwater Management Plan prepared by *Larry Cook Consulting Pty Ltd* for *Grants Road Sand* in 2014 (Ref. 11017-D dated November 2014) and in the Surface Water Management Plan prepared by *Larry Cook Consulting Pty Ltd* for *Grants Road Sand* in 2015 (Ref. 11017-E dated February 2015). The objectives of the management plans were prepared in accordance with Schedule 3 Part 4 (c) (i, ii, iii & iv) of the Project Approval.

2.0 SITE DETAILS

2.1 LOCATION AND SITE IDENTIFICATION

The existing sand quarry and proposed quarry extension are located on Grants Road in Lot 1 in DP358717 on the Somersby Plateau.

The location of the Property is shown in **Figure 1**. The topographic map sheet covering the Property is the 1:25,000-scale Gosford topographic map sheet (9131-2S.) The approximate MGA coordinates of the centre of the proposed Project Site are Easting 338500 m and Northing 6304250 m. The key features required to identify the Site are summarised in **Table 1**.

Table 1
Site Identification Details

Site	**Description**
Site Name	Grants Road Sand
Site Owner	G.R. & A.K. Jones
Address	270 Grants Road Somersby NSW 2250
Title Plan	Lot 1 in DP358717
LGA	Central Coast Council

3.0 WATER MONITORING SITES

A network of groundwater monitoring bores and surface water monitoring sites are established on the Site.

Water level monitoring is undertaken in four dedicated monitoring bores. Water quality sampling and testing is carried out in two of these monitoring bores and at three surface water monitoring sites. The locations of the surface water and groundwater monitoring (sample) sites are shown in **Figure 2** and locations of the monitoring bores (sampling and water level) annotated in **Figure 3.** A register of the monitoring sites provided in **Table 2**.

Table 2
Register of Water Monitoring Sites

Monitoring Site	Monitoring Type	Location	Monitoring
W1	Surface Water	North-west discharge point	Water quality
W4	Surface Water	Culvert on south-west waterway	Water quality
S1	Surface Water	South-west waterway on western boundary of Lot 1	Water quality
G4 (BH 4)	Groundwater	Bore on NW corner of decant Pond	Water quality and automated water level
G3 (BH 3)	Groundwater	Bore in NW corner of Lot 1 (control bore)	Water quality and automated water level
DDH 1	Groundwater	Northern central part of Lot 1	Automated water level
DDH 2	Groundwater	Southern central part of Lot 1	Automated water level

4.0 AUTOMATED WATER LEVEL MEASUREMENTS

Automated water level measurements were collected in new water level sensors installed in the network of four monitoring bores in May 2016.

A composite set of hydrographs is presented in **Figure 3** and a set of normalised hydrographs shown in **Figure 5**. Rainfall data from the official nearby BOM weather station at Mangrove Mountain (Mangrove Mountain BOM Station No. 061375) is also charted.

The following observations and comments are provided:

- The composite hydrographs reveal a general rise in the water table between June and mid-September 2016 followed by a commensurate decline to the end of the reporting period in December 2016.

- The character of the hydrographs for monitoring bores DDH 1 and DDH 2 is consistent with predictions that the relative deeper sub-horizontal sandstone aquifers that can be effectively separated and semi-confined (and sometimes confined) by interbedded relatively massive sandstone units that possess lower hydraulic conductivities. Although this relatively deeper set of aquifers in DDH 1 and DDH 2 show a direct response to rainfall events, they do not usually respond as rapidly or in magnitude (amount of water level fluctuations) to the shallower aquifer intersected in the relatively shallow monitoring bore BH 3.
- A rapid fall in the water table is noted in Monitoring Bore DDH1 in early July 2016 followed by a gradual recovery through to late September.
- The close correlation between several rain events recorded at nearby Mangrove Mountain and water level rise recorded in shallow monitoring bores (BH3 and BH4) suggests relative rapid recharge of the shallow aquifer system particularly between early June 2016 and mid-September after which the immediately surrounding landform was altered. The correlation between rainfall and water level is particularly noticeable in the hydrograph for Control Monitoring Bore BH3 which has the longest recording history (2013-current). This observation is consistent with the conclusions of extensive groundwater investigations over the Site and surrounding district by *Larry Cook Consulting Pty Ltd* who note that the shallow aquifers will be characterised by a predictably rapid response to any significant rainfall events (direct and immediate recharge).
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

5.0 WATER SAMPLING

Regular water sampling was undertaken in the nominated groundwater monitoring bores and surface water monitoring sites by *Grants Road Sand* during the reporting period 1.1.16 through 31.12.16.

A stainless steel bailer was used to sample the two monitoring bores. Latex disposable gloves were used during sample collection and samples stored in laboratory-supplied labelled bottles and chilled in an esky. The samples were submitted to the project's NATA accredited laboratory ALS Environmental for a suite of prescribed tests and determinations listed in **Table 3** in order to reveal any trends in the results and any potential contamination from quarrying and sand washing activities. The samples were transported to the project laboratory under Chain of Custody (COC) protocol.

Table 3 List of Analytes and Tests
All Samples for:
pH
Total Suspended Solids (TSS)
Selected Samples for:
Total Dissolved Solids
Nitrite + Nitrate as N
Total Kjeldahl Nitrogen as N
Total Nitrogen as N
Total Phosphorus as P

6.0 QUALITY ASSURANCE & QUALITY CONTROL

6.1 DATA QUALITY OBJECTIVES

The data quality objectives of the investigation were to obtain sufficient representative data to allow a high quality groundwater assessment including:

- Characterisation of groundwater quality; and
- Identification of any risks posed to the environment.

The assessment was conducted to a standard consistent with generally accepted and current professional consulting practice for such an investigation. The evaluation criteria (Decision Rules) adopted for the investigation are summarised in **Table 4**.

Table 4 Data Quality Objectives	
DQO	**Evaluation Criteria**
Documentation completeness	Completion of calibration records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratory
Data comparability	Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory.
Data representativeness	Adequate sampling coverage dictated by distribution of pre-selected monitoring bores, and selection of representative samples
Precision and accuracy for sampling and analysis	Use properly trained and qualified field personnel. Achieve laboratory QC criteria.

6.2 FIELD QA/QC

The Quality Assurance and Quality Control QA/QC protocols used during the fieldwork are listed in **Table 5**.

Table 5
Field QA/QC

Protocol	Description
Sampling Team	The fieldwork was managed and carried out by an experienced technician or suitably trained staff member.
QA/QC System	All fieldwork was conducted in accordance with Industry Standard Sampling Procedure.
Chain of Custody Forms	All samples were logged and transferred under appropriately completed Chain of Custody (COC) Forms.
Preservation	All samples were delivered to the project laboratory in appropriately preserved containers, with preservation consisting of packing samples in eskies with ice.
Blind Field Duplicates	Duplicate testing was not carried out for these assessments.

6.3 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

The project laboratory (ALS) used for the tests and chemical analysis of samples during 2016 is NATA accredited for the selected tests and analysis.

7.0 RESULTS

Laboratory results are summarised in **Table 6**. Copies of the laboratory certificates supplied by Grants Road Sand are provided in **Annexure 1**.

In summary:

- Monitoring Site S1 on the south-western boundary of the Site (drainage) was noted to be dry on 9th February 2017.
- The **pH** of the surface water (W1 W4 and S1) is slightly acidic to near neutral. The pH of groundwater (G3 and G4) is moderately acidic that reflects rainwater recharge and retention of water within Hawkesbury Sandstone. The pH values are typical of groundwater hosted by the Hawkesbury Sandstone on Mangrove Mountain.
- The concentration of **Total Suspended Solids (TSS)** recorded in the two groundwater monitoring bores (G3 and G4) is, in all but one sample, less than the LOR. The exception is a concentration of 5 mg/L recorded in G4 on 18th December 2016. The concentration of TSS recorded in the three surface water samples ranges from less than the LOR to a maximum of 22 mg/L recorded in two samples; W4 on 20th July 2016 and S1 on 18th December 2016.

Table 6 Composite Analytical Results

SAMPLE		Guidelines		Method Detection Limit	G3					G4				
DESCRIPTION		Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2] (95% level protection)		Monitoring Bore (Groundwater)					Monitoring Bore (Groundwater)				
DATE					9/2/16	20/7/16	4/9/16	23/10/16	18/12/17	9/2/16	20/7/16	4/9/16	23/10/16	18/12/17
ANALYTE	UNIT													
pH	pH Units	ISD		0.1		4.48			5.41		4.49			4.8
Total Suspended Solids	mg/L			5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	5
Total Dissolved Solids	mg/L			10.0		90			120		85			155
Nitrite + Nitrate as N	mg/L			0.0		5.55			5.17		5.54			7.35
Total Kjeldahl Nitrogen as N	mg/L			0.1		1			0.9		0.5			4.6
Total Nitrogen as N	mg/L			0.1		6.6			6.1		6			12.0
Total Phosphorus as P	mg/L			0.01		<0.01			<0.01		<0.01			0.01

SAMPLE		Guidelines		Method Detection Limit	W1					W4					S1				
DESCRIPTION		Drinking Water - Health Guidelines [1]	Trigger Value for the Protection of Freshwater Aquatic Ecosystems [2] (95% level protection)		Surface Water Monitoring Site					Surface Water Monitoring Site					Surface Water Monitoring Site				
DATE					9/2/16	20/7/16	4/9/16	23/10/16	18/12/17	9/2/16	20/7/16	4/9/16	23/10/16	18/12/17	9/2/16	20/7/16	4/9/16	23/10/16	18/12/17
ANALYTE	UNIT																		
pH	pH Units	ISD		0.1		6.25					6.22				dry	6.13			6.57
Total Suspended Solids	mg/L			5.0	10	10	20	<5		10	22	21	<5		dry	20	20	<5	22
Total Dissolved Solids	mg/L			10.0		46					42					38			111
Nitrite + Nitrate as N	mg/L			0.0		0.11					0.11					0.11			0.03
Total Kjeldahl Nitrogen as N	mg/L			0.1		1.1					2					2.3			1.9
Total Nitrogen as N	mg/L			0.1		1.2					2.1					2.4			1.9
Total Phosphorus as P	mg/L			0.01		0.09					0.23					0.26			0.18

[1] **Drinking Water Guidelines**: National Water Quality Management Strategy 2011 Version 3.1 updated March 2015

[2] **Australian and New Zealand Guidelines for Fresh and Marine Water Quality**. National Water Quality Management Strategy (ANZECC 2000)

Note: ISD denotes insufficient data to set a guideline value based on health considerations

- The concentrations of **Total Dissolved Solids (TDS)** range from 85 and 155 mg/L in groundwater samples to between 38 and 46 mg/L in surface water samples. These levels indicate low salinity.
- The concentrations of **Nitrate plus Nitrite** range from 5.17 and 7.35 mg/L in groundwater samples to 0.11 mg/L in surface water samples. Relative soluble nitrate is likely associated with the agricultural history of the area.
- The concentrations of **Total Kjeldahl Nitrogen** range from 0.50 and 4.56 mg/L in groundwater samples to between 1.1 to 2.3 mg/L in surface water samples.
- Levels of **Total Phosphorus** were recorded at less than the LOR in the two groundwater samples and less than 0.26 mg/L in surface water samples. Phosphorus is likely associated with the agricultural history of the area.
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

8.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of surface water and groundwater testing obtained during the period 1.1.16 through 31.12.16, the following discussion, conclusions and recommendations are provided.

GEOCHEMISTRY

- The pH of the surface water sampled is slightly acidic to near neutral that reflects rainwater recharge over the quarry precinct and potential mixing with local groundwater hosted by the Hawkesbury Sandstone.
- The concentrations of Total Suspended Solids (TSS) recorded in groundwater samples were at low levels with even lower levels recorded in the surface water samples.
- Low levels of nutrients likely reflect the agricultural history of the district (fertilisers and chicken growing),
- No potential impacts from current approved quarrying activities on this aquifer system were detected.

WATER LEVEL MONITORING

- The close correlation between several rain events and water level rise recorded in shallow monitoring bores suggests relative rapid recharge of the shallow aquifer system. This is consistent with the results of extensive groundwater investigations over the Site and surrounding district.
- The hydrograph for relatively deeper monitoring bore also shows a direct response to rainfall events but with a more subdued magnitude.
- No potential impacts from approved quarrying activities on this aquifer system were detected.

RECOMMENDATIONS

- Continue acquisition of water level measurements in the network of four groundwater monitoring bores.
- Continue regular routine surface water and groundwater monitoring in the monitoring network during 2017 in accordance with the requirements documented in the surface water and groundwater management plans.
- Submit water samples to the project laboratory (ALS) for analysis, compile results and assess any trends and exceedances and, if required, implement a response and action plan in accordance with the environmental management plans.
- Prepare a report giving the results of the 2017 monitoring program and an assessment of any trends and potential impacts. This will include an ongoing assessment of hydrographs, pH and TSS, and other tests as required.

For and on behalf of
Larry Cook Consulting

Larry Cook
Hydrogeologist

ANNEXURES

Annexure 1

Laboratory Certificates

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1600561**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Newcastle
Contact	: Ms Leanne Jones	Contact	:
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: info@grantsrdsand.com.au	E-mail	:
Telephone	: ----	Telephone	: +61 2 4014 2500
Facsimile	: ----	Facsimile	: +61 2 4967 7382
Project	: Water Samples	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 11-Feb-2016 09:30
C-O-C number	: ----	Date Analysis Commenced	: 11-Feb-2016
Sampler	: ----	Issue Date	: 12-Feb-2016 15:01
Site	: ----		
		No. of samples received	: 4
Quote number	: ----	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**G3**	**G4**	**W1**	**W4**	**----**
			Client sampling date / time	09-Feb-2016 17:15	09-Feb-2016 17:15	09-Feb-2016 17:15	09-Feb-2016 17:15	----
Compound	*CAS Number*	*LOR*	*Unit*	**EN1600561-001**	**EN1600561-002**	**EN1600561-003**	**EN1600561-004**	**--------**
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	**10**	**10**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1616012**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	:
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Water Samples	Date Samples Received	: 22-Jul-2016 09:17
Order number	: ----	Date Analysis Commenced	: 25-Jul-2016
C-O-C number	: ----	Issue Date	: 27-Jul-2016 15:22
Sampler	: STEVEN JONES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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- Analytical Results

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Signatories

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Signatories	*Position*	*Accreditation Category*
Dian Dao		Sydney Inorganics, Smithfield, NSW

General Comments

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When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	G3	G4	S1	W4	W1
			Client sampling date / time	20-Jul-2016 16:30	20-Jul-2016 16:40	20-Jul-2016 04:00	20-Jul-2016 16:00	20-Jul-2016 16:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES1616012-001**	**ES1616012-002**	**ES1616012-003**	**ES1616012-004**	**ES1616012-005**
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**4.48**	**4.49**	**6.13**	**6.22**	**6.25**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**90**	**85**	**38**	**42**	**46**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	**20**	**22**	**10**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**5.55**	**5.54**	**0.11**	**0.11**	**0.11**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.0**	**0.5**	**2.3**	**2.0**	**1.1**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**6.6**	**6.0**	**2.4**	**2.1**	**1.2**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	**0.26**	**0.23**	**0.09**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1619694**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	:
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WATER MONITORING	Date Samples Received	: 06-Sep-2016 09:03
Order number	: ----	Date Analysis Commenced	: 06-Sep-2016
C-O-C number	: ----	Issue Date	: 07-Sep-2016 10:26
Sampler	: STEVEN JONES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	G3	G4	S1	W4	W1
			Client sampling date / time	04-Sep-2016 16:00	04-Sep-2016 16:00	04-Sep-2016 16:00	04-Sep-2016 16:00	04-Sep-2016 16:00
Compound	*CAS Number*	*LOR*	*Unit*	**ES1619694-001**	**ES1619694-002**	**ES1619694-003**	**ES1619694-004**	**ES1619694-005**
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	**20**	**21**	**18**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1624007**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	:
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: NOTES MONITORING	Date Samples Received	: 25-Oct-2016 09:10
Order number	: ----	Date Analysis Commenced	: 25-Oct-2016
C-O-C number	: ----	Issue Date	: 26-Oct-2016 10:28
Sampler	: STEVE JONES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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Accredited for compliance with
ISO/IEC 17025 - Testing

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Signatories

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Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

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~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	G3	G4	S1	W4	W1
			Client sampling date / time	23-Oct-2016 16:30	23-Oct-2016 16:30	23-Oct-2016 16:30	23-Oct-2016 16:30	23-Oct-2016 16:30
Compound	*CAS Number*	*LOR*	*Unit*	**ES1624007-001**	**ES1624007-002**	**ES1624007-003**	**ES1624007-004**	**ES1624007-005**
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	<5	<5

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1629315**	Page	: 1 of 2
Client	: **GR & AK Jones**	Laboratory	: Environmental Division Sydney
Contact	: Ms Leanne Jones	Contact	: Customer Services ES
Address	: 270 Grants Rd Somersby NSW 2350	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: WATER MONITORING	Date Samples Received	: 20-Dec-2016 09:00
Order number	: ----	Date Analysis Commenced	: 20-Dec-2016
C-O-C number	: ----	Issue Date	: 29-Dec-2016 11:22
Sampler	: STEVEN JONES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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Signatories

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Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

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When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
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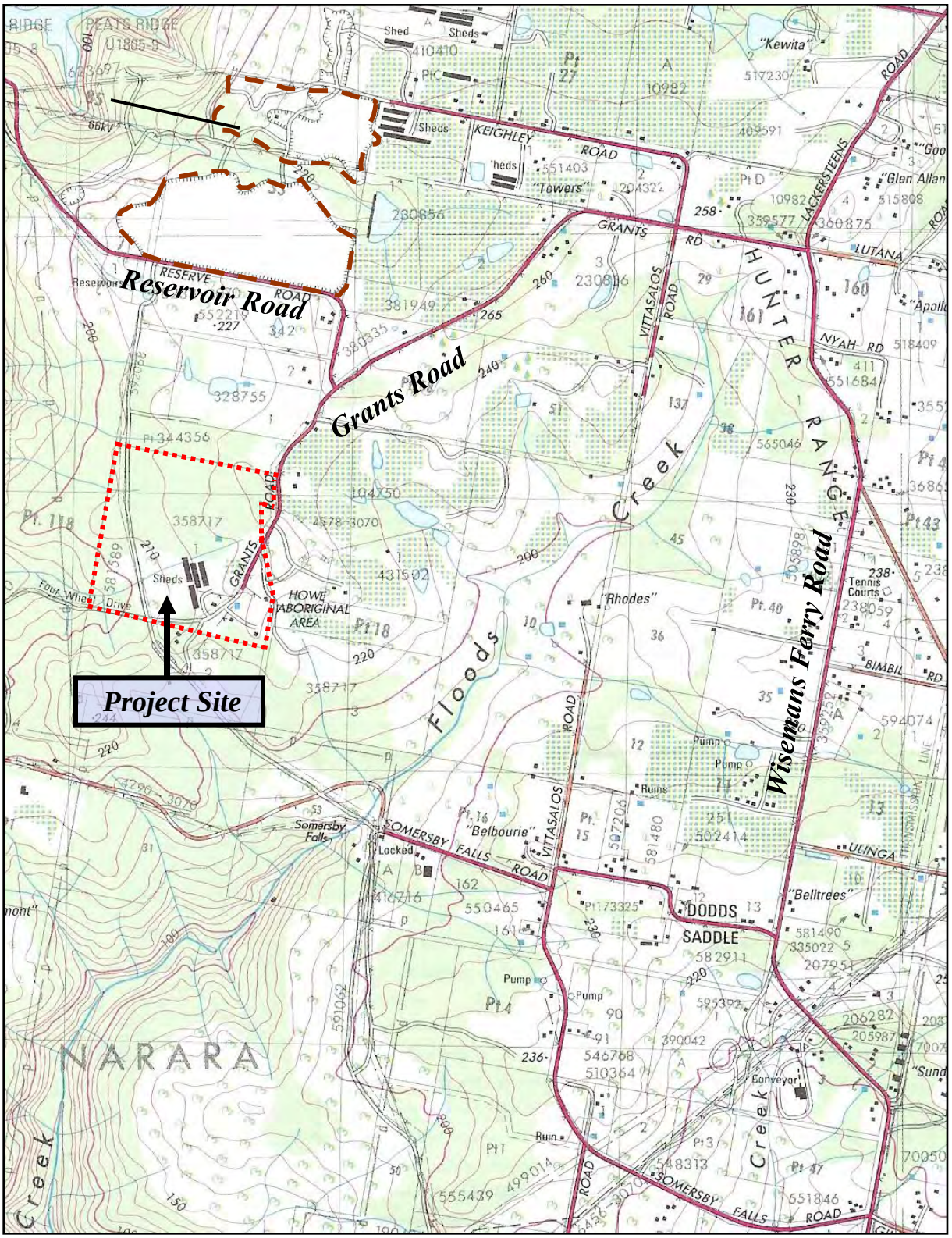
~ = Indicates an estimated value.

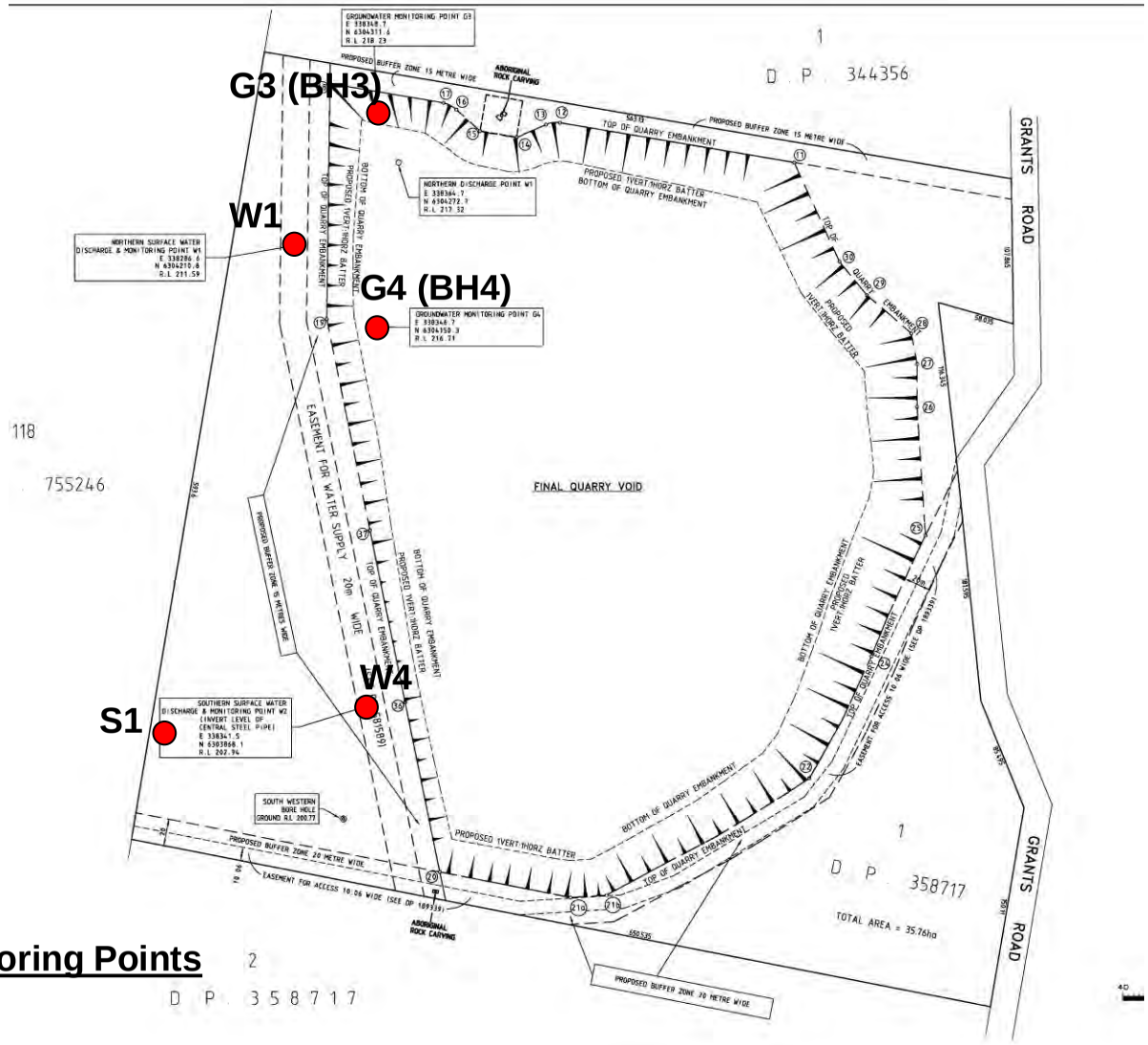
Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	G3	G4	S1	----	----
			Client sampling date / time	18-Dec-2016 16:00	18-Dec-2016 16:00	18-Dec-2016 16:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1629315-001**	**ES1629315-002**	**ES1629315-003**	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.41**	**4.80**	**6.57**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**120**	**155**	**111**	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**5**	**22**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**5.17**	**7.35**	**0.03**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.9**	**4.6**	**1.9**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**6.1**	**12.0**	**1.9**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	<0.01	**0.01**	**0.18**	----	----

Figures



Larry Cook Consulting **PO Box 8146** **Tumbi Umbi NSW 2261** **Ph: 02 4340 0193**	**Grants Road Sand Quarry Expansion**	Scale: As shown
	Location of Project Site	**FIGURE 1**

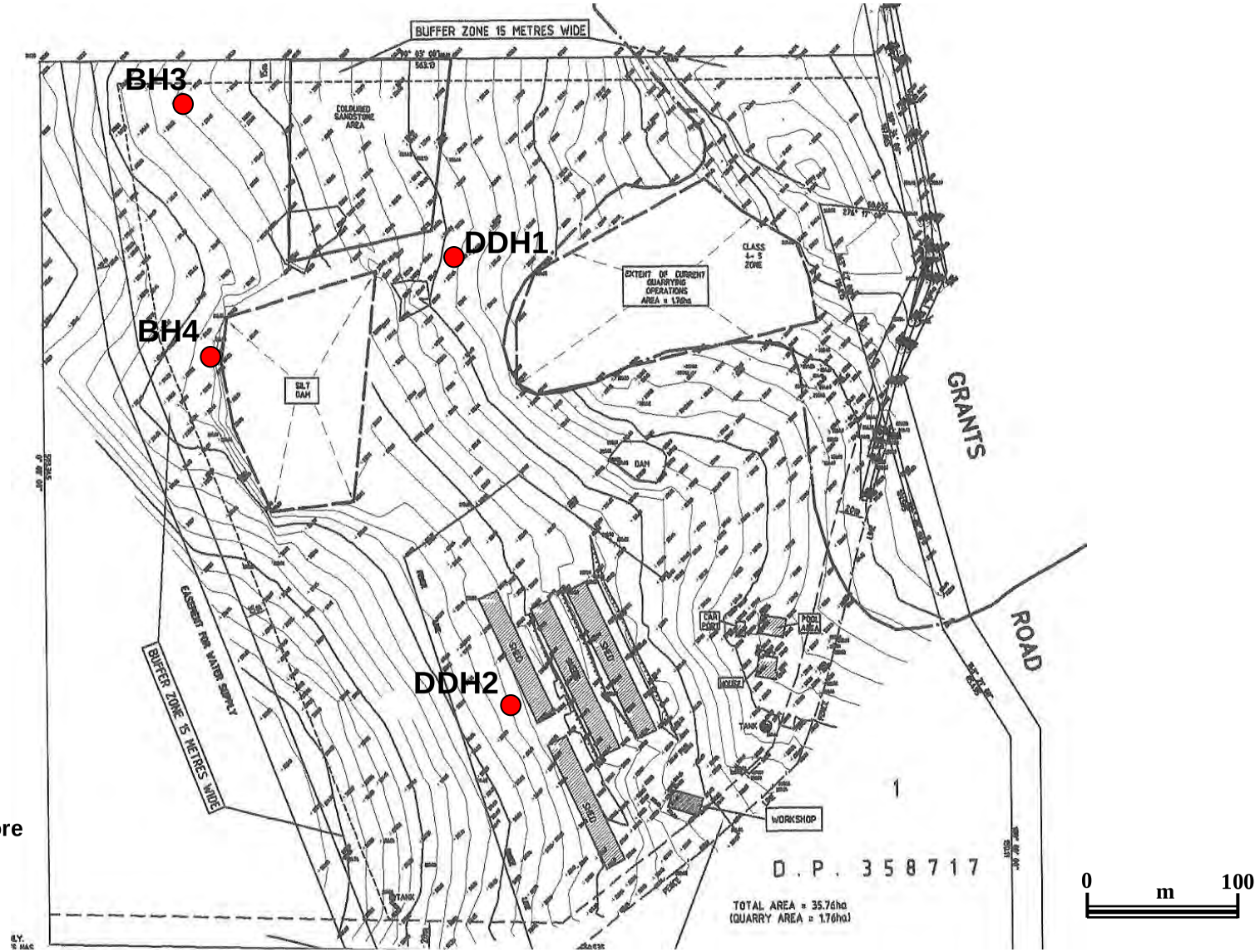


Surface Water Monitoring Points
W1, W4 & S1

Groundwater Monitoring Points
G3 & G4

Modified after Stephen Thorne & Associates (2015)

Larry Cook Consulting **PO Box 8146** **Tumbi Umbi NSW 2261** **Ph 02 4340 0193**	**Grants Road Sand Quarry Extension** Locations of Monitoring Sites	N	Scale: As shown **FIGURE 2**



Larry Cook Consulting
PO Box 8146
Tumbi Umbi NSW 2261
Ph 02 4340 0193

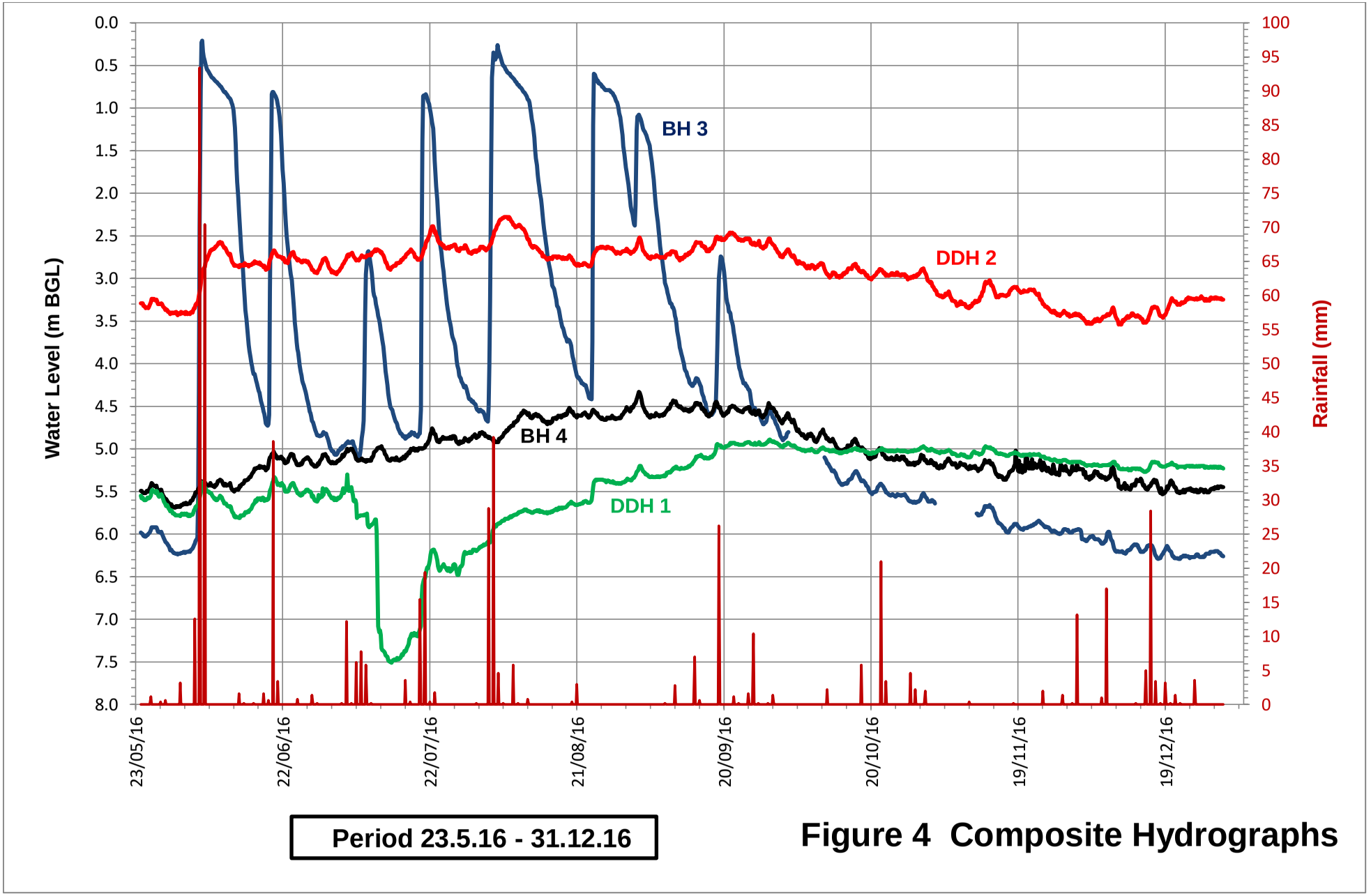
Grants Road Sand Quarry Expansion

Site Plan and Locations of Monitoring Bores

N

Scale: As shown

FIGURE 3



Period 23.5.16 - 31.12.16

Figure 4 Composite Hydrographs

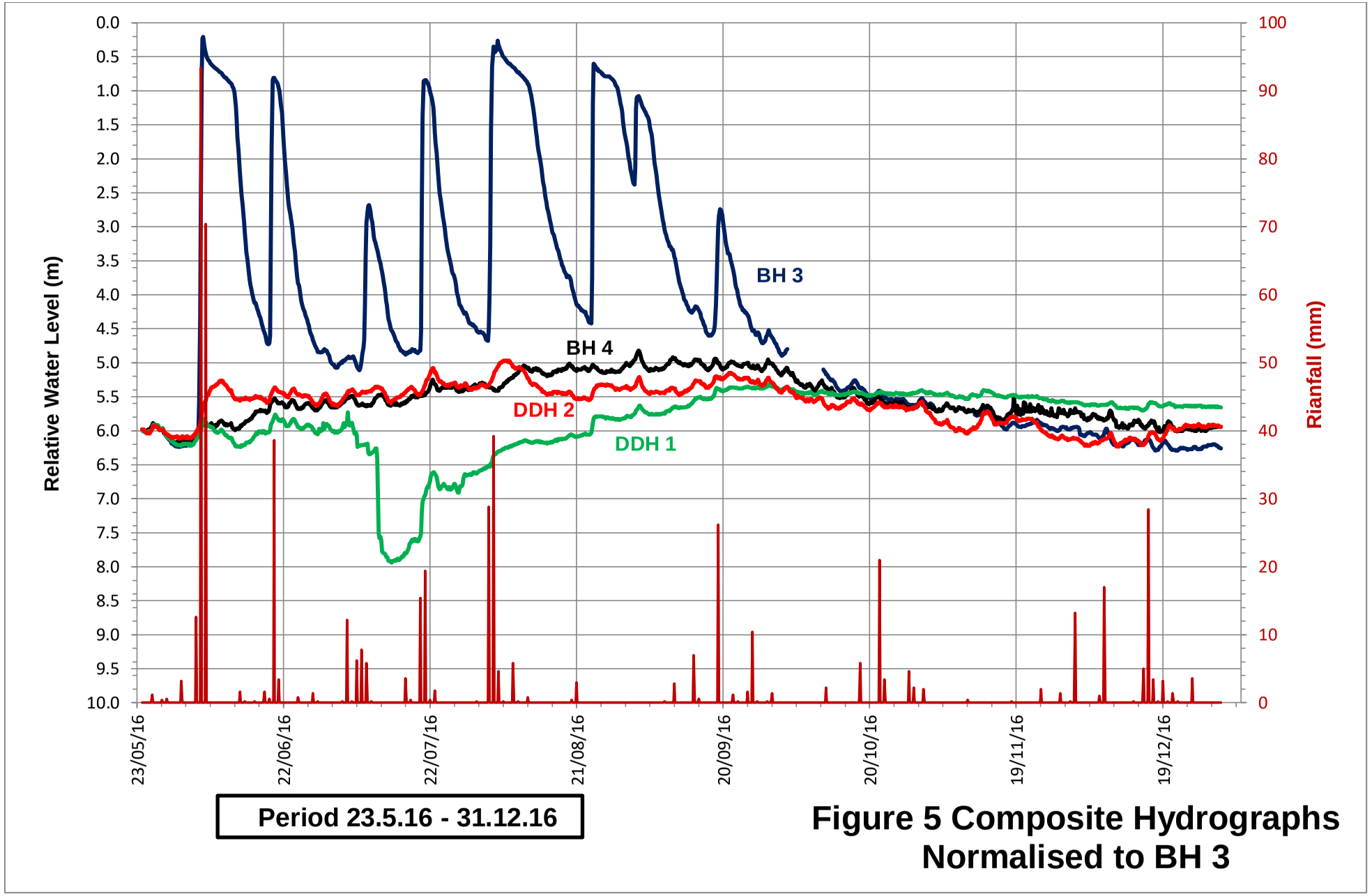


Figure 5 Composite Hydrographs Normalised to BH 3