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Boral Peppertree Quarry

Annual Review

January – December 2019

Document Control

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Boral Peppertree Quarry

STATUS	DATE	DISTRIBUTION
DRAFT (Version No. 1)	30th March 2020	Michael Higgins (Boral Peppertree Quarry Manager) Sharon Makin (Stakeholder and Environment Advisor)
Final (Version No. 1)	31st March 2020	Michael Higgins (Boral Peppertree Quarry Manager) Sharon Makin (Stakeholder and Environment Advisor)

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Boral Peppertree Quarry

Annual Review (Jan 2019 – Dec 2019)

Name of operation	Peppertree Quarry
Name of operator	Boral Resources (NSW) Pty Ltd
Development consent / project approval #	06_0074
Name of holder of development consent / project approval	Boral Resources (NSW) Pty Ltd
Mining lease #	Not applicable
Name of holder of mining lease	Not applicable
Water licence #	10WA102701 and 10WA116000
Name of holder of water licence	Boral Resources (NSW) Pty Ltd
MOP/RMP start date	Not applicable
MOP/RMP end date	Not applicable
Annual Review start date	1st January 2019
Annual Review end date	31st December 2019

I, Michael Higgins, certify that this audit report is a true and accurate record of the compliance status of Peppertree Quarry for the period 2019 Calendar Year and that I am authorized to make this statement on behalf of Boral Resources (NSW) Pty Ltd.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer : Michael Higgins

Title of authorised reporting officer : Peppertree Quarry Manager

Signature of authorised reporting officer

Date 31st March 2020

Table of Contents

Tables

Figures

Commonly Used Abbreviations and Acronyms

AR	Annual Review
AHMP	Aboriginal Heritage Management Plan
AMC	Aboriginal Management Committee
ANZECC	Australian and New Zealand Environment Conservation Council
AQMP	Air Quality Management Plan
AS	Australian Standard
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
DO	Dissolved Oxygen
DPI&E	Department of Planning, Industry and Environment
Ha	Hectares
HSE	Health, Safety and Environment
HSEQMS	Health, Safety, Environmental Management System
HVAS	High Volume Air Sampler
kL	Kilolitres
LOR	Limit of Reporting
mgbl	metres below ground level
NATA	National Association of Testing Authorities
NBMP	Noise and Blast Management Plan
NSW	New South Wales
NTU	Nephelometric Turbidity Units
O&G	Oil & Grease
PIRMP	Pollution Incident Response Management Plan
PM_{10}	Particulate Matter (10 microns in diameter)
POEO Act	*Protection of the Environment Operations Act 1997*
RL	Reduced Level
TDS	Total Dissolved Solids
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
$\mu g/m^2$	micro grams per square metre
$\mu g/m^3$	micro grams per cubic metre
WMP	Water Management Plan

1 STATEMENT OF COMPLIANCE

The Statement of Compliance for the 2019 Reporting Period is contained in Table 1.

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Approval MP 06_0074	no
EPL 13088	yes

The Non compliances identified during the reporting period are detailed in Table 2. Each Noncompliance has been risked ranked as per the DPIE Annual Review Guidelines Compliance Status key outlined in Table 3.

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition description	Compliance status	Comment	where addressed in the Annual review
MP 06_0074	Schedule 3, Condition 29	The Surface Water Monitoring Program must include: (a) detailed baseline data on surface water flows and quality in Tangarang Creek and Barbers Creek	non-compliant	Water Flow monitoring is not possible within Barbers Creek due to accessibility. Alternative methodologies and locations are being reviewed.	Section 7

Table 3: Compliance Status Key

Risk Level	Colour Code	Description
High	non - compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	non - compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	non - compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non compliance	non - compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2 INTRODUCTION

Peppertree Quarry (the Quarry) is owned and operated by Boral Resources Pty Ltd (Boral). The hard rock quarry is located south-east of Marulan in the NSW Southern Tablelands, approximately 175 km south-west of Sydney (refer to Figure 1).

The Quarry was first granted planning approval in February 2007 under Part 3A of the Environmental Planning and Assessment Act 1979 following the preparation and display of an Environmental Impact Assessment. The project has since been the subject of five separate modification applications which were approved in March 2009, November 2011, October 2012, and August 2016 and most recently in October 2019.

The Quarry has an identified resource area of approximately 250 million tonnes, which dependent upon extraction rates, would allow quarrying for 70 years or more over an area of approximately 104 hectares (ha), within a 650-ha parcel of land.

All quarry products and materials (granodiorite aggregate products and manufactured sand) are transported by rail to a number of Boral rail terminals for distribution by trucks into the Sydney metropolitan area.

This Annual Environmental Management Report (AR) provides a summary of the Quarry's activities, environmental performance, statutory compliance and community relationships between the periods of 1st January 2019 to 31st December 2019 (the reporting period).

The AR has been prepared in accordance with the requirements of the Project Approval 06_0074 Modification 4 (Condition 10 - Schedule 5), which requires:

- Details on works (including rehabilitation) conducted in the previous calendar year and the proposed works planned for the next 12 months;
- A review of monitoring results and community complaint records;
- A review of compliance with statutory requirements in relation to specified limits, plans, programs and performance criteria;
- A summary of corrective actions required to address any non-compliances identified during the AR reporting period;
- Reporting monitoring results with an analysis of trends from previous years' results;
- A review of discrepancies between predicted and actual environmental impacts and an analysis of the potential cause of any significant discrepancies; and
- Measures to be implemented in the next 12 months to improve environmental performance.

The AR has also been prepared in line with the DPIE Annual Review Guideline October 2015.

Copies of the AR will be submitted to:

- NSW Department of Planning, Industry and Environment;
- NSW Environment Protection Authority;
- Water NSW;
- Department of Primary Industries – Water;
- Office of Environment and Heritage;
- Goulburn Mulwaree Shire Council;

- The Peppertree Quarry Community Consultative Committee; and
- Aboriginal Heritage Management Committee.

The report will also be available at the Boral website:

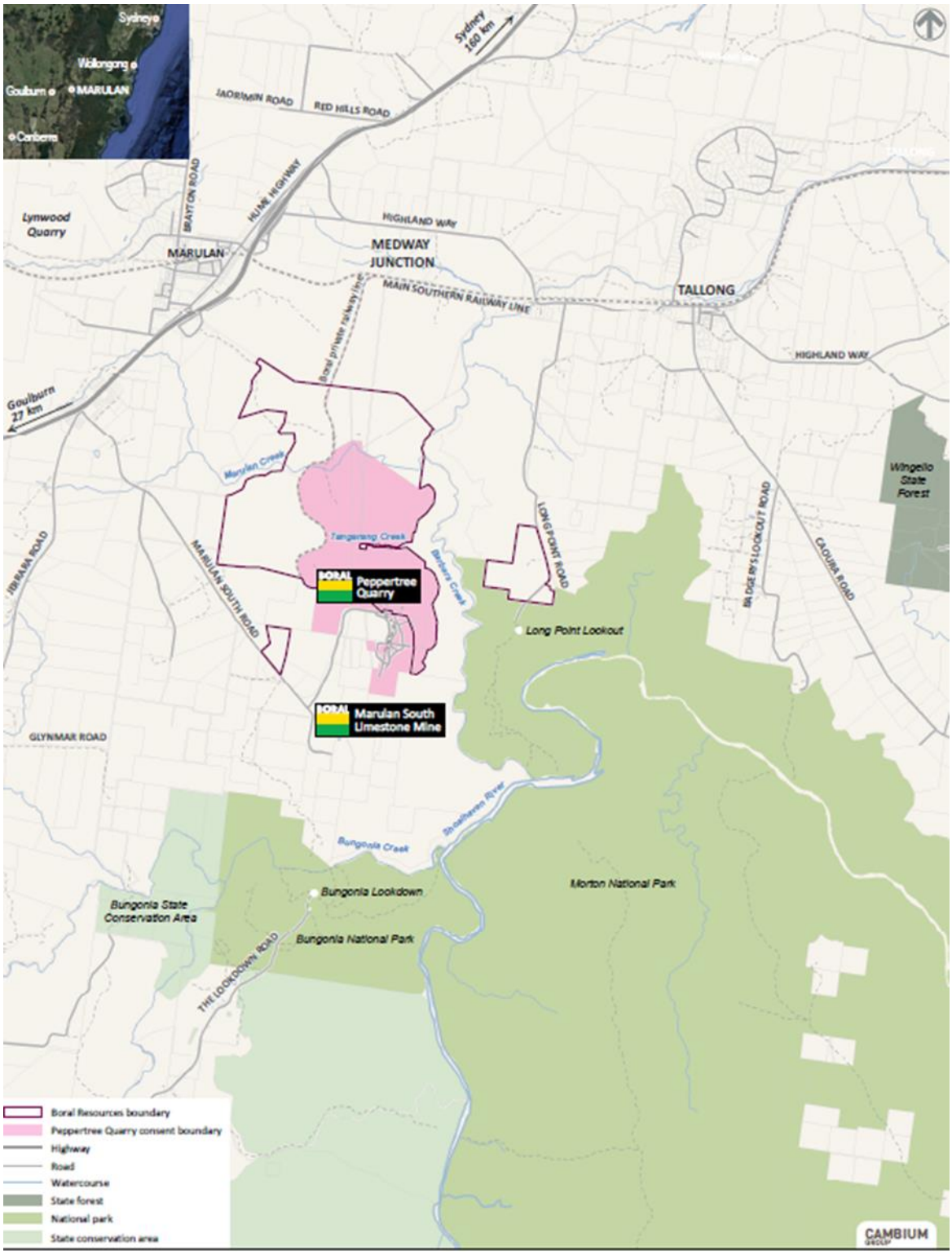
https://www.boral.com.au/locations/boral-marulan-south-operations / reporting -Peppertree Quarry

Key contacts associated with the management of the Quarry operations, environment, safety and stakeholder relationships are provided in Table 4.

Table 4: Key Contact Details – Peppertree Quarry

Contact Person	Position Title	Contact Details
Michael Higgins	Quarry Manager	Tel: (02) 4841 1701 Email: Michael.higgins@boral.com.au
Sharon Makin	Stakeholder and Environment Manager	Tel: (02) 4841 1701 Email: sharon.makin@boral.com.au
Paul Jackson	Stakeholder Relations Manager	Tel: (02) 9033 5215 Email: paul.jackson@boral.com.au

Figure 1: Peppertree Quarry Location



3 APPROVALS

The Quarry operates under a number of regulatory approvals and licences which are summarized in Table 5 below.

Table 5: Approvals

Approval	Detail	Regulatory Authority
Project Approval 06_0074 Modification 5 (2019)	Quarry operating conditions updated for approval to ● develop a new overburden area (South-west Overburden Emplacement – SWOE) ● extend the consent boundary to the south to encompass the SWOE ● construct a new haul road from the pit to the SWOE ● construct a new intersection at Marulan south road to link the new haul road with the SWOE ● amend the design of the Western Overburden Emplacement ● remove the Western Earth Bund (which has not been constructed) and ● Relocate a power line which runs through the proposed SWOE site.	NSW Department of Planning, Industry and Environment
EPL No. 13088	The EPL is issued for the scheduled activity of: Crushing, Grinding, Separation and Extractive activities for tonnages greater than 2 million tonnes per annum. There have been no variations to the EPL during 2019.	NSW Environment Protection Authority
10WA102701	extraction of water from 110ML dam	NSW Office of Water
10WA116000	water bore licence allowing an annual extraction of up to 15 ML.	NSW Office of Water

A copy of the Project Approval is available on request or can be accessed through the following Boral website:

https://www.boral.com.au/locations/boral-marulan-south-operations / General approval - Peppertree quarry

A copy of the EPL is available on request or can be accessed through the following Boral website:

https://www.boral.com.au/our-commitment/environmental-reporting / Boral Quarries - NSW / Boral Peppertree Quarry

Approval was granted of Modification 5 in October 2019 to modify Peppertree Quarry's operation to

- develop a new overburden area (South-west Overburden Emplacement – SWOE)

- extend the consent boundary to the south to encompass the SWOE
- construct a new haul road from the pit to the SWOE
- construct a new intersection at Marulan south road to link the new haul road with the SWOE
- amend the design of the Western Overburden Emplacement
- remove the Western Earth Bund (which has not been constructed) and
- Relocate a power line which runs through the proposed SWOE site.

This Annual Return reflects compliance of the operation to the Modification 4 Condition of Consent. Conditions in relation to Modification5 works will not be implemented until 2020 after Management plans and other documentation is approved and in place.

4 QUARRY OPERATIONS

4.1 OPERATIONS LAST 12 MONTHS

The pit has continued to develop in a south-eastern direction with an overburden campaign undertaken during the first part of 2019. Overburden was emplaced in the Southern Overburden Emplacement, with completion of the majority of the emplacement by July 2019. Rehabilitation was progressively undertaken.

The mobile primary crusher remained within the 1st bench (RL555) of the quarry pit throughout the reporting period.
Operations occurred within the prescribed hours of operation.

No exploration activities were undertaken at the Quarry during the reporting period.

The western overburden continued to be used for emplacement during 2019.

Final Determination of Modification (5) was made by the Department of Planning, Industry and Environment.

4.2 OPERATIONS NEXT 12 MONTHS

Over the next 12 months, the pit will continue to move in a south easterly direction.

The mobile crusher will relocate to RL540 in February 2020 and operate there for the remainder of the year.

The Southern western overburden emplacement (Modification 5) will commence late in 2020.

The western overburden emplacement will reach completion, with rehabilitation commenced.

Modification 6 for the installation of two dust extraction units within the processing area of the quarry will be submitted to the Department of Planning, Industry and Environment early in 2020 with the intent that the dust extraction units will be installed and operational by the end of the year. These units will extract fine dust from within the crusher and screen buildings.

4.3 PRODUCTION, SALES AND TRANSPORT LAST 12 MONTHS

During the reporting period, the Quarry produced 2 415 840 tonnes of aggregate, slightly above the forecasted 2.3 million tonnes. (Refer to Figure 2).

The DRE Production results Form for the Financial Year ending 2019 is contained in Appendix 1.

Project Approval Condition 7 (Schedule 2) requires all products to be transported from Peppertree by rail with a capped tonnage of 3.5 million tonnes per annum. For the 2019 calendar year, 2 836 141 tonnes of product was transported by rail to Boral terminals at Maldon, Enfield and St Peters. This is both Peppertree product and approximately 445 000 tonnes of Limestone sand.

Road transportation may be allowed on request to Department of Planning, Industry and Environment. During the reporting period, Boral made 3 requests to the Department for road transport of products for the use by adjoining properties and donations to local community groups. The Department approved the requests but with limitations on the transport and tonnage. The approvals are summarized in Table 6.

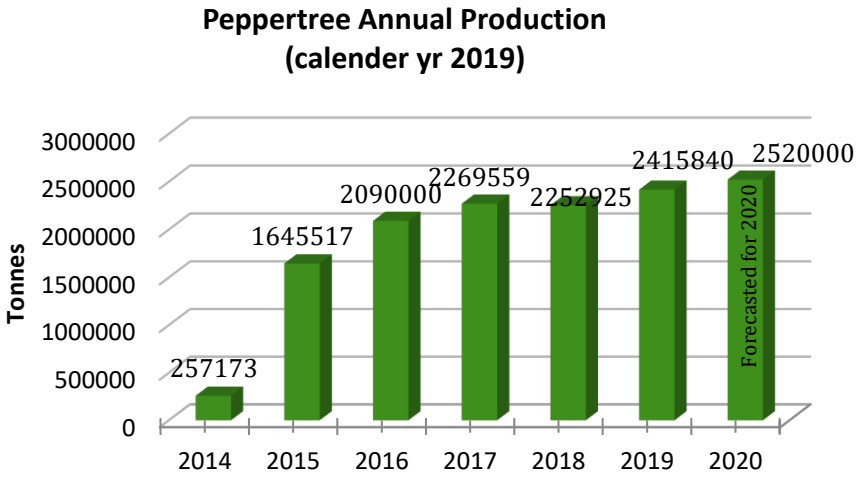
Table 6: Approval Requests for Road Transport

Date	Group	Material	Trucks	Complete
July 2019	Aglime	scalps	4	complete
July 2019	Aglime	rock	2	complete
August 2019	S Lichtenberger	scalps	16	complete

4.4 PRODUCTION, SALES AND TRANSPORT NEXT 12 MONTHS

The anticipated production for 2020, from Peppertree Quarry is 2.5 million tonnes. However, actual realised tonnage will be dependent on market demand and the production levels at other Boral hard rock quarries.

Figure 2: Quarry Production Trends



For 2020, all products will be railed from the site. It is estimated that this will total 2.95 million tonnes, including Limestone sand.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 7 lists specific actions from the 2018 AR to have been undertaken during the 2019 reporting period.

Table 7: Actions Required from 2017 AR

Proposed Activities in 2018	Requested by	Status	Where Discussed
Progress permanent solution for dust extraction at the crusher	Operator	Tender was awarded to Sandvik for the design, construction and installation of 2 dust extraction units. Modification 6 to be submitted early 2020 for the installation and operation of the units with installation planned for late 2020, pending approval.	Section 4
Undertake progressive Overburden stabilization and rehabilitation (as per Biodiversity and rehabilitation management plan 3 year plan)	Operator	Hydro mulching and planting have been undertaken on completed slopes of the eastern and southern overburden.	Section 8
review all management plans - NBMP, AQMP, BRMP, WMP, EMS	Operator	Management plan review commenced in line with Modification 5 approval.	Section 6.1
review recommendations of the Rehabilitation Rapid Visual Assessments and Ecological Assessment and implement where practicable	Operator	Recommendations progressed	Section 8
Implement recommendations of the 2018 Independent audit	Operator	Recommendations implemented in the review of the management plans and waste management onsite. Waste Management plan has been prepared and issued to the DPIE.	Section 11
undertake audit of the surface water management system at the Southern Overburden emplacement once system is installed	DPIE (Mod 4 approval condition)	Audit will be undertaken in 2020	Section 12
Discuss with DPIE and EPA relocation of dust monitoring devices or continued data extrapolation	Operator	Discussion held with EPA who have advised the need for a dual monitoring system for some time to capture and calibrate data at both the old and new site. The implementation of this will be reviewed in 2020. The current system to monitor and model to the boundary will continued.	Section 6.3
Install and operate Real Time noise monitoring alert system	DPIE	The real time noise monitoring system has been installed and is online. The upgrade of the weather station is progressing to provide data for noise management of the primary operations.	Section 6.4
Fence scar trees	Operator	Scar trees have been temporarily fenced. Contractor has been arranged for permanent fencing to be installed.	Section 6.9

Proposed Activities in 2018	Requested by	Status	Where Discussed
Artefact collation and review	Operator	this has not been progressed but is planned for 2020.	Section 6.9
Implement Stakeholder Engagement plan for 2019	Operator	Plan has been implemented with a number of activities undertaken during 2019	Section 9
Pit expansion to the East	Operator	Pit continued expansion to the east	Section 4
review of Ground water trigger levels	Operator	Groundwater trigger levels have been reviewed and will be updated in the revised Water management plan in 2020 as part of the required review for Modification 5 Consent approval.	Section 7
Documents waste management procedures and formalize recycling strategies	Operator	Waste management plan has been prepared and issued to the DPIE.	Section 6.6

6 ENVIRONMENTAL PERFORMANCE

The Quarry has a comprehensive management and monitoring program that collects information and data for the assessment of environmental impacts, regulatory compliance and performance against continual improvement objectives. Management and Monitoring is undertaken in accordance with the respective activity specific Management Plans which define the framework for measuring environmental performance and compliance with statutory requirements.

Table 8 provides an overall summary of the environmental performance of the quarry across a number of parameters, with further details provided in the following sections.

Table 8: Summary of Environmental Performance

Aspect	performance during the reporting period	Trend / Key management implications	Implemented / proposed management actions
deposition gauges	complies with criteria at the neighboring residence	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	Continue to monitor and assess performance
PM10 HVAS	complies with criteria at the neighboring residence	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	Continue to monitor and assess performance
TSP HVAS	complies with criteria at the neighboring residence	data over time is consistent with the EIS predictions, Modification 4 &5 modeling and previous AR reporting	Continue to monitor and assess performance
Noise	complies with criteria at the sensitive receivers	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	real time noise monitoring to be implemented to allow for management of potential noise impacts
Blast - vibration	complies with criteria at the nominated receivers	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	continue to operate as per NBMP and Blast Management procedures
Blast – over pressure	complies with criteria at the nominated receivers	data over time is consistent with the EIS predictions, Modification 4 &5 modeling and previous AR reporting	continue to operate as per NBMP and Blast Management procedures
Waste	review of waste management undertaken with new suppliers in place	Waste minimization, recycling and tracking not actively progressed.	Implement waste management plan including review of recycling options
dangerous goods & Hazardous materials	complies with relevant requirements with systems in place	Database in place	continue to maintain systems
bush fire management	complies with relevant requirements with systems in place	Systems tested over December 2019 with local bushfire threats. Working relationship with Local RFS was excellent. Self-evacuation undertaken on 2 occasions with no issues.	continue to maintain systems and review bush fire management plan
Heritage conservation	complies with AHMP requirements with unidentified finds and the completion of salvage works	Continue to work with AMC representatives. Monthly meeting established to ensure all actions are identified and communicated.	undertake collation of the artefacts and plan to “return to Country”

6.1 BORAL INTEGRATED MANAGEMENT SYSTEM

Peppertree Quarry operates in accordance with the Boral integrated Health Safety, Environment and Quality Management System (HSEQ MS) which establishes a strategic platform for Regulatory compliance and continual improvement in environmental management. This system is documented in the Peppertree Quarry Environmental Management System plan approved by the DPIE in November 2017.

Management plans required by modified approvals are reviewed and / or prepared in line with conditions of consent as well as aligned with the Boral HSEQ requirements.

6.2 METEOROLOGICAL MONITORING

In accordance with Project Approval Condition 21 (Schedule 3), the Quarry continues to utilize the onsite weather station established since the commencement of the quarry development.

The weather station was relocated, June 2019, to a site more suitable for its use with the real time noise monitoring and to a location that will not be affected by future quarry activities.

A Monthly review of the Weather station data is undertaken by a consultant to confirm that the station and the data are within operational compliance.

In addition, a forecasting system via Weatherzone is in place to provide alerts to relevant site personnel on predicted significant weather events such as high winds and extreme rainfall events so that appropriate actions and controls can be proactively implemented.

6.3 AIR QUALITY

The Quarry operates an air quality monitoring system in accordance with the Air Quality Management Plan (AQMP) approved in April 2017. Management actions have been developed and are outlined in the AQMP.

6.3.1 Deposition Dust Monitoring

There are three dust deposition gauges used for monitoring of larger dust particles (typically >50µm) that settle out from the air and referred to as depositional dust. All gauges are located on Boral owned land (refer Appendix 2).

The dust deposition gauges were sampled monthly (+/- 2 days) during the reporting with results comprising of the insoluble (mineralogical) matter and ash residue (organic).

Condition 17 (Schedule 3) of the Project Approval requires that long term deposited dust emissions do not exceed an annual average criterion of 4 g/m^2/month at any neighboring residence or privately owned land.

The criterion allows for consideration towards extraordinary events such as fire incidents and dust storms which may cause exceedances beyond the actual dust contribution of activities associated with the Quarry. To account for such events, the ash content of the monthly deposition gauge samples is also analysed to identify organic matter which would not be typically be representative with the Quarry activities.

As all deposition gauges are located on Boral owned land, a review of the monitoring data and gauge location was conducted by Todoroski Air Sciences. Monitoring data was interpolated to the neighboring residences (in line with Condition 17 Schedule 3) with no exceedances above the criteria. Refer Appendix 2 for results. It has been previously recommended that at least 2 of the gauges be relocated.

A discussion with the EPA has been undertaken as to a change in the monitoring locations to be closer to the boundary and receivers.

The EPA have recommended that monitoring occurs at both the current and proposed locations for a period of time to assess the data before moving to the new proposed locations. This will be assessed in 2020.

The monthly results and annual averages during the reporting period from the three dust deposition gauges (D1, D2 and D3) are in Appendix 2.

6.3.1.1 Deposited Dust – Performance Review (2019)

Sites D1, D2 and Site D3, for the majority of the 2019 reporting period were below or just on the criteria of 4g/m2/month, with the levels increasing in the summer months of January, February and December. For most of the samples, the analysis shows comparatively lower ash content to the insoluble solids concentrations. This is an indication that the samples are likely to have had some level of organic matter which is not generally representative of mineralogical based quarry dust.

All sites were below the criteria of 4g/m2/month when interpolated to the boundary.

6.3.1.2 Long Term Trend Analysis and assessment (2014 – 2019)

Dust Deposition modelling for the EA (2006) was based upon conservative assumption and indicated that the annual average dust concentrations and deposition levels would be below relevant air quality criteria at the nearest residential properties.

The latest modification (October 2019) also modelled that the dust concentrations would remain below the relevant air quality criteria.

The Dust deposition results, when assessed at the boundary of the operations, have been consistently below the criteria since operations commenced in 2014 and therefore are in line with the predictions of the EA and the latest Modification.

6.3.1.3 Deposited Dust Summary and opportunities for improvements

As the dust gauges are situated on Boral owned land and not at the Boundary, monthly interpolation of the data will continue to ensure compliance.

6.3.2 PM10 and TSP

The two HVAS are on Boral owned land, paired together (refer Appendix 2) for the measurement of particulate matter less than 10 microns in diameter (PM_{10}) and Total Suspended Particulates (TSP) and are programmed to operate on a continuous 24-hour period on six in seven-day cycle. The HVAS sampler flows are subject to bi-monthly calibration and other parameters calibrated on an annual basis.

Condition 17 (Schedule 3) of the Project Approval requires that the operation of the Quarry must meet PM_{10} and TSP criteria presented in Table 9 at any neighboring residence or privately owned land.

Table 9: PM_{10} and TSP Criteria

Pollutant	Averaging period	Criteria
TSP	Annual average	90 µg/m^3
PM_{10}	Annual average	30 µg/m^3
	24-hour average (short term impact)	50 µg/m^3

It has been identified that the HVAS are not located at the boundary of the Peppertree Quarry and therefore data obtained from these samplers needs to be interpolated to determine compliance at the nearest receiver.

Regular reports are prepared by Todoroski Air Sciences with a review of the results interpolated to the receivers. Details of the interpolated data are included in Appendix 2.

6.3.2.1 TSP and PM10 – Performance Review (2019)

Graphical results for the annual average of TSP and PM_{10} for the 2019 reporting period are contained in Appendix 2. Both were within the Project Approval criteria of 90 µg/m^3 and 30 µg/m^3respectively.

On seven occasions during the reporting period the short-term 24-hour average criteria of 50 µg/m^3 for PM_{10} emissions were exceeded at the HVAS location.

On investigation, the PM_{10} exceedances were not considered representative of previous 24-hours of quarry activities. Investigations included assessing weather conditions and quarry operations. When interpolated to the boundary the results were below the criteria.

Problems were experienced with the consistent operation at the PM10 sampler at the end of 2017 with some improvement following maintenance of the machine. A new PM10 HVAS was installed in March 2019.

6.3.2.2 Long Term Trend Analysis and assessment – TSP and PM10

The TSP monitoring results have all been under the average annual criteria of 90ug/m3.

These results indicate that TSP dust levels are well below long term impact assessment criteria; consistent over the years; and consistent with the EA and modification 4 predicted annual average.

The PM10 results have all been under the 24 hours average with the exception of a number of specific events in 2015, early in 2016, 2017, 2018 and again for 7 times during 2019. However, when interpolated to the boundary, all are below criteria.

The Air Quality Assessment for the EA (2006) and the Modification 5 predicted compliance with the annual average criteria and the short term 24hr average.

The results indicate that PM10 dust levels are consistent with the EA predicted annual average and with the predicted maximum 24 hour PM10 concentration at the residential receivers.

6.3.2.3 PM10, TSP Summary and opportunities for improvements

As the HVAS are situated on Boral owned land and not at the Boundary, monthly interpolation of the data will continue to ensure compliance. Modification 5 Consent Approval requires the measurement of PM2.5. This HVAS will be installed in 2020 prior to overburden operations commencing and will be either a static sampler situated at the same location as the PM10 and TSP HVAS or 2 mobile units moved around the boundaries, as per advice from Todoroski Air Sciences.

6.4 NOISE

The Noise and Blast Management Plan (NBMP) provides the framework and guidance for the Quarry activities to be conducted in a manner such that appropriate control measures are implemented to minimise the potential for adverse impacts on the amenity, property and safety of quarry neighbors and meet compliance requirements of the CoA of the Project Approval. A number of management actions have been put in place to assist in meeting these objectives with guidance on performance through a quarterly noise monitoring program.

The results and a general review of the quarterly noise monitoring program conducted during the reporting period are presented in Appendix 3.

In accordance with NBMP, operational noise assessments are conducted on a quarterly basis. During the reporting period noise assessments were conducted in February, May, August and November.

Attended monitoring is conducted during both day and night time periods to enable the measurement of operational noise from quarry activities conducted during the Project Approval permissible hours of operation. Unattended monitoring is generally continuous between the device deployment and collection, measuring noise levels for all assessment periods.

Operator attended noise measurements are conducted at or near the locations specified in Table 4 of Project Approval Condition 4 (Schedule 3). Appendix 3 shows the receiver locations required to be monitored.

Table 10 presents the criteria for receiver locations required to be assessed in accordance with Condition 4 (Schedule 3) of the Project Approval and EPL Condition L2.

Modification 5 Conditions of Consent has new criteria for each residential receiver based on modelling and the implementation of the Noise Policy for Industry guidelines. These noise criteria will be implemented once the Peppertree Quarry Noise and Blast Management Plan reviewed under the new consent has been approved by the DPIE.

Table 10: Operational Noise Assessment Criteria

Residential Receiver Locations	Noise Assessment Criteria			
	Day (7am to 7pm) LAeq (15 min)	Evening (7pm to 10pm) LAeq (15 min)	Night (10pm to 7am)	
			LAeq (15 min)	LA1 (1Min)
R3	35	35	35	45
R2	35	35	35	45
R8	41	35	35	45
R4	35	35	35	45
R17	35	35	35	45

A real time noise monitor has been installed and is in operation at Residential Receiver R3. A procedure is being developed as to the management of quarry noise, based upon real time noise measurements and weather conditions.

6.4.1 Noise Management Performance Review

A summary of the maximum day and night time noise assessment measurements against the respective Project Approval compliance criteria for LAeq (15 minutes) noise levels (Condition 4 – Schedule 3) is provided in Appendix 3.

The assessment results found that the Quarry LAeq (15minutes) noise levels were in compliance at all receiver locations with the measured results considerably lower than the respective limits prescribed by the Project Approval.

A summary of the maximum night time noise assessment measurements against the respective Project Approval compliance criteria for measured LA1 (1 minute) noise levels at all receiver locations is also provided in Appendix 3. The assessment results found that the LA1 (1 minute) noise levels were in compliance at all receiver locations with the averaged levels being considerably lower than the respective prescribed limits.

Furthermore, Low Frequency Noise was assessed as per the requirements of the Consent. Assessment of Low frequency noise was undertaken every quarter as part of the regular monitoring at all receivers.

Tonal, low frequency, impulsive and intermittent noise characteristics were not present in the quarry noise emissions.

6.4.2 Long Term Trend Analysis and Assessment

Long term trend analysis has been undertaken on monitoring data for residential receivers R2, R5, R6 and R16 as monitoring commenced prior to operations in 2014.

Analysis on residential Receivers R 4 and R17 has been undertaken since October 2016.

Extended hours of operation for in pit activities commenced in August 2016 however no noticeable variation has been identified in the noise monitoring.

Graphical representations of the noise monitoring results (estimated Quarry LAeq [15 minute and 1 min) contribution sourced from the quarterly monitoring reports) are contained in Appendix 3. The monitoring results have remained generally consistently below criteria since the commencement of operations at all locations.

Noise modelling for both the 2007 EA and the latest Modification 5 indicated that all receiver locations will experience noise levels below the criteria. Sleep disturbance and cumulative noise impact due to the operations are not considered likely.

The quarterly noise monitoring has found that the quarry achieved compliance with the approved operating noise criteria at all locations for the majority of the time and therefore is in line with the predicted models.

6.4.3 Noise summary and opportunities for improvement

The Noise and Blast Management Plan will be updated to capture the changes in noise management at the Quarry, particularly the operation of the real time noise monitor and changes in noise criteria.

Progress will continue with the implementation of a real time noise monitoring system to allow pit operations to be managed under temperature inversion conditions to reduce potential noise impacts on receivers.

6.5 BLASTING

All blasts are conducted in accordance with the Noise and Blast Management Plan.

Monitoring of overpressure and ground vibrations at four nominated sensitive receptors is conducted during every blast (refer Appendix 4 for locations).

As part of every blast air, overpressure and ground vibration is monitored for compliance with the relevant assessment criteria in the Project Approval.

Conditions 12 and 13 (Schedule 3) of the Project Approval requires that air-blast overpressure and ground vibration should not exceed the criteria in presented Tables 11 and 12 respectively at any residence on privately-owned land.

Table 11: Air-blast Overpressure Impact Criteria

Air-blast overpressure (dB Lin peak)	Allowable Exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%

Table 12: Ground Vibration Criteria

Peak Particle Velocity (mm/s)	Allowable Exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

6.5.1 Blast Management Performance Review

Blast monitoring results for over pressure and ground vibration during the reporting period are presented in Appendix 4. The maximum measurements for over pressure and ground vibration were 114.2 (1/8/19 – B2) and 2.27 mm/sec (31/10/19 – B5) respectively.

The Quarry conducted 60 blasts during the reporting period, all of which complied with Project Approval criteria.

All blasts were performed in accordance with the following Environmental Performance Conditions under Schedule 3 of the Project Approval:

- Monday to Saturday with no blasts between 9.00 am and 5.00 pm on Sunday or public holidays (Condition 11);
- Monitored for overpressure and ground vibration levels (Conditions 12 and 13 respectively);
- Best practice considerations associated with safety and minimisation of fumes and dust (Condition 14); and
- Notifications to neighbours and public information (Condition 15).

6.5.2 Long Term Trend Analysis and Assessment

Graphical representations of the blast monitoring results since the commencement of operations are presented in Appendix 4.

For both parameters, the results for this reporting period are consistent with previous years. Additionally, trend analysis depicts that over the operations, airblast overpressure and ground vibration has remained consistent.

Since the first AR reporting period in 2014, the Quarry has conducted 287 blasts.
All blasts were compliant with Airblast Overpressure and Ground Vibration blasting criteria as predicted in the EA and latest Modification 5.

6.6 WASTE MANAGEMENT

Boral is committed to continuing the minimization of waste from its operations, in accordance with the waste hierarchy and minimizing the amount of waste sent to landfill. All liquid and solid wastes are classified and sorted so they can be appropriately reused and recycled.

Waste generated by the quarry operations is collected and segregated to allow the proper storage and end use of the material to be managed.

Waste is classified in accordance with the NSW EPA Waste Classification Guidelines thereby advising on the appropriate management and / or disposal.

A Waste Management Plan has been prepared, in 2019, which outlines the management methods in place for each waste with contracts in place with licensed contractors where appropriate, refer Table 13. The plan was issued to the DPIE.

Table13. Waste Management Methods for Peppertree Quarry

Waste	Waste Classification	Management Method	Contractor
Oil absorbent pads	Solid general waste	Once used, bagged and placed in bin for landfill providing no liquid oil present.	Veolia – local Council landfill
Food scraps	Solid general waste	Bagged and placed in bin for landfill	Veolia – local Council landfill
Disposable Coffee Cups	Solid general waste	Coffee cups are made of compostable materials rather than polystyrene. Currently cups are bagged and placed in the bin for landfill.	Veolia – local Council landfill
Screen mats	Solid general waste	Placed in bin for landfill	Veolia – local Council landfill
Oil filters	Solid general waste once oil has been drained	Drained of oil, bagged and placed in bin for landfill	Veolia – local Council landfill
Oily rags / waste	Solid general waste	Oily rags are collected in the workshop for recycling however currently bagged and placed in bin for landfill	Veolia – local Council landfill
Plastic / Glass bottles / Aluminum cans	Solid general waste	Separated in the crib room and offices for recycling.	Endeavour Industries
Paper and Cardboard	Solid General waste	Separated in the crib room and offices for recycling	Endeavour Industries
Cardboard	Solid general waste	Separated at the workshop and warehouse and placed in specific cardboard bins	Veolia – recycling
Conveyor belt	Solid general waste	Collected and stockpiled for reuse. Contract is in place with companies who repair the belts to remove the damaged belts.	Fenner Dunlop or Spice Tech with belt on sold for mainly agricultural uses
Oil drums	Solid general waste	Drained on site, stockpiled in designated area, and crushed for recycling	Fast Skips

Waste	Waste Classification	Management Method	Contractor
Empty IBC Containers	Solid general waste	Stockpiled in designated area and returned to supplier	Polo Citrus
Steel	Solid general waste	Offcuts and parts are placed in designated steel skip bins for recycling	Fast Skips
Waste oil	liquid waste	Collected and stored onsite in purpose designed oil tank adjacent to the workshop. This tank is emptied on a regular basis with the oil taken for recycling by a licensed regulated waste transporter	Clean away
tyres	solid general waste	There is very little storage of tyres on site. Tyres are replaced by designated contractors who take the damaged tyre for recycling or disposal.	Bridgestone, Premier Tyres
timber pallets	Solid general waste	Pallets and timber waste are placed in designated timber skip bins for recycling. Pallets in good condition will be returned to the supplier where possible	Veolia
Photocopy toners	Solid general waste	bagged and posted for recycling	Veolia – local Council landfill
Sewage Effluent	liquid waste	Above ground absorption trench on site.	Onsite management
batteries	Solid general waste	Collected and recycled through regional facilities	Onsite management
Manganese Crusher liners	Solid General waste	Placed in designated skip bin and recycled	Fast Skips
Tungsten tips	Solid General waste	Placed in designated skip bin and recycled	Fast Skips
E Waste	General solid waste	Collected and recycled through regional facilities	Onsite management
General rubbish	General	General solid waste	General rubbish
Overburden	Virgin excavated natural material (VENM)	Emplaced within approved designated emplacements on site	Onsite management
Granodiorite Fines	Virgin excavated natural material (VENM)	Emplaced within approved designated emplacements on site	Onsite management
Scalps	Virgin excavated natural material (VENM)	Stockpiled on site prior to sale	Onsite management

6.7 Dangerous Goods and Hazardous Materials Management

The Quarry has a Safety Data System (SDS) in place utilising the ChemAlert Program. A Hazardous and Dangerous Goods Register is in place which identifies each chemical stored onsite. The register is electronically filed with a physical copy kept within the Site Office.

In accordance with Project Approval Condition 43 (Schedule 3), all dangerous goods and chemicals are handled and transported in accordance with the AS1940 and AS25956 and the Dangerous Goods Code.

The only Dangerous Goods Licence pertaining to the Quarry is for a 100 kL aboveground double skinned and bunded diesel tank for refueling locomotives. The WorkCover Notification (NDG200221) is on behalf of an on-site contractor who operates and maintains the refueling facility. The Contractor's operation and management of the facility is audited on a regular basis for compliance.

6.8 BUSH FIRE MANAGEMENT

Schedule 3, condition 45 requires that the quarry to :

(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 on-site.

Peppertree quarry has in place an extensive fire management system which is audited by independent experts on a quarterly basis.

Emergency response plans contain details for bush fire management and responses.

Marulan Rural Fires services, conducted training and an inspection of the quarry early in December 2019, only weeks prior to the Bushfires, which impacted the southern highlands and Tablelands. The emergency response plan was reviewed based on feedback from the RFS.

Modification 5 Consent Conditions requires the preparation of a Bush fire Management plan which will include the emergency response details as agreed with the RFS.

6.9 HERITAGE CONSERVATION

The Aboriginal Heritage Management Plan (AHMP) updated in 2017 reflects management associated with current quarry activities.

The AHMP continues to provide the framework for the identification, protection, conservation and presentation of Aboriginal cultural values at the Quarry with the primary objectives of the AHMP are to identify, protect, conserve, present and transmit the Aboriginal heritage values associated with the land, on which the Quarry activities are conducted.

No works were undertaken or required during 2019, however the Aboriginal Heritage Management Committee were invited to celebrate NAIDOC week with the site staff.

In 2019, a regular monthly meeting has been established with the Aboriginal Heritage Management Committee. The agenda covers future quarry operations, possible community projects and the implementation of the Boral Reconciliation Action Plan.

7 WATER MANAGEMENT

Surface and groundwater is managed in accordance with a Water Management Plan (WMP), approved by the DPIE in July 2017.

Table 14 provides an overall summary of the environmental performance of the quarry in regards to water management, with further details provided in the following sections.

Table 14: Summary of Environmental Performance – Water Management

Aspect	performance during the reporting period	Trend / Key management implications	Implemented / proposed management actions
surface water quality	no results were over the trigger levels for 3 consecutive samples requiring detailed investigation	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	continue management and monitoring
Environmental flow	complies with criteria	data over time is consistent with the EIS predictions, Modification 4 & 5 modeling and previous AR reporting	continue management and monitoring
groundwater standing level	complies with criteria	data over time is consistent with the EIS predictions, Modification 4 &5 modeling and previous AR reporting	continue management and monitoring
groundwater quality	Results are consistent with trends and show no marked variations in water quality nor any impacts associated from quarry operations	data over time has been consistent within each groundwater well.	review trigger levels and assess repairs / redevelopment of wells

The Quarry experienced worsening drought conditions during 2019 with limited water entering the Main Dam from either rainfall or runoff.

Drought response planning was put into place and included the assessment of …

- the use of the licensed groundwater well
- road delivery of potable water
- use of chemical additives for road dust suppression
- pumping of water from other local water supplies and
- rail delivery of potable water.

For several months, road delivery of water was essential to continue quarry operations as the Main Dam had insufficient water supply. Quarry operations were ceased on occasions when water deliveries were not available due to the need for the water trucks to be available for bush firefighting.

7.1 SURFACE WATER

Surface water management at the Quarry is conducted in accordance with a Water Management Plan (WMP) that was revised and approved in 2017.

In accordance with Condition 29 (Schedule 3) of the Project Approval, the WMP includes a surface water quality program that involves quarterly sampling from Tangarang Creek, Dam 1, upstream culvert, Marulan

South Creek and overflow from any sediment ponds during extreme storm events. (Refer to Appendix 5 for sampling locations).

This condition also details that the Surface Water monitoring program includes…

"(a) detailed baseline data on surface water flows and quality in Tangarang Creek and Barbers Creek"

Both Tangarang and Barbers Creek are sampled on a quarterly basis either by Peppertree or Marulan South operations.

Flow is measured in Tangarang creek as part of the Environmental flow requirements for Peppertree Quarry.

At the current time, no flow data is obtained from Barbers Creek. This area is difficult to access and the use of solar powered flow monitoring equipment will need to be assessed. Flow monitoring will be implemented in 2020 if possible.

The quarry has a practice to ensure sediment ponds associated with overburden emplacements are emptied within 5 days of a rain event, by pumping to the pit, so there is sufficient capacity in the dams for the next rain event. No ponds overflowed and required monitoring during 2019.

The Quarry's main Dam provides environmental flows into the ephemeral Tangarang Creek and as such downstream water quality is largely representative of the discharges with some minor natural variations from the wider catchment influences.

The suite of parameters analysed for each water quality sample is listed in Table 15.

Table 15: Summary of Creek Water Quality Parameters

Laboratory Analysis		
Total Dissolved Solids (mg/L)	Potassium (K+)	Bicarbonate (HCO_{3}-)
Total Suspended Solids (mg/L)	Magnesium (Mg2+)	Nitrate (NO_{3}-)
Turbidity – Laboratory (NTU)	Sodium (Na+)	Nitrite (NO_{2}-)
TPH C10-C36	Ammonia (NH4+)	Total Nitrogen
Benzo[a]pyrene	Chloride (Cl-)	Total Phosphorous
Naphthalene	Sulphate (SO42-)	Faecal coliforms (cfu/100mL)
Calcium (Ca2+)		

As part of the review of the Water Management Plan and its approval in July 2017 trigger levels were developed in line with ANZECC guideline recommendations.

Table 16 summarizes the trigger values used to assess potential impacts on water quality in creeks in the vicinity of the Quarry. However, it should be noted that observations to date indicate that while the water quality in the Shoalhaven River mostly meets the ANZECC ecosystem protection levels, the upstream contributing creeks do not. Therefore, the trigger values in Table 16 are adopted as benchmark goals rather than a performance or compliance criteria.

Table 16: Water Quality Trigger Values

Indicator	ANZECC Default Trigger for Ecosystem Protection[1]	WaterNSW Benchmarks for Catchment Streams	Proposed 'Triggers'
pH	6.5 – 7.5	6.5 – 8.0	6.5 – 8.5
EC (µS/cm)	30 – 350		<1.200
Total nitrogen (mg/L)	0.25	<0.25	1.1
Total phosphorus (mg/L)	0.02	<0.02	0.09
Turbidity (NTU)	2 - 25	0 - 25	

[1] Default trigger values for physical and chemical stressors for South-east Australia for slightly disturbed ecosystems (upland river)

The trigger values are applied as follows for ongoing monitoring in Tangarang Creek (both upstream and downstream of any influence from the Quarry):

- If the upper bound for pH, EC, total suspended solids or turbidity is exceeded for a period of three consecutive months downstream of the quarry but is not exceeded upstream of the quarry, this would be the trigger to undertake further assessment of potential sources within the Quarry.
- If the additional assessment finds that the change in water quality may be induced by quarry operations, then further investigation would be required to identify the source of the water quality impact, and review and revise practices to minimise the impact.

This further assessment would include investigation of the potential pathways for water quality impacts within the Quarry area to identify whether the change in water quality is attributable to quarry activities, and the nature of activity that has caused the change.

7.1.1 Surface Water Monitoring Results

The quarterly surface water quality monitoring data is presented in Appendix 5. Due to the ephemeral nature of Tangarang Creek, the upstream monitoring point only experienced one flow during the reporting period.

7.1.2 Surface Water Management Performance Review

The quarry surface water quality trends are generally consistent over the 2019 period with historic trends (refer Appendix 5) but do reflect the period of dryness and end of the year storm events.

The results for pH were substantially in the range of trigger levels (i.e. pH 6.5 to 8.5), with the exception of the Dam. The pH was above 8.5 on two occasions in the September (8.8) and December (9.4) 2019 sample periods.

Fluctuations in Total Dissolved Solids (TDS) during the reporting period were generally in accordance with the ADWG guideline value of 500 mg/L. ANZECC (2000), with the exception of the Marulan South Creek samples and the Dam for September and December 2019 samples. It is believed that this is due to the low levels of water in the dam at the time and lack of any inflow of water.

Turbidity levels were consistent over the 4 sampling periods in 2019 being well below the ANZECC guideline for both the dam and T1. For the June sampling period, U1 and Marulan South Creek were higher than the trigger level due to a rain event. Samples were only obtained from U1 on one occasion during the year, when significant rain events allowed overflow of farm dams upstream of the quarry Dam.

Total Nitrogen and Phosphorous are indicators of nutrient levels in water systems and results are depicted in Appendix 5.

Dam levels for Total Nitrogen reflected rain events and fluctuated over the reporting period while Marulan South Creek was consistently above the Trigger level. T1 remained consistently low and below the Trigger.

Total Phosphorus remained low and below trigger levels at T1 and the dam. Marulan South Creek remained higher than the trigger level for all samples.

All results for hydrocarbon and Polycyclic Aromatic Hydrocarbons (PAHs) were at concentrations below the Laboratory levels of reporting (LORs).

No results, in the T1 samples were over trigger levels for 3 consecutive samples, attributable to quarry operations requiring a detailed investigation.

7.1.3 Long Term Trend Analysis and Assessment

Long term trend analysis has been undertaken on pH, TDS, Turbidity, total Phosphorus and total nitrogen with the results presented in Appendix 5.

pH is consistently between the range of 6.5 to 8.5, with some higher than usual levels occurring in the dam in rain or low flow events. Levels at T1 downstream have remained within the trigger levels.

Long term TDS levels at the dam and T1 sites have remained below the ADWG guidelines, for the majority of the time, since rain events in 2013. Dam levels increased in the December 2019 sampling period due to the low levels of water in the dam at the time and lack of any inflow of water.

For the majority of time, Turbidity in both the dam and T1 samples has been below the ANZECC criteria. Turbidity has exceeded the criteria at both sites in times of large rain events when water from the above catchment enters the dam and downstream creek. At these times, the dam is overflowing through the culverts with large flows.

Total Phosphorus levels fluctuate over time at all sampling sites. For most of the time, levels were below the trigger criteria for all sites. Levels did increase in the Dam and Marulan south creek at the end of 2018 which may be attributed to outside activities associated with local farming practices. Dam levels decreased below the trigger in 2019 samples.

Total Nitrogen levels have fluctuated over time. T1 has been below trigger levels since 2014.

The initial EA and management plan predicted compliance with the appropriate ANZECC and ADWG criteria based on limited background sampling. With the exception, of periods of storm events, surface water analysis has been in line with the EA predictions and the criteria.

7.1.4 Environmental Flows

Under Project Approval Condition 24 (Schedule 3), the supply of 10% of daily inflows into the Quarry main dam must be provided as environmental flows to Tangarang Creek. The monthly averages of inflow and outflow volumes in comparison to the required 10% of environmental flow requirement are presented in Table 17. The environmental flows exceeded the 10% requirement every month, throughout the reporting period. For a number of months no inflow was recorded into the dam at all.

Overall for 2019 the quarry complied with the 10% environmental flow requirement.

Table 17: Environmental Flow Data (2019)

Month (2019)	Inflow (Megalitres)	Outflow Requirement (10%)	Outflow (Megalitres)	Compliance
January	0	0	1.43	Yes
February	0	0	1.89	Yes
March	0	0	3.47	Yes
April	0	0	2.51	Yes
May	0	0	2.44	Yes
June	0	0	2.17	Yes
July	0	0	1.91	Yes
August	0	0	1.75	Yes
September	0	0	2.19	Yes
October	0	0	1.85	Yes
November	0	0	1.26	Yes
December	0	0	0.99	yes
Total	0	0	23.86	yes

7.1.5 Surface water summary and opportunities for improvement

Results over the operation of the quarry, show little detrimental impact on the downstream environment in Tangarang creek.

Water management strategies need to remain in place with ongoing quarterly monitoring at all sites.

Flow monitoring to be assessed at Barbers Creek.

7.2 GROUNDWATER

The Quarry WMP includes a groundwater monitoring program conducted quarterly of five shallow and seven deep piezometers ranging from between 15 m to 100 m in depth (refer to Appendix 5). The groundwater monitoring is undertaken in general accordance with AS 5667.11 – 1998 Water Quality Sampling – Guidance on Sampling of Groundwaters.

The groundwater monitoring program has been undertaken for 4 years since commencing in October 2015.

Indicative trigger values were proposed and included in the Water Management Plan (2017), to allow an assessment of potential impacts, with an aim to develop more specific targets once sufficient data had been gathered. With the completion of the 4 rounds of sampling in 2019 there is now sufficient data to allow a review of these values in 2020.

Sampling in 2019 has also shown a number of wells which require further development or repairs. This is due to the depth of the bores and movement of the wells. A plan for redevelopment of the wells and possible drilling where required will be developed in 2020.

Assessment of groundwater results is undertaken following each monitoring round with any analytes with trigger levels exceedances being noted. In instances where trigger levels are exceeded in two consecutive rounds of monitoring further assessment is undertaken to determine whether the potential anomaly is the result of quarrying activities or due to natural variability.

Ground water flow has been mapped over the last 12 months and shows a pattern of very slow recharge due to the nature of the granodiorite and with a direction of flow towards the pit. RPS, groundwater consultants who undertake the monitoring and assessment have advised….

"Given the direction of flow towards the pit…..and the low hydraulic conductivity of the aquifer, there is negligible risk of impact to the receiving environment from groundwater."

The groundwater field sampling measurements, standing water levels and the Laboratory analytical results from the quarterly groundwater sampling completed during the reporting period are presented in Appendix 5.

7.2.1 Groundwater Management Performance Review

It should be noted that the groundwater monitoring first commenced in October 2015 and to the end of the reporting period seventeen sampling events had therefore been completed. Groundwater results and trends presented in Appendix 5 and discussed below are in the early stages of a long-term monitoring program which will generate a greater data set from which more detailed and accurate interpretation of any potential or actual impacts on groundwater may be occurring through quarry activities.

pH trends have remained relatively stable in each piezometer for 2019. The pH levels vary considerably between the respective piezometers with a range of 6.81 (neutral) to 11.95 (alkaline). These levels occur in pit groundwater bores as well as those outside of any influence from quarry activities. Levels rose in July but have returned to more normal readings in December 2019

Field measured Electrical Conductivity (EC) during the reporting period ranged from 783 to 3250 uS/cm, indicative of fresh to brackish water quality. EC trends are relatively stable and consistent between each of the piezometers with several piezometers. EC did show an increase in July 2019 returning to more normal levels in December 2019. This could be possibly due to weather conditions over the year.

Dissolved oxygen (DO) trends showed a high degree of variability in individual and between respective piezometers throughout the reporting period.

Standing water levels remained relatively stable in each of the piezometers, with some fluctuation due to infrequent rainfall events. PQ5 is identified as the sentinel water bore and shows only a small fluctuation of water level.

Key findings from the analytical results were:

- Concentrations of nutrients (total nitrogen and total phosphorous) exceeded the trigger values in most of the piezometers throughout the reporting period, and as such it is believed that these levels are representative of background levels
- Organic analyses (oil & grease, polycyclic aromatic hydrocarbons, volatile and semi-volatile total recoverable hydrocarbons and benzene, toluene, ethyl benzene, xylenes and naphthalene) were not detected at the majority of the piezometers. On a limited number of occasions, Oil and grease was detected in bores outside of the pit area.

For all the other analytes, all piezometers across the site showed levels above the trigger values at times.

The majority of these trigger exceedances results is minor, and is likely due to the poorly developed nature of the bores, the limited dataset utilised for development of the trigger levels, or naturally occurring background levels.

7.2.2 Long term trend and assessment

pH trends have remained relatively stable in each piezometer since the commencement of the monitoring program in 2015. The pH levels have varied considerably between the respective piezometers with a range of neutral to alkaline. These levels occur in both in pit groundwater bores as well as those outside of any influence from quarry activities.

The early EC trends are relatively stable and consistent between each of the piezometers. Variations appear to occur consistently across most of the bores and are most likely in response to recharge rain events.

A rapid decrease in Dissolved Oxygen (DO) trends occurred from the development of the piezometers in 2015 through to 2016. Spikes in DO have occurred in several of the piezometers during 2017 and 2018 and are likely to have been influenced by recharge rain events. For 2019, a change was made in the measurement of the DO to better identify any issues within the groundwater.

Standing water levels remained stable in each of the piezometers, with some fluctuation due to infrequent rainfall events. PQ5 is identified as the sentinel water bore and shows very little fluctuation of water level.

Key findings from the analytical results were:

- Concentrations of nutrients (total nitrogen and total phosphorous) exceeded the trigger values in most of the piezometers, and as such it is believed that these levels are representative of background levels

- Organic analyses (oil & grease, polycyclic aromatic hydrocarbons, volatile and semi-volatile total recoverable hydrocarbons and benzene, toluene, ethyl benzene, xylenes and naphthalene) have been detected at times in some of the piezometers. These have been one off occurrences and on investigation have not been associated with quarry operations. It is more likely to be associated with development of the piezometers or laboratory level of detections.

For all the other analytes, all piezometers across the site showed levels above the trigger values at times

A review of the exceedances show that the results are consistent with previous trends and do not indicate marked variations in water quality.

7.2.3 Ground water summary and opportunities for improvement

A review of the data over the 17 sampling rounds has shown results above trigger values.

A review of these results show that they are consistent with previous trends and do not indicate marked variations in water quality nor any impacts associated from the quarry operations.

RPS, groundwater consultants who undertake the monitoring and assessment have advised….

“Given the direction of flow towards the pit…..and the low hydraulic conductivity of the aquifer, there is negligible risk of impact to the receiving environment from groundwater.”

Sampling in 2019 showed that some bores required further development and / or repairs. A proposal for required works will be prepared in 2020.

Indicative trigger values have been developed for the groundwater samples. The revision and establishment of site specific triggers will be assessed in 2020.

8 REHABILITATION

During the 2019 AR period, a total of 141.02 ha of Quarry land remains disturbed. This was an increase of 7.18 ha with the ongoing development of the southern and western overburden emplacements and the expansion of the pit footprint.

Table 18 presents the total estimated areas of disturbance and rehabilitation.

Table 18: Areas of Disturbance and rehabilitation

Area Reference	Total Disturbed Area (ha)	Total rehabilitated Area (ha)	Disturbed Area during 2019 (ha)	Rehabilitated Areas during 2019 (ha)
1: Infrastructure area – (Primary, STQ and TLO)	25	0 (Not applicable till end of life)	0	0
2: Quarry extraction area	46.5	0 (Not applicable till end of life)	0	0
3: eastern overburden emplacement	17.9	4.8	0	Areas overplanted with trees in 2019
4: west pad	0.3	0	0	0
5: Overburden emplacement / Noise bund	12	12.1	0	Area has been overplanted with trees
6: Dam and creek rehabilitation area	10	10.3	0	No further rehabilitation work required. Now in maintenance
7. heritage salvage	13.2	0	0	0
8. western overburden emplacement	4.6	0	0 Emplacement occurred within the existing footprint from 2018	0
9. southern overburden emplacement	11.52	5.5	0 emplacement occurred within the existing footprint from 2018	2.7 Overplanting of previous stabilized sites was also undertaken with around 40 000 plants planted.
Total area Disturbed / Rehabilitated as of the end of 2019	141.02	32.7	0	2.7

A Biodiversity and Rehabilitation management plan was prepared and approved by the DPIE in April 2017 in accordance with Development Consent Condition 4, Schedule 5.

Planting of the area of the eastern and southern overburden occurred in during 2019 along with the hydro mulching of 20 000m2 of overburden emplacement embankments. Due to the drought conditions, planting and hydro mulching have been delayed until rainfall.

As Part of the Quarry's rehabilitation monitoring program the annual Rapid Visual assessment was undertaken in November 2019. This assessment was conducted by independent consultant Lachlan Crawford of LAMAC Management.

The assessment recommended that the following be considered in the next 12 months of rehabilitation maintenance planning…

- Management of blackberry
- Continue to monitor and treat weeds along Tangarang Creek (RMU1b).
- Continue the feral goat control program.
- rock armour identified slopes to improve slope stability and minimise potential for erosion
- Re-commence tube stock establishment program to increase species diversity on slopes currently revegetated with groundcover species.
- maintain (but prevent from further spread of) weed cover amongst the tube stock plantings on emplacements,
- Continue the recovery and placement of rock piles and wooden debris on (or adjacent to) rehabilitated surfaces and landforms.
- Complete remedial repair works on the gully that has formed on the rock armoured drop structure that drains the eastern emplacement.

A more detailed Ecological Assessment was undertaken in January 2019 by Independent consultants, Emergent Ecology. This Assessment is undertaken every 2 years to determine the status of the rehabilitation areas against the Closure completion criteria and to provide advice for improvements.

The report concluded

"the 2019 rehabilitation monitoring identified that Habitat Management Areas and rehabilitation sites, while in early vegetation establishment phase, are generally close to closure criteria targets however still require active management and further monitoring to ensure the sites remain on target."

The next assessment will be conducted in January 2021

Schedule 3, Condition 35 and 36 requires the payment and review of a Rehabilitation Bond following The Independent Audit every 3 years. The Audit was undertaken in November 2018 with the Bond guaranteed in July 2019, based on previous calculation methodologies. However, with Modification 5 Conditions of Consent, the Bond is required to be revised, using independent assessment, third party rates for rehabilitation and including the disturbance footprint of the South Western overburden over the next 3 years. This is to be submitted within 6 months of works commencing and will be issued to the DPIE mid-2020.

9 COMMUNITY

9.1 ENVIRONMENTAL COMPLAINTS MANAGEMENT

The Quarry maintains an environmental complaint register that identifies actions required to resolve issues and concerns raised by the community. A 24-hour telephone complaints line is in place and advertised through the monthly community newsletter and on the website. A list of the nature of any complaints is published to the Boral website on a regular basis.

The Quarry received 3 complaints, during the reporting period. These complaints were investigated and all appropriate actions taken at the time. Details are in Table 19.

As part of an ongoing noise assessment program managed during the reporting period, text notifications have also been received from a local resident regarding noise. A real time noise monitor is now in place at this residence. Information received from the residence is correlated with the real time noise measurements, operations occurring at the time and the weather conditions to allow the quarry to establish an operating procedure around the management of the noise.

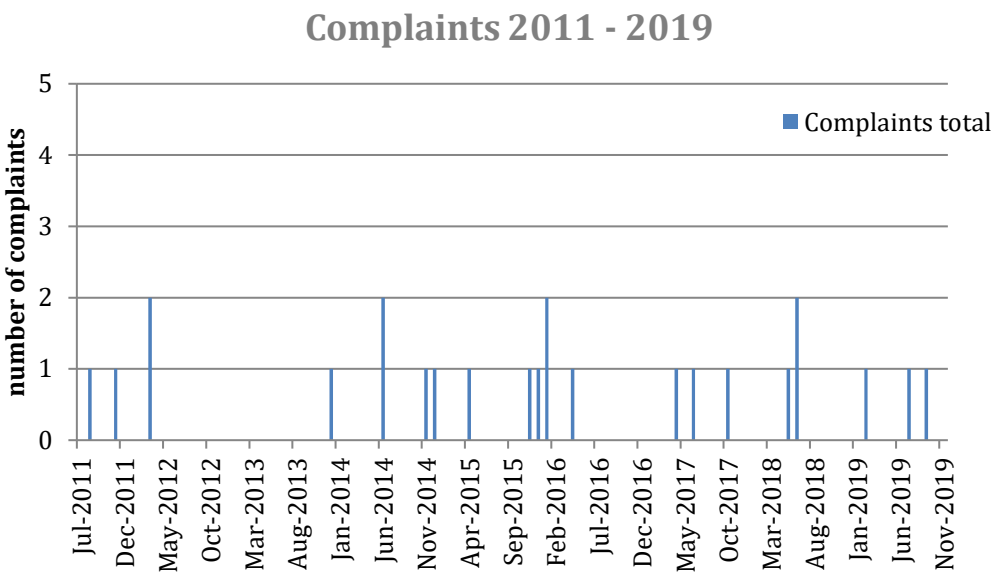
Boral will continue to develop and maintain relationships with the community and ensure their concerns are addressed to an acceptable outcome wherever possible.

Complaints received since the Quarry commenced production are presented in Figure 3 (2011- 2019).

Table 19: Complaints

Date - 2019	Nature of Concern	Outcome of investigation
2nd February 2019	White coloured dust blowing from train travelling through north through Bundanoon	Train movements identified that a Marulan South train, and not Peppertree was travelling through Bundanoon at the time. It was noted that the train was treated with dust suppression products.
2nd July 2019	Loud noise at 5am waking up residents. Lots of clanging of metal on metal	Primary in pit crusher had commenced operation at 5am. A temperature inversion was identified as occurring at the time with a light wind in the direction of the residence. Noise was investigated from further down the road and identified as the Metso and the excavator feeding the operation. Weatherzone forecast for potential noise at this residence to be used to manage operations during these times
24th September 2019	EPA raised complaint from Tallong resident regarding general dust in the air from operations and trains from Quarries. Complaint not targeted at Peppertree but quarries in general	EPA conducted a site inspection to review train loading operations in particular how materials are managed for dust. Approximately 3% water added to each wagon of material.

Figure 3: Long term trend Complaints (2011 – 2019)



9.2 COMMUNITY CONSULTATION

The Quarry has actively engaged with the local community since the commencement of the 2006 Environmental Assessment for the project. The program has included:

- The establishment of a Community Consultation Committee;
- Regular community newsletters;
- Active participation in local events;
- Arranging site inspections and one on one consultation;
- Active engagement with key government and non-government organisations; and
- Maintenance of an environmental and community complaints register and actively managing and resolving community issues as they arise.

9.3 COMMUNITY CONSULTATIVE COMMITTEE

A Community Consultative Committee (CCC) has been established since 2011 in accordance with Condition 8 of Schedule 5 of the Project Approval. The CCC comprises of:

- Two representatives from Peppertree Quarry including the Environment and Community Adviser;
- One representative from Goulburn Mulwaree Council (the Mayor); and
- Three Local Community Representatives

Independently chaired, the role of the CCC is to offer the Quarry input from the community perspective on matters of environmental performance and stakeholder relations. Meetings include the review of environmental data and any feedback provided to the site from local community members. Issues of concern can be raised with the site by the CCC representatives.

The timing of the meetings is determined by the CCC and generally undertaken at least 6 monthly. The CCC meet 4 times during the 2019 calendar year – February, June, September and December.

An Annual report was prepared (as per the Community Consultative Guidelines) and issued to the DPIE in July 2019.

9.4 Community Newsletters

Community Newsletters are produced on a regular basis in order to inform local residents of the Quarry operations and activities as well as detailing Boral's involvement in local community events. These are distributed via the "Discover Marulan" newsletter issued to the local community. These can be found at:

http://discovermarulan.com.au/newsletters/

The newsletter is also posted on the Boral website. The first newsletter was circulated in 2011 and continued to be frequently issued during the reporting period.

9.5 Community Events

The Quarry staff is actively engaged with community events in the Marulan and Goulburn area. Community and stakeholder activities during the reporting period included:

- Charity Golf Day – Financial sponsorship, Quarry team representation and promotional goods giveaway;
- Tallong Apple Festival – Financial sponsorship;
- Marulan Kite festival – Financial sponsorship and committee involvement;
- Marulan Village Plan – Meeting and program support;
- Boral Youth Leadership program in partnership with Outward Bound; and
- Marulan Public School sporting shed,
- Goulburn Mulwarre Council Community Bike ride as part of Bike week

9.6 Blast Liaison

In accordance with the Development Consent, Condition 15 (Schedule 3), landowners and occupiers of residences within 2 kilometres of the Quarry pit are encouraged to register interest in order to be advised of any future blasts at the pit. Four parties are advised by email with 1 notified by phone.

9.7 Access to Information

Boral has a number of websites for each corporate division. Peppertree Quarry has its own site at:

https://www.boral.com.au/locations/boral-marulan-south-operations

The site contains all public information in relation to statutory approvals and development.

10 INDEPENDENT AUDIT

In accordance with Project Approval Condition 5 (Schedule 5) an Independent Audit was conducted in November 2018.

A copy of the final audit report and a response to any recommendations was provided to the Department of Environment, Industry and Planning in March 2019.

A number of administrative items were identified that needed attention. Boral's response to the Audit findings and the DPIE is contained in Appendix 6.

The Next independent audit is planned for the end of 2021.

11 INCIDENTS & NON COMPLIANCES DURING THE REPORTING PERIOD

11.1 INCIDENT MANAGEMENT AND RESPONSE

In accordance with NSW EPA requirements, a Pollution Incident Response Management Plan (PIRMP) has been developed and implemented which details the:

- Risks and hazards associated with quarry operations, equipment and materials;
- Controls in place to reduce the risk in the occurrence of potential incidents;
- Inventory of pollutants and respective volumes stored on-site;
- Safety and incident response equipment;
- Communication strategy for the immediate notification of an incident to relevant government agencies and neighbours;
- Actions to be taken during or immediately after an incident; and
- Training and responsibilities of response staff.

The PIRMP was last reviewed and revised in November 2019 and a copy can be accessed on the Boral website at: http://www.boral.com.au/Article/nsw_poela_environmental_reporting.asp

11.2 SUMMARY OF REGULATORY NOTIFICATIONS

No notifications were provided to Department of Planning, Industry and Environment and EPA during the reporting period in regards to Peppertree Quarry operations.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The activities proposed to be undertaken during the 2020 AR reporting period are presented in Table 20. The activities have been selected and prioritized based on:

- Internal and Independent Audit findings and recommendations;
- Operational requirements; and
- Continual improvement objectives in accordance with Boral's Environmental Policy and integrated HSEQ management System.

Table 20: Proposed Activities in 2020 AR Period

Proposed Activities in 2020	Objectives
Obtain Modification 6 approval and install and operate permanent solution for dust extraction at the crusher	• Mitigation of dust
Undertake progressive Overburden stabilization and rehabilitation (as per Biodiversity and rehabilitation management plan 3 year plan)	• Minimise erosion and sediment runoff • Move towards achieving biodiversity management plan goals of establishing vegetation corridors
review and/or prepare management plans - NBMP, AQMP, BRMP, WMP, EMS, BFMP as per modification 5 approval requirements	• Review in line approval condition in relation to Independent audit
Undertake annual Rehabilitation Rapid Visual Assessments (November 2020)	• Move towards achieving biodiversity management plan goals of establishing vegetation corridors
undertake audit of the surface water management system at the Southern Overburden emplacement once system is installed	• Surface water management
Assess and implement flow monitoring in Barbers Creek if possible	• Surface water management
Install PM2.5 HVAS as per Modification % approval	• Air quality management
install and operate Real time noise monitoring alert system	• Minimisation of noise in the community • Voluntary undertaking commitment
Fence scar trees	• Preservation of Culture
Artefact collation and review	• Preservation of culture
Implement Stakeholder Engagement plan for 2020	• Ongoing community engagement
Pit expansion to the East and commence south western overburden as per Modification 5	• Ongoing operations
review of Ground water trigger levels and redevelopment of wells where required	• Management of groundwater
Commence construction of South western Overburden	• Ongoing operations

APPENDIX 1: ANNUAL RETURN FOR EXTRACTIVE MATERIALS – FINANCIAL YEAR 2019

Form S 1

NSW GOVERNMENT | Planning, Industry & Environment

RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2019

Quote RIMS ID in all correspondence

Quarry Id:	Rims ID: 400960
Operators Name:	BORAL RESOURCES (NSW) PTY LTD
Address:	PO BOX 6041 NORTH RYDE NSW 2113
Email:	jon-paul.amodio@boral.com.au
Quarry Name:	PEPPERTREE QUARRY
Quarry Address:	MARULAN SOUTH RD, MARULAN 2579 NSW

Inquiries please telephone: (02) 4063 6713

Completed or Nil Returns Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below)

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

2018-2019

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, RESOURCE PLANNING & PROJECTS, NSW DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2019**. 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.

Director, Resource Planning & Projects

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

Typical Geology _____

Nearest Town to Quarry Marulan

Local Council Name Goulburn Mulwaree Council

Deposited Plan and Lot Number/s of Quarry _____

Email Address of Operator _____

Name of Owner or Licensee Boral Resources (NSW) Pty Ltd

Postal Address of Licensee _____

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 _____

To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

- **SIGNATURE of PROPRIETOR or MANAGER** Wendy Chan **DATE** 15/10/2019
- **CONTACT PERSON for this return** Wendy Chan
- **NAME** (Block letters) WENDY CHAN **Telephone** 02 9033 5423

SALES During 2018-2019

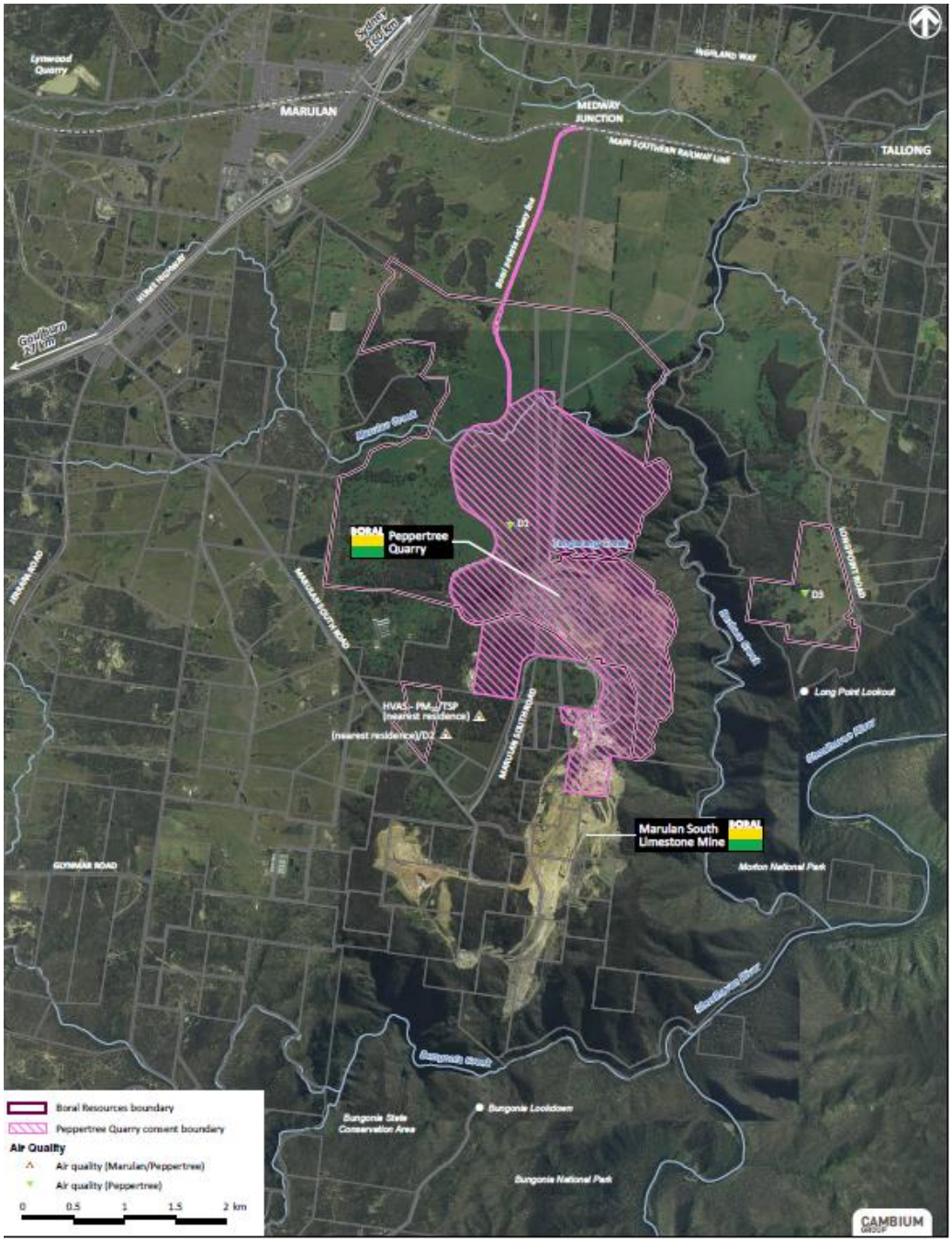
Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
• **Virgin Materials** **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		1,389,721
Under 5mm		
Natural Sand		
Manufactured Sand		1,368,546
Prepared Road Base & Sub Base		74,992
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	
• **Industrial Sand**		
Foundry, Moulding		
Glass		
Other (Specify)		
• **Dimension Stone**	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
• **Decorative Aggregate**	Including Terrazzo	
• **Loam**	Soil for Topdressing, Garden soil, Horticultural purposes)	
• **TOTAL SITE PRODUCTION**		2,833,259
• **Gross Value ($) of all Sales**	$97,361,886	
• **Type of Material**		
• **Number of Full-Time Equivalent (FTE) Employees**	Employees: 49	Contractors

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

APPENDIX 2 AIR QUALITY MONITORING INFORMATION

Air monitoring locations



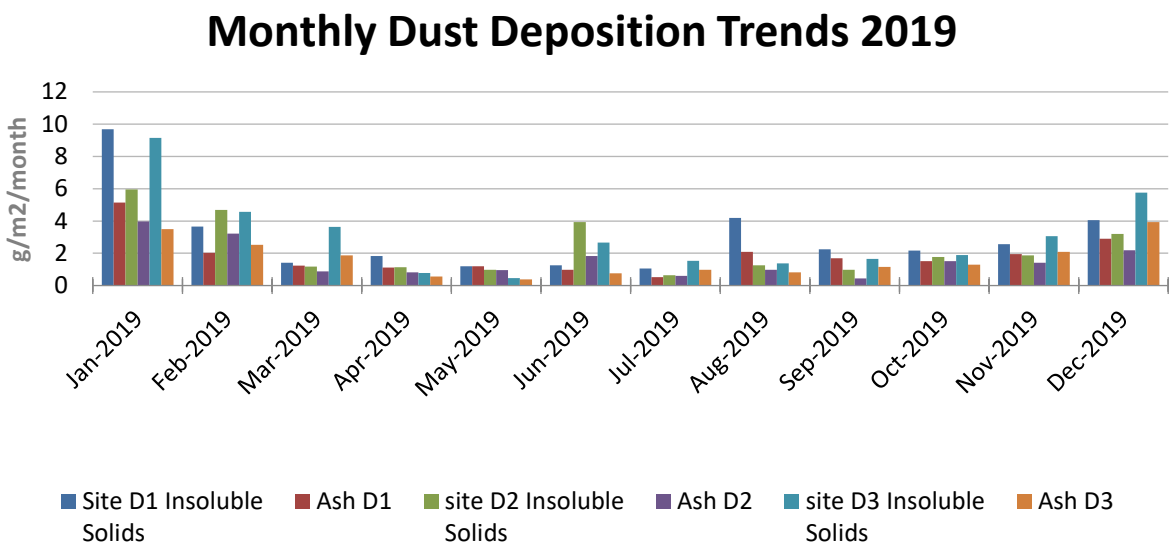
Dust Deposition Results

Sample Identification		Monthly Dust Deposition (Insoluble Solids g/m2/month)												Annual Average Criteria: (4 g/m²/m)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
D1	Insoluble Solids	9.68	3.66	1.41	1.82	1.2	1.26	1.05	4.19	2.24	2.17	2.57	4.05	**2.94**
	Ash Content	5.15	2.03	1.24	1.12	1.19	0.98	0.53	2.08	1.69	1.52	1.94	2.91	**1.87**
D2	Insoluble Solids	5.95	4.68	1.17	1.13	0.97	3.94	0.64	1.26	0.97	1.78	1.86	3.2	**2.30**
	Ash Content	3.97	3.22	0.88	0.82	0.96	1.82	0.6	0.98	0.44	1.52	1.42	2.91	**1.57**
D3	Insoluble Solids	9.14	4.56	3.63	0.77	0.46	2.66	1.54	1.38	1.66	1.88	3.05	5.75	**3.04**
	Ash Content	3.49	2.53	1.87	0.56	0.39	0.76	0.98	0.81	1.15	1.29	2.09	3.93	**1.65**

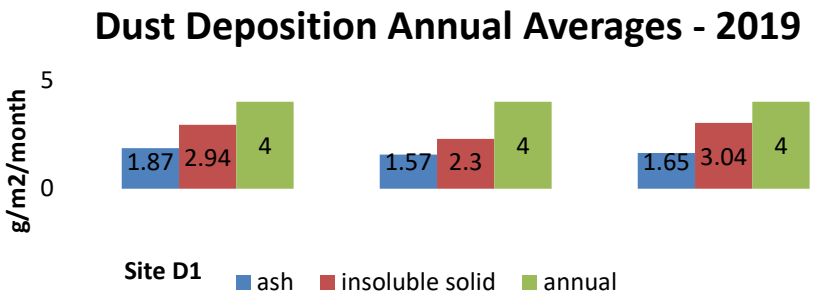
Interpolated deposited dust levels - Todoroski Air Sciences

Sample Identification		Monthly Dust Deposition (Insoluble Solids g/m2/month)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
D1	Insoluble Solids annual average (at the gauge)	8.01	7.75	7.43	5.95	5.35	4.73	4.57	4.68	4.27	4.18	4.02	2.94
	Insoluble Solids annual average (at the boundary)	1.9	1.8	1.5	1.3	1.2	1.1	1.1	1	1	1	0.7	0.5
D2	Insoluble Solids annual average (at the gauge)	4.04	4.15	3.86	3.55	3.41	3.47	3.29	3.19	2.95	2.77	2.55	2.30
	Insoluble Solids annual average (at the boundary)	2.6	2.6	2.4	2.3	2.2	2.2	2.1	1.8	2	1.6	1.4	1.2
D3	Insoluble Solids annual average (at the gauge)	4.93	4.79	4.77	4.51	4.27	4.19	4.03	3.72	3.65	3.45	3.05	3.04
	Insoluble Solids annual average (at the boundary)	3.1	3.1	3.1	3.0	2.8	2.7	2.5	2.3	2.4	2.0	1.8	1.6

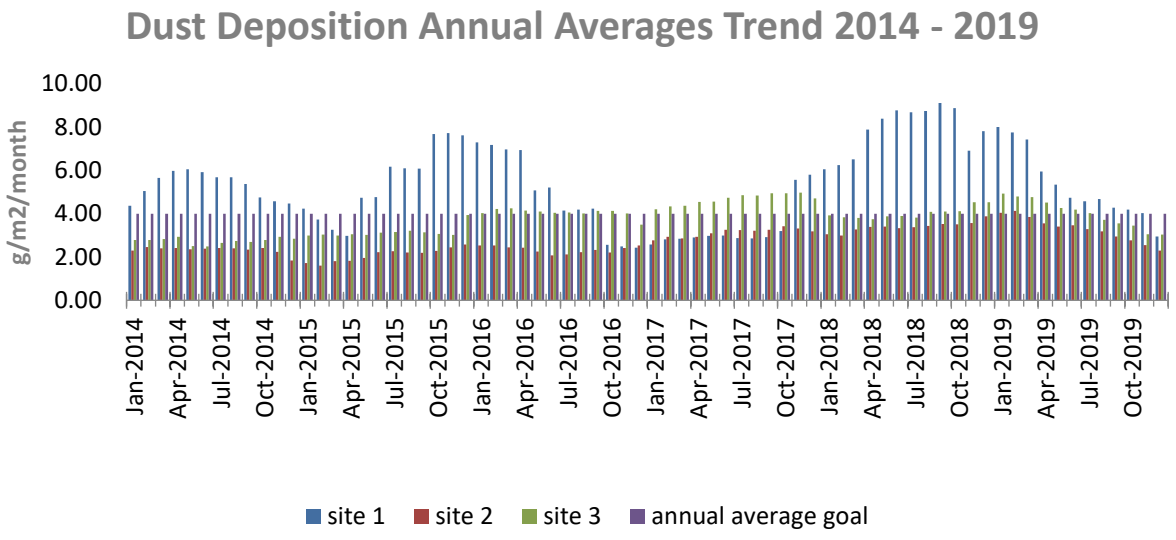
Monthly Dust Deposition Trends 2019



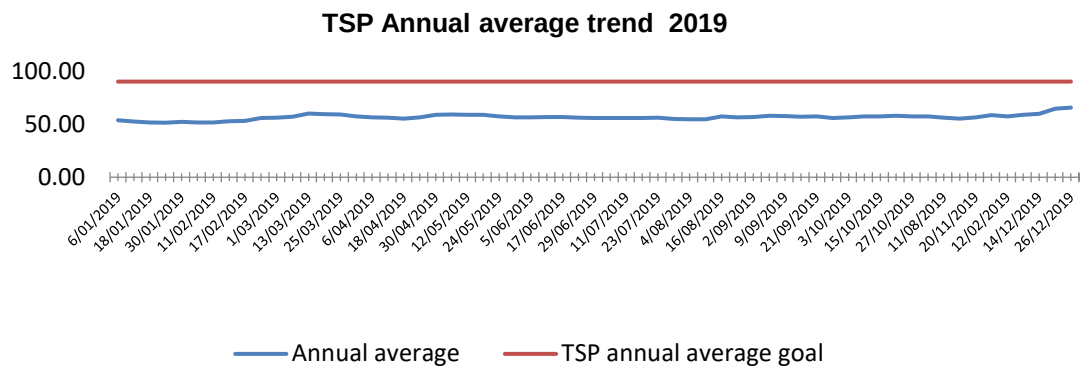
Dust Deposition Results – Annual Averages



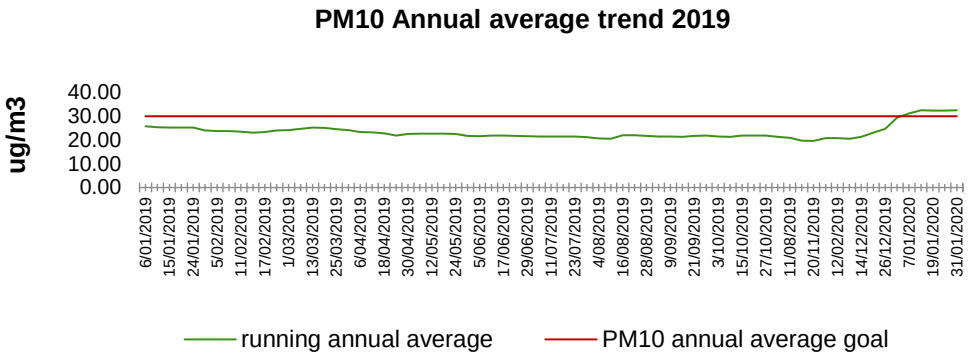
Dust Deposition Results – Annual Averages trend 2014 - 2019



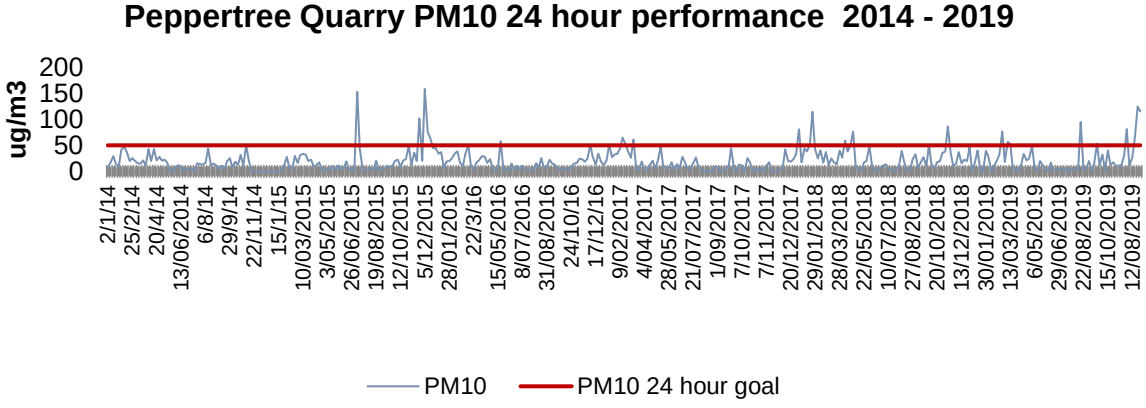
TSP - Annual Average results – 2019



PM_{10} annual average results 2019



PM10 24 hour performance results – 2014 - 2019

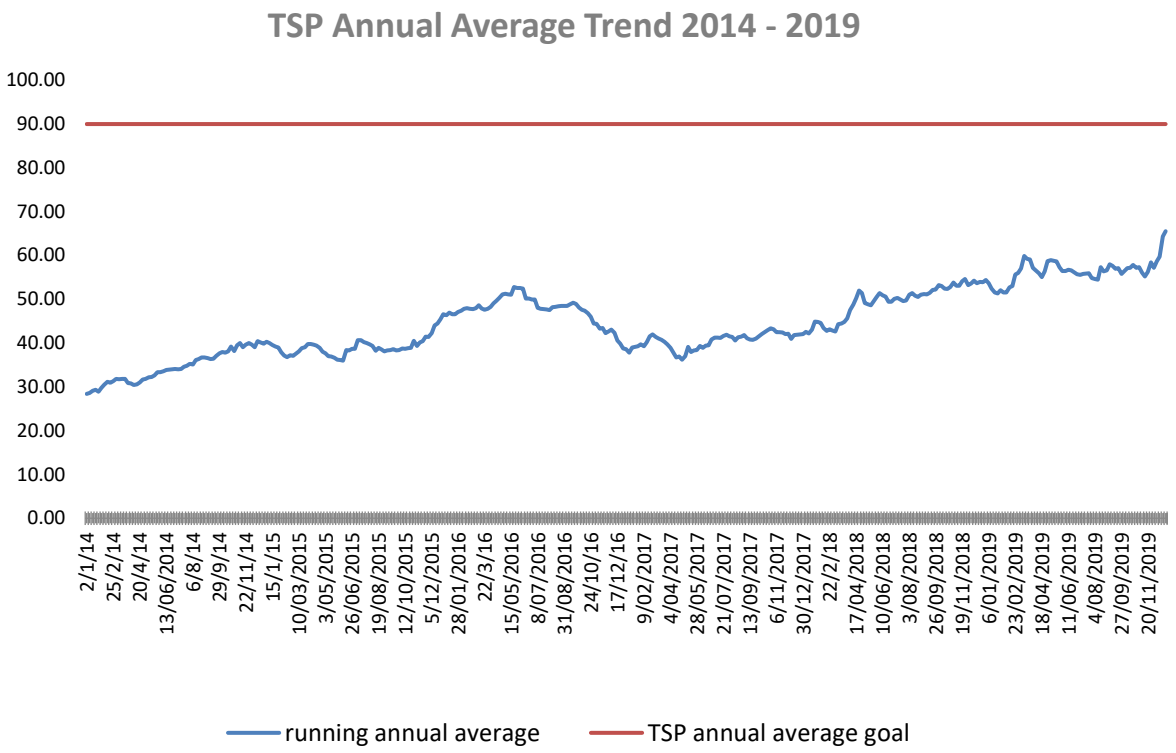


Interpolated HVAS dust levels - Todoroski Air Sciences

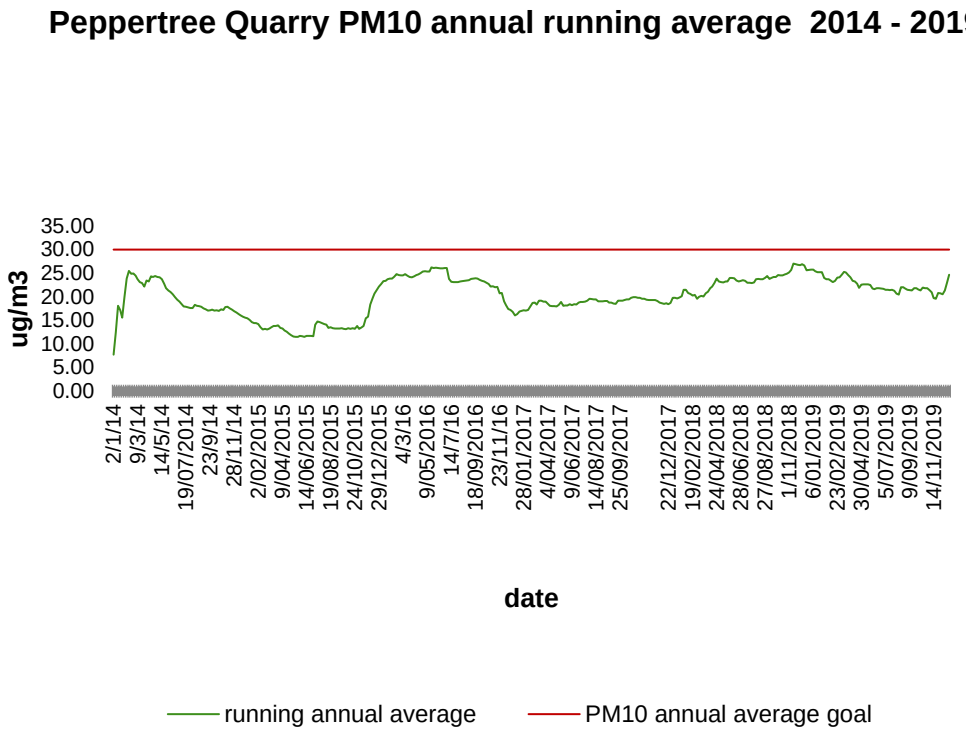
dates	PM10 (Measured)	PM10 (estimated contribution to most impacted receptor)
6/01/2019	No measurement	
12/01/2019	18.21	2.4
15/01/2019	40.3	4.4
18/01/2019	No measurement	
24/01/2019	No measurement	
30/01/2019	39.31	9.8
5/02/2019	27.77	14.5
7/02/2019	No measurement	
11/02/2019	9.6	0.2
13/02/2019	20.23	4.4
17/02/2019	32.06	7
23/02/2019	76.2	29.8
1/03/2019	18.3	8.7
7/03/2019	56.73	29.6
13/03/2019	53.22	27.7
19/03/2019	6.86	3.6
25/03/2019	4.58	0
31/03/2019	0.34	0
6/04/2019	12.81	0
12/04/2019	33.58	11.7
18/04/2019	21.05	3.7
24/04/2019	24.74	3.9
30/04/2019	49.05	4.6
6/05/2019	6.74	0.6
12/05/2019	1.18	0.1
18/05/2019	19.92	6.9
24/05/2019	11.27	0
30/05/2019	1.42	0
5/06/2019	3.36	1.1
11/06/2019	16.75	0
17/06/2019	0.07	0

dates	PM10 (Measured)	PM10 (estimated contribution to most impacted receptor)
23/06/2019	3.46	1.8
29/06/2019	3.96	0
5/07/2019	4.08	2.1
11/07/2019	6.23	0
17/07/2019	0.46	0
23/07/2019	5.36	0
29/07/2019	2.18	0.1
4/08/2019	4.72	1.3
10/08/2019	3.25	0
16/08/2019	95.05	0
22/08/2019	2.67	0.5
28/08/2019	4.38	0.5
3/09/2019	19.79	0.9
9/09/2019	2.16	0.5
15/09/2019	14.47	0
21/09/2019	53	9.2
27/09/2019	11.66	0
3/10/2019	31.96	1.4
9/10/2019	2.74	0.9
15/10/2019	40.13	5.8
21/10/2019	12.69	4.9
27/10/2019	17.23	0.4
02/11/2019	9.95	0.2
08/11/2019	11.19	0
14/11/2019	11.23	0
20/11/2019	30.78	15.4
26/11/2019	81.48	0
12/02/2019	11.45	0
12/08/2019	25.8	13.4
14/12/2019	62.69	18.5
20/12/2019	124.15	45.8
26/12/2019	115.38	32.6

Long Term TSP Trend – 2014 to 2019

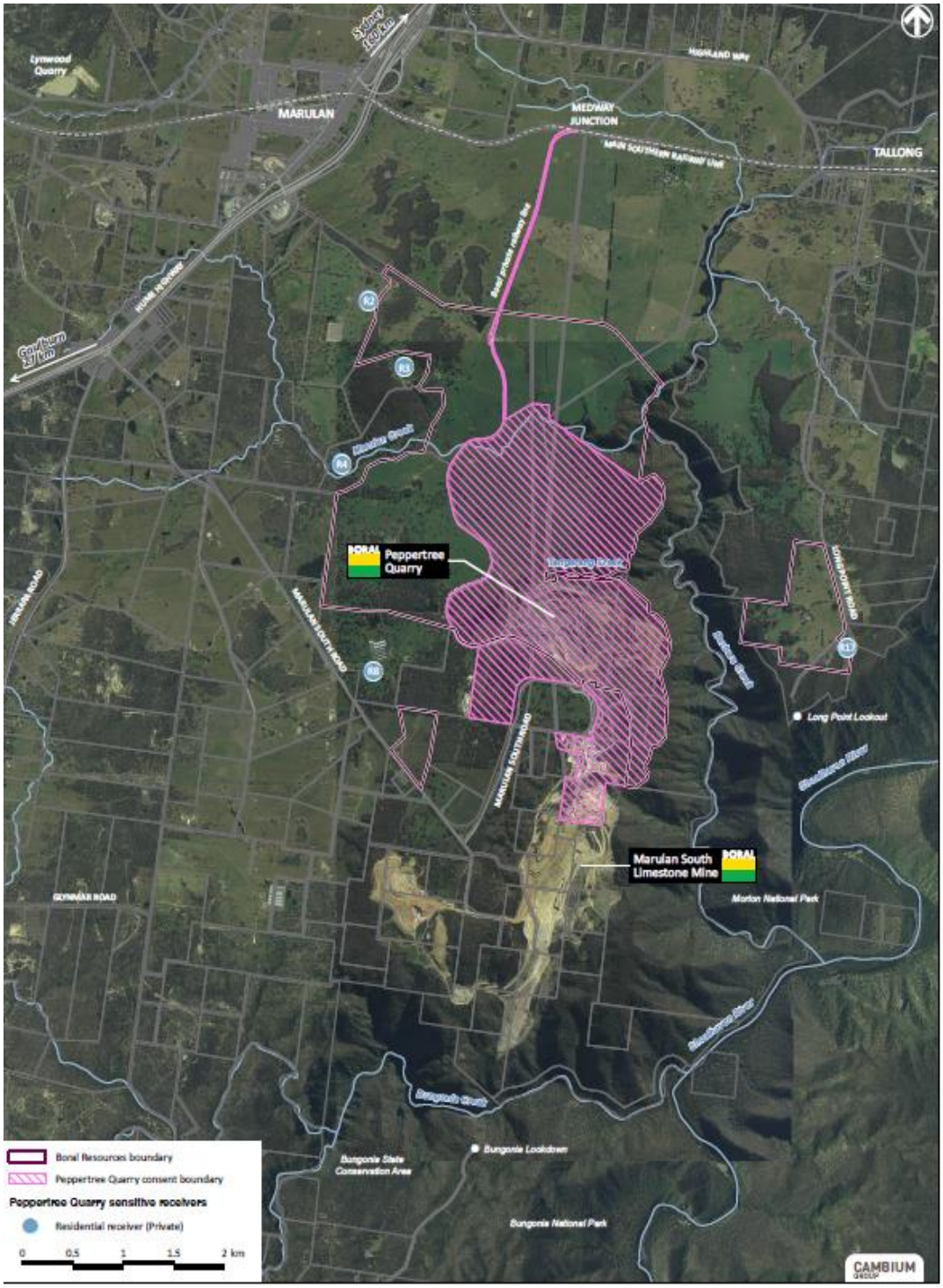


Long Term PM10 Trend – 2014 to 2019



APPENDIX 3 NOISE MONITORING

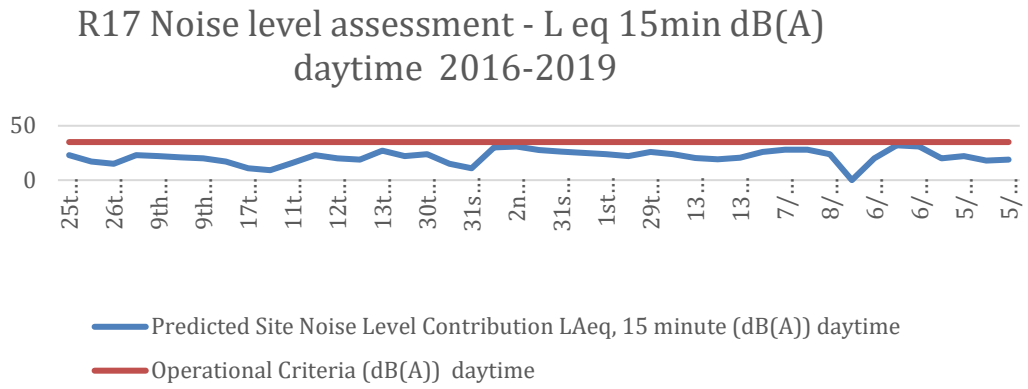
Residential receiver locations

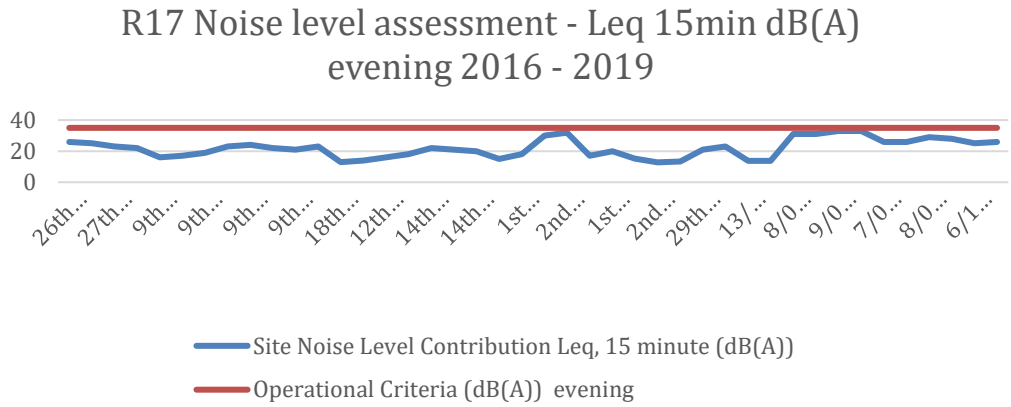


Noise Assessment Results (LAeq (15min))

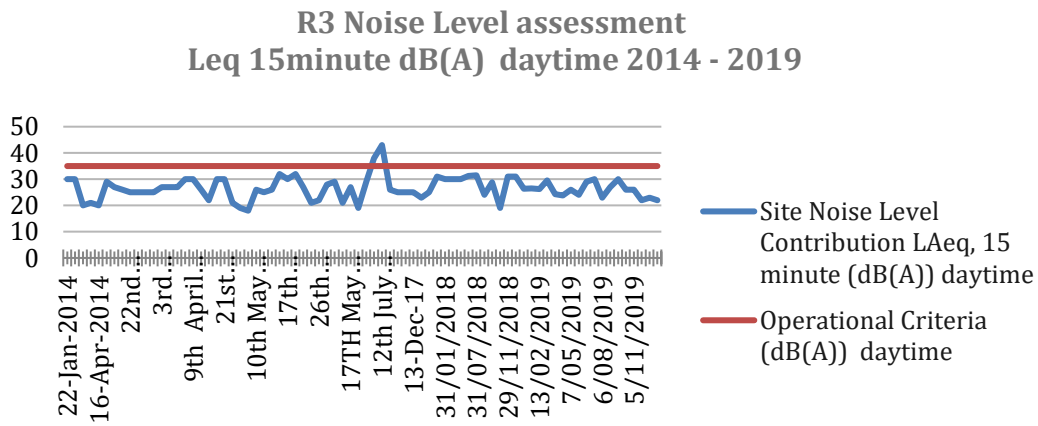
Residential Receiver	Assessment Dates (2019)	Noise Level Assessment (LAeq (15min))		
		Compliance Criteria	Measured Noise Levels dB(A)	Compliance with Criteria
Receiver R3	February	Day: 35 Evening/Night: 35	26.4/26.5/26.3/29.5/24.3/23.8 26/28.5/23	Yes Yes
	May	Day: 35 Evening/Night: 35	26/24/29/30 30/20/21/21/22	Yes Yes
	August	Day: 35 Evening/Night: 35	23/27/30 20/23/22/23	Yes Yes
	November	Day: 35 Evening/Night: 35	26/26/22/23/22 27/26/27	Yes Yes
Receiver R2	February	Day: 35 Evening/Night: 35	26.8/26.6 16.5/13/11.7	Yes Yes
	May	Day: 35 Evening/Night: 35	29/33/33/32 27/27/26/28	Yes Yes
	August	Day: 35 Evening/Night: 35	30/28/31 31/31/26/25	Yes Yes
	November	Day: 35 Evening/Night: 35	24/21/28/22 26/30/32/33	Yes Yes
Receiver R8	February	Day: 41 Evening/Night: 35	20.9/22.2/24.1/29.2/26 31.5/29.6/33.1	Yes Yes
	May	Day: 41 Evening/Night: 35	24/24/35/39 23/18/21/21	Yes Yes
	August	Day: 41 Evening/Night: 35	22/29/28 34/35/18/27	Yes Yes
	November	Day: 41 Evening/Night: 35	No monitoring due to weather	Yes Yes
Receiver 4	February	Day: 35 Evening/Night: 35	22.4/22.6/23/22.9 23.8/25.9/27.1	Yes Yes
	May	Day: 35 Evening/Night: 35	24/26/31/33 23/23/24/20/19	Yes Yes
	August	Day: 35 Evening/Night: 35	23/26/26 23/22/22/22	Yes Yes
	November	Day: 35 Evening/Night: 35	20/20/23 20	Yes Yes
Receiver 17	February	Day: 35 Evening/Night: 35	20.3/19.2/20.5 23.1/13.7/13.8	Yes Yes
	May	Day: 35 Evening/Night: 35	26/28/28/24 31/31/33/33	Yes Yes
	August	Day: 35 Evening/Night: 35	20/32/31 26/26/29/28	Yes Yes
	November	Day: 35 Evening/Night: 35	20/22/18/19/28/21 25/26	Yes Yes

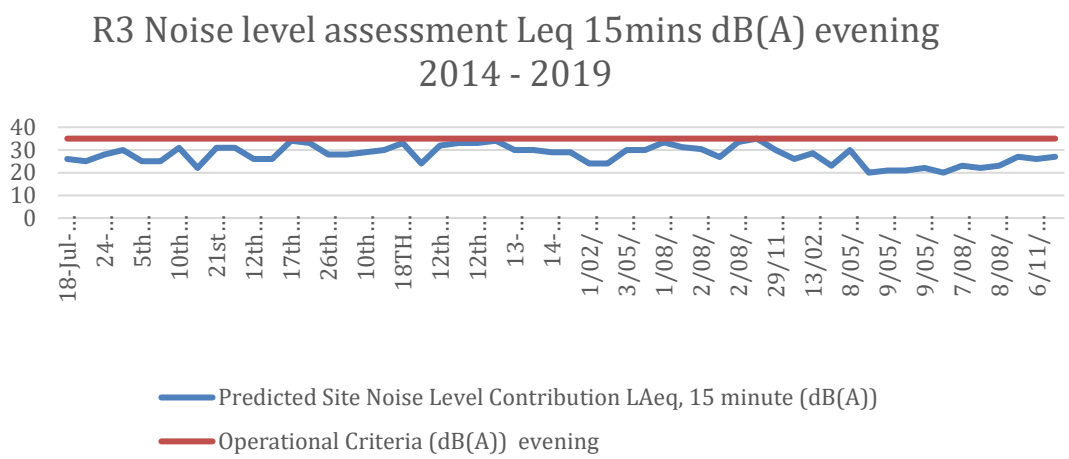
R 17 Off-Site Noise Level Trends (LAeq 15) 2016 – 2019



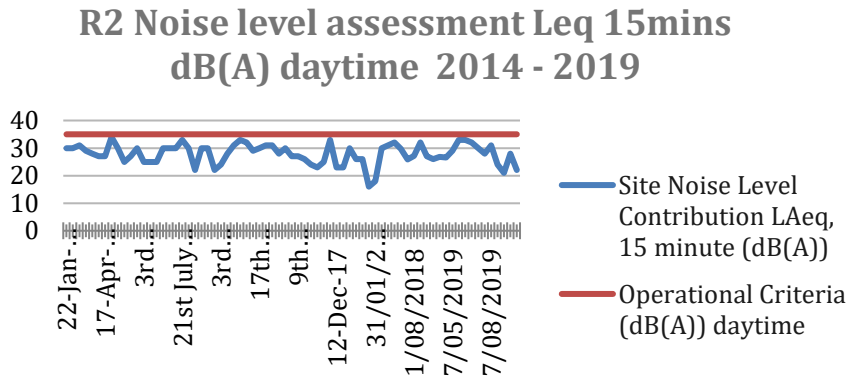


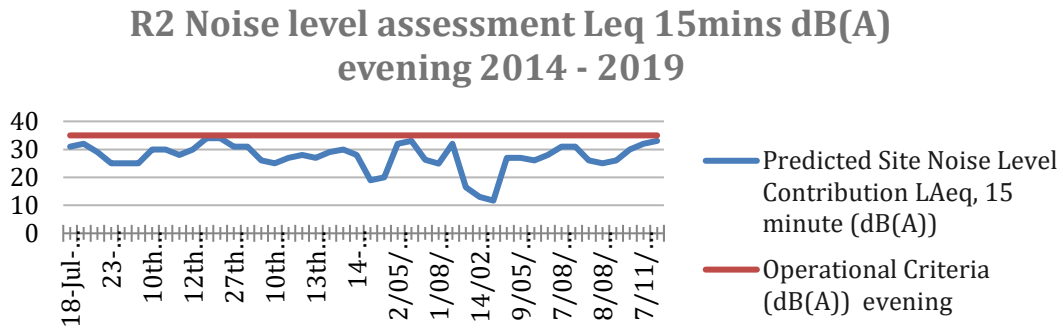
R 3 Off-Site Noise Level Trends (LAeq 15) 2014 – 2019



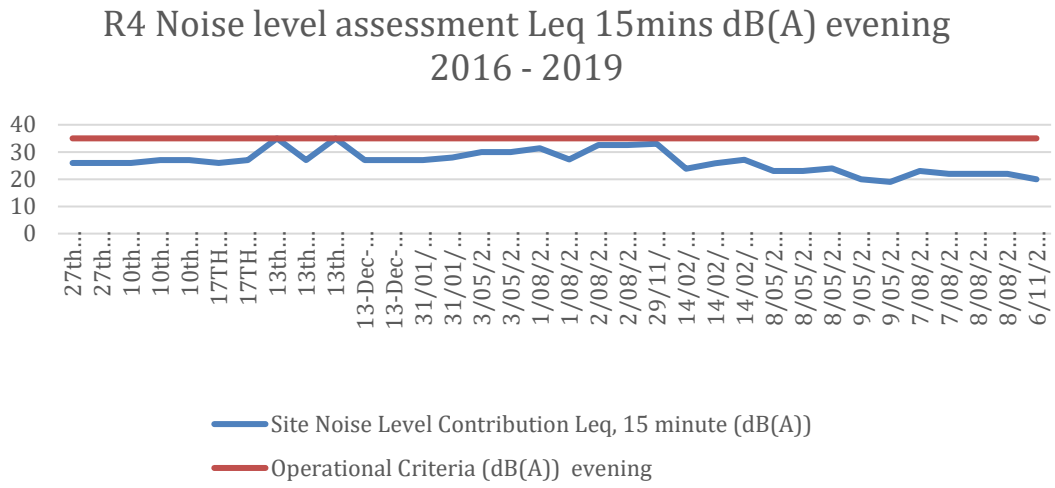


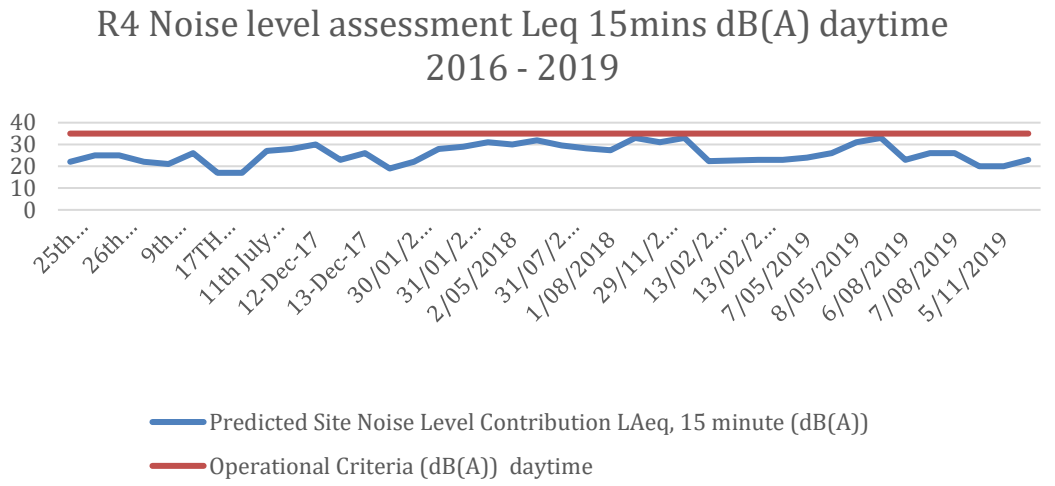
R2 Off-Site Noise Level Trends (LAeq 15) 2014 – 2019



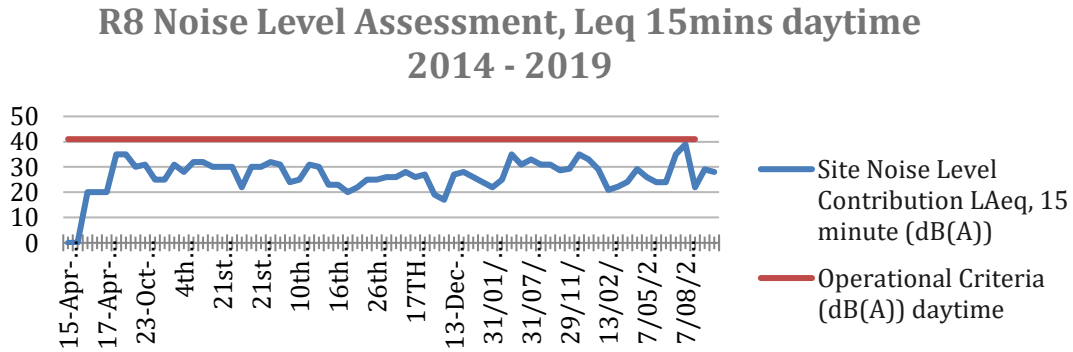


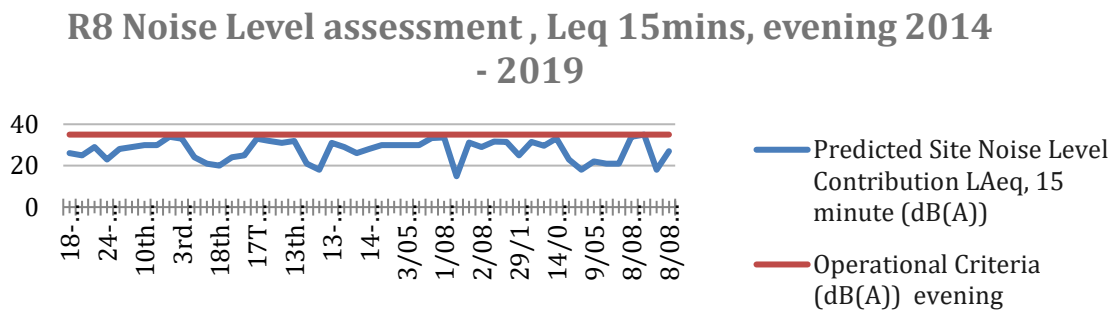
R 4 Off-Site Noise Level Trends (LAeq 15) 2016 – 2019





R8 Off-Site Noise Level Trends (LAeq 15) 2014 – 2019

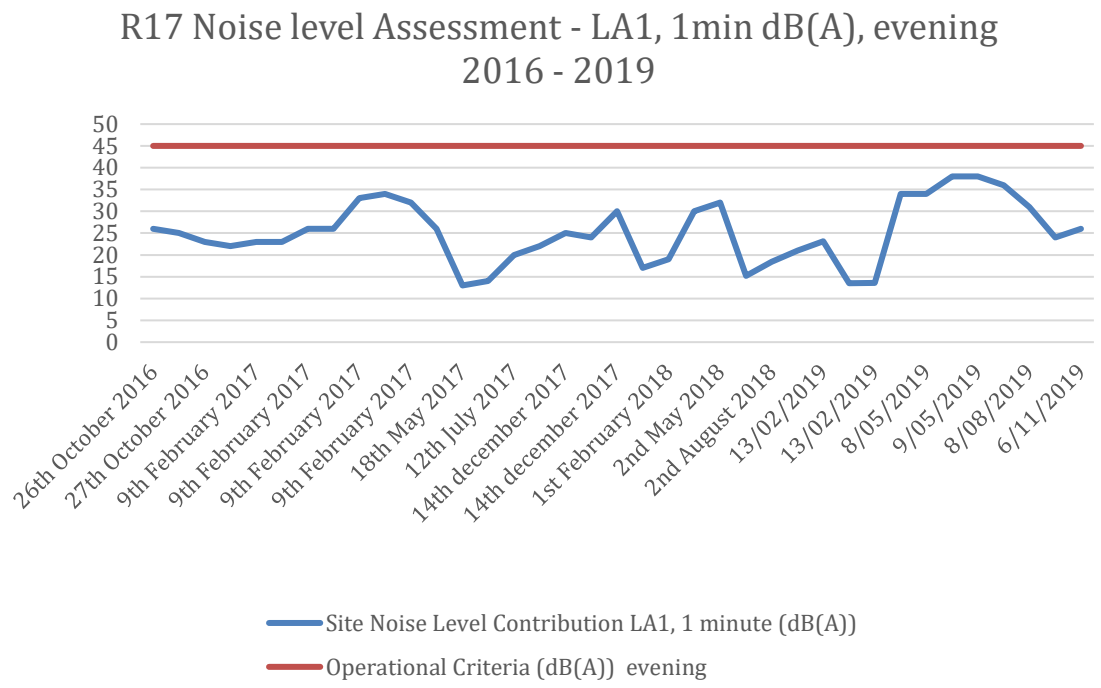




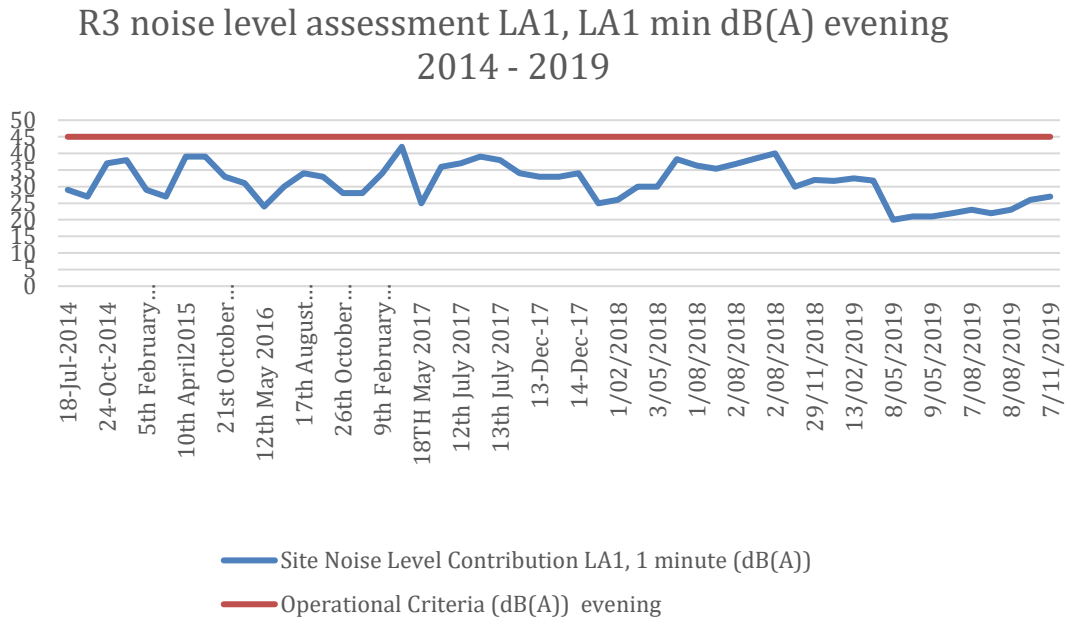
Noise Assessment Results (LA1 (1min))

Residential Receiver	Assessment Dates (2019)	Noise Level Assessment (LA1 (1min))		
		Compliance Criteria	Measured Noise Levels dB(A)	Compliance with Criteria
Receiver R3	February	45	31.7/32.5/31.8	Yes
	May	45	20/21/21/22	Yes
	August	45	23/22/23	Yes
	November	45	26/27	Yes
Receiver R2	February	45	19.7/13/18.1	Yes
	May	45	27/27/26/28	Yes
	August	45	31/30/27/25	Yes
	November	45	32/33	Yes
Receiver R8	February	45	38,7/38.1/37.4	Yes
	May	45	28/28/29	Yes
	August	45	39/41/18/31	Yes
	November	45	No monitoring	Yes
Receiver R4	February	45	24.1/30.6/36.3	Yes
	May	45	20/20	Yes
	August	45	23/21/22/22	Yes
	November	45	20	Yes
Receiver R17	February	45	23.1/13.5/13.6	Yes
	May	45	34/34/38/38	Yes
	August	45	36/31	Yes
	November	45	24/26	Yes

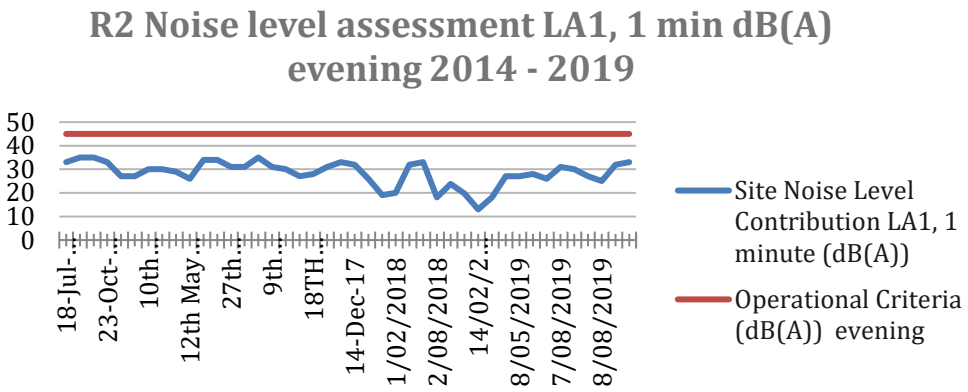
R 17 Noise Level Trends (LA1, 1minute) 2016 – 2019



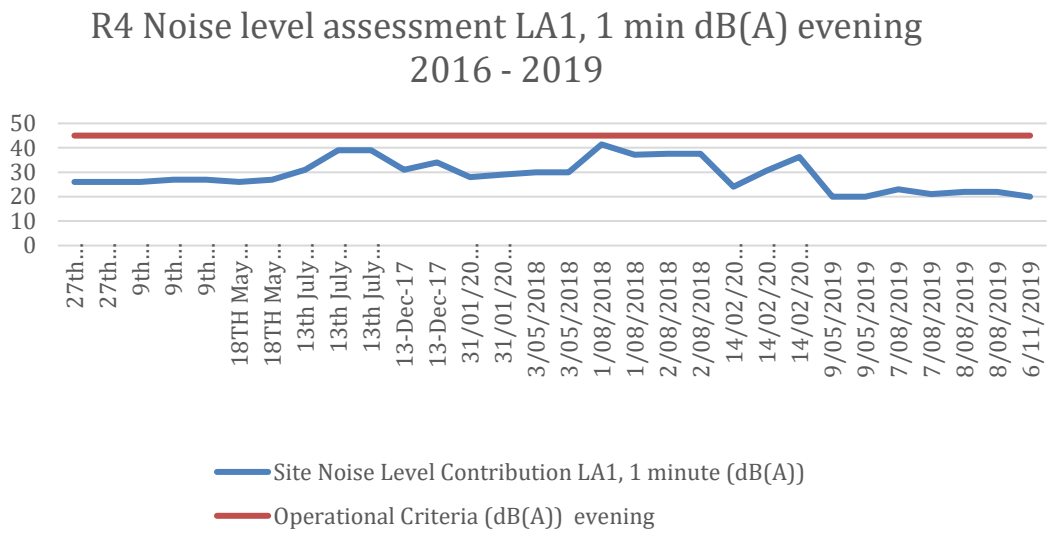
R3 Noise Level Trends (LA1, 1minute) 2014 – 2019



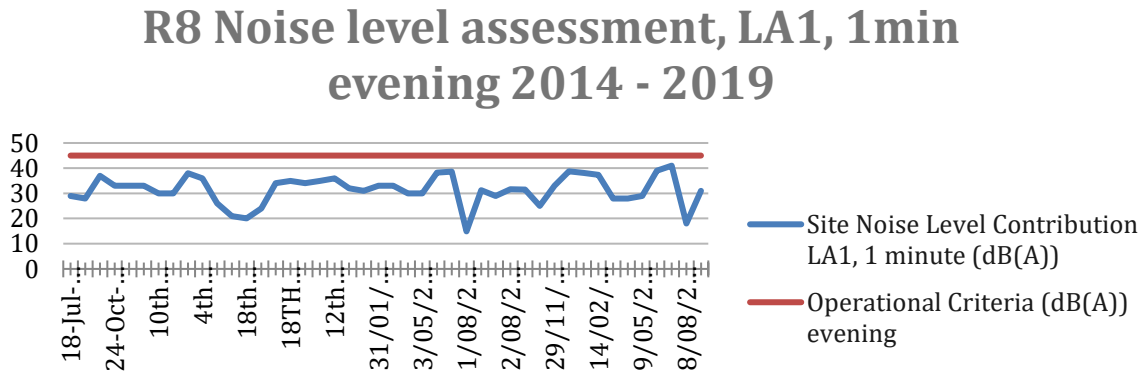
R2 Noise Level Trends (LA1, 1minute) 2014 – 2019



R4 Noise Level Trends (LA1, 1minute) – 2019

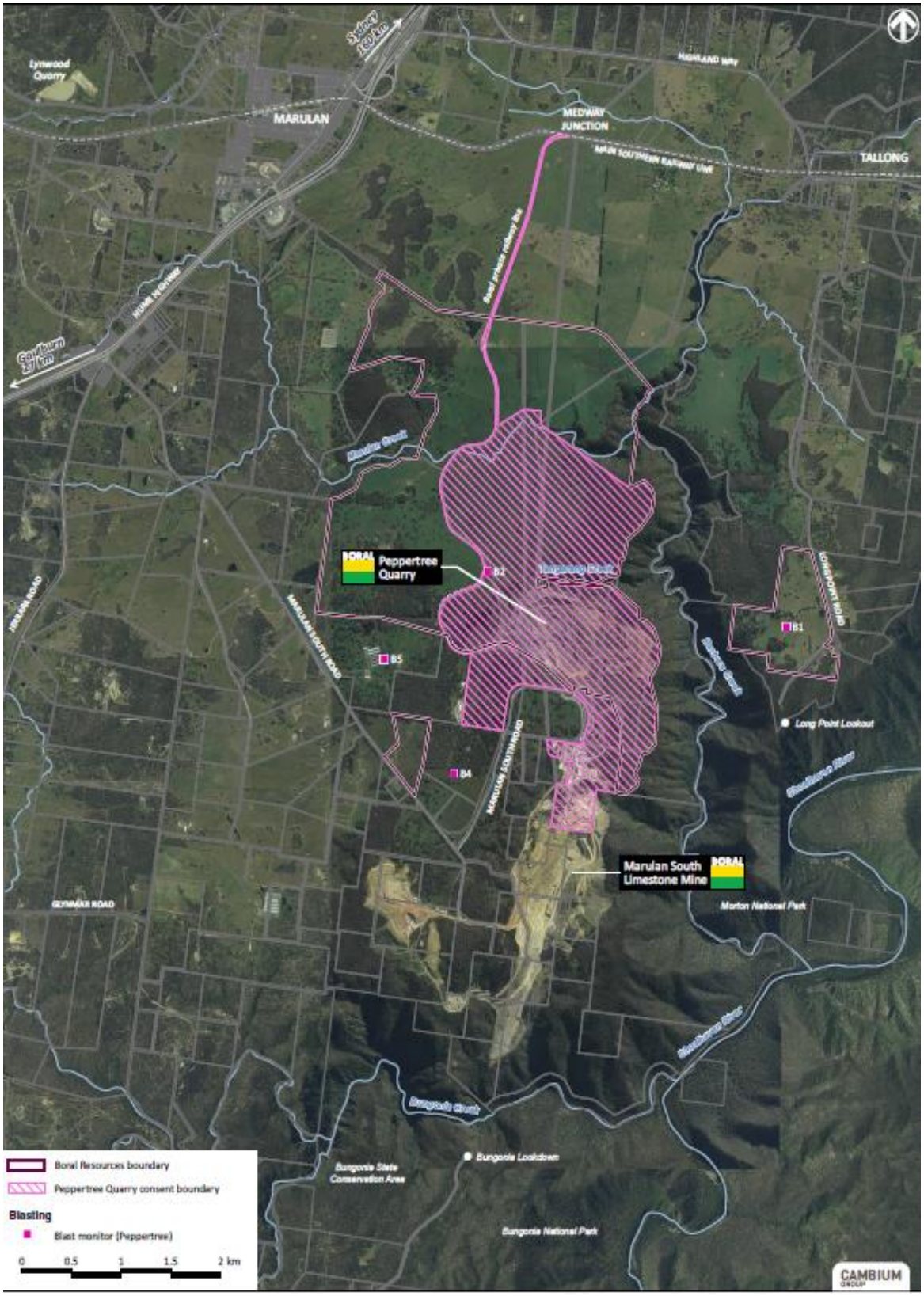


R8 Noise Level Trends (LA1, 1minute) – 2018



APPENDIX 4 BLAST MONITORING INFORMATION

Blast monitoring locations



Blast Monitoring Results

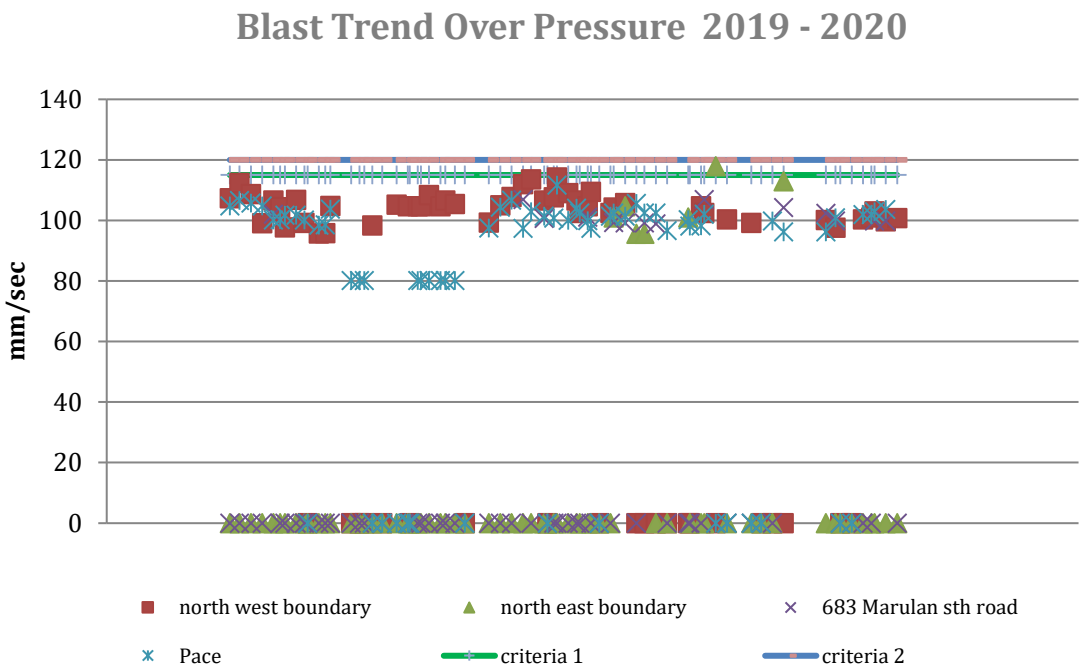
Note 0 = no trigger

Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	
11/01/2019	107.3	0	0	104.8	1.29	0	0	1.18	YES
17/01/2019	112.4	0	0	106.6	0.41	0	0	0.6	YES
24/01/2019	108.7	0	0	105.7	1.26	0	0	1.66	YES
31/01/2019	99	0	0	104.8	1.24	0	0	0.91	YES
7/02/2019	106.6	0	102	100.1	0.87	0	0.22	1.19	YES
11/02/2019	104.3	0	0	100.2	0.57	0	0	0.7	YES
14/02/2019	97.7	0	0	101.7	0.29	0	0	0.28	YES
21/02/2019	106.8	0	0	101.7	0.84	0	0	1.18	YES
26/02/2019	99.2	0	0	100.1	0.34	0	0	0.43	YES
28/02/2019	0	0	0	0	0	0	0	0	YES
7/03/2019	95.7	0	0	98.4	0.4	0	0	0.43	YES
11/03/2019	95.8	0	0	98.5	0.23	0	0	0.25	YES
14/03/2019	104.8	0	0	103.7	1	0	0	1.11	YES
27/03/2019	0	0	0	80.1	0	0	0	0.24	YES
1/04/2019	0	0	0	80.1	0	0	0	0.34	YES
4/04/2019	0	0	0	80.1	0	0	0	1.7	YES
9/04/2019	98.3	0	0	0	0.21	0	0	0	YES
15/04/2019	0	0	0	0	0	0	0	0	YES
24/04/2019	105.2	0	0	0	0.92	0	0	0	YES
1/05/2019	104.7	0	0	0	0.48	0	0	0	YES

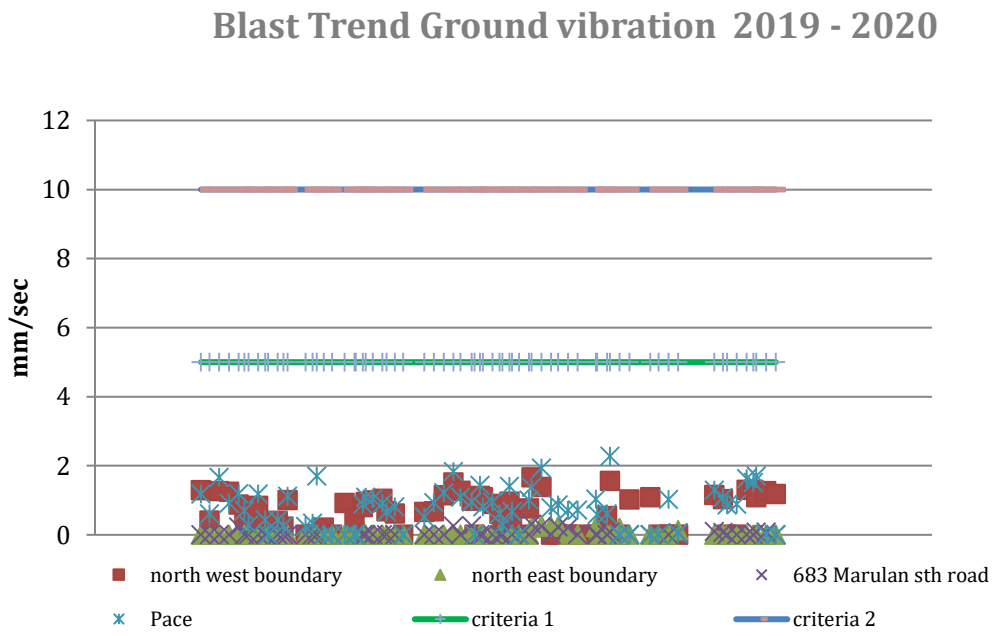
Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	
2/05/2019	0	0	0	0	0	0	0	0	YES
7/05/2019	104.7	0	0	80.1	0.8	0	0	0.88	YES
9/05/2019	104.7	0	0	80.1	0.95	0	0	1.09	YES
14/05/2019	108.4	0	0	80.1	0.99	0	0	1.04	YES
21/05/2019	104.7	0	0	80.1	1.04	0	0	0.91	YES
24/05/2019	106.5	0	0	80.1	0.68	0	0	0.66	YES
30/05/2019	105.4	0	0	80.1	0.61	0	0	0.81	YES
5/06/2019	0	0	0	0	0	0	0	0	YES
20/06/2019	99.3	0	0	97.5	0.66	0	0	0.51	YES
27/06/2019	105	0	0	104.3	0.68	0	0	0.93	YES
4/07/2019	107.7	0	0	106.7	1.14	0	0	1.22	YES
11/07/2019	111.9	0	106.9	97.4	1.51	0	0.25	1.83	YES
16/07/2019	113.5	0	0	102.9	1.27	0	0	1.09	YES
24/07/2019	106.6	0	100.6	101.4	0.98	0	0.26	0.95	YES
26/07/2019	0	0	0	0	0	0	0	0	YES
30/07/2019	107.6	0	0	100.7	1.12	0	0	1.43	YES
1/08/2019	114.2	0	0	111.6	1.09	0	0	0.81	YES
8/08/2019	109	0	0	100	0.89	0	0	0.95	YES
13/08/2019	106.6	0	0	104	0.6	0	0	0.6	YES
15/08/2019	102.4	0	0	102.4	0.29	0	0	0.28	YES
20/08/2019	104.7	0	101.1	99.9	0.96	0	0.3	1.4	YES

Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Pace)	
22/08/2019	109.4	0	0	97.3	0.43	0	0	0.67	YES
27/08/2019	0	0	0	0	0	0	0	0	YES
3/09/2019	102.4	0	0	101.4	0.76	0	0	1	YES
5/09/2019	104.2	100.9	99.3	102.4	1.66	0.21	0.31	1.37	YES
12/09/2019	105.7	104.7	99.2	101.4	1.38	0.27	0.24	1.93	YES
19/09/2019	0	95.6	0	105.6	0	0.23	0	0.78	YES
24/09/2019	0	95.6	99.1	102.4	0	0.24	0.22	0.86	YES
1/10/2019	0	0	98.8	102.4	0	0	0.21	0.71	YES
8/10/2019	0	0	0	96.6	0	0	0	0.72	YES
21/10/2019	0	100.9	0	100.2	0	0.22	0	1.03	YES
22/10/2019	0	0	0	98.1	0	0	0	0.59	YES
29/10/2019	104.7	0	0	98.2	0.54	0	0	0.6	YES
31/10/2019	102.4	0	106.9	102	1.56	0	0.08	2.27	YES
7/11/2019	0	117.9	0	0	0	0.2	0	0	YES
14/11/2019	100.3	0	0	0	1.02	0	0	0	YES
29/11/2019	99.2	0	0	0	1.09	0	0	0	YES
5/12/2019	0	0	0	0	0	0	0	0	YES
12/12/2019	0	0	0	99.8	0	0	0	1.02	YES
19/12/2019	0	112.9	104.2	96.2	0	0.13	0.06	0.04	YES

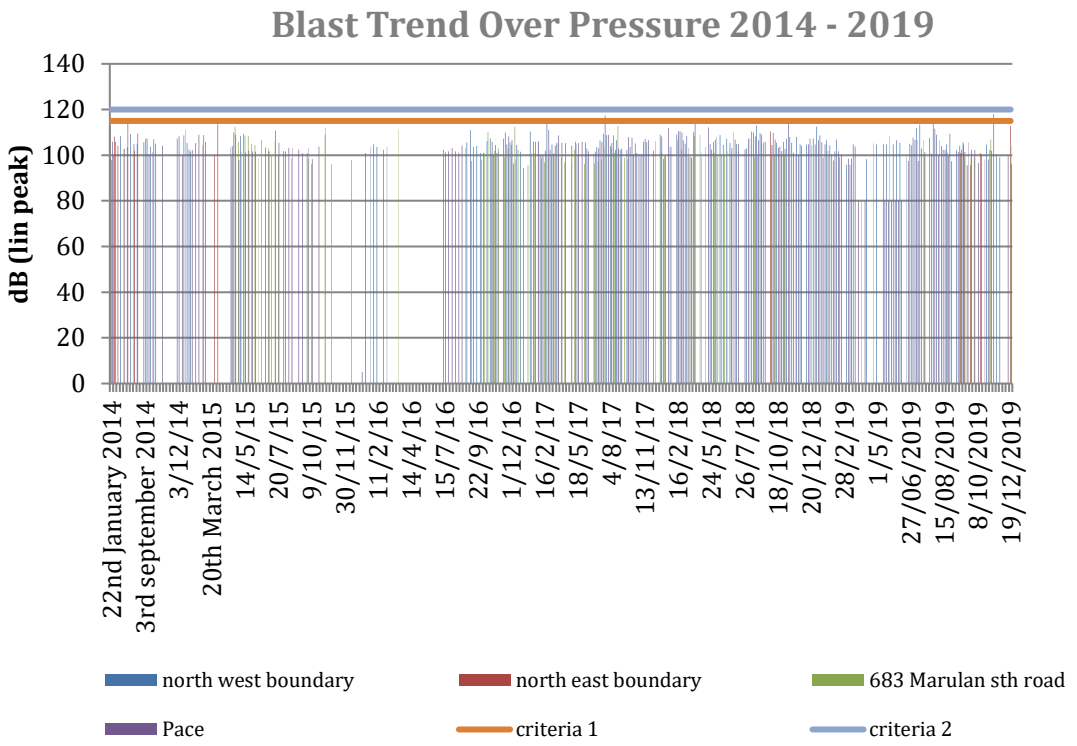
Blasting Overpressure Performance for 2019



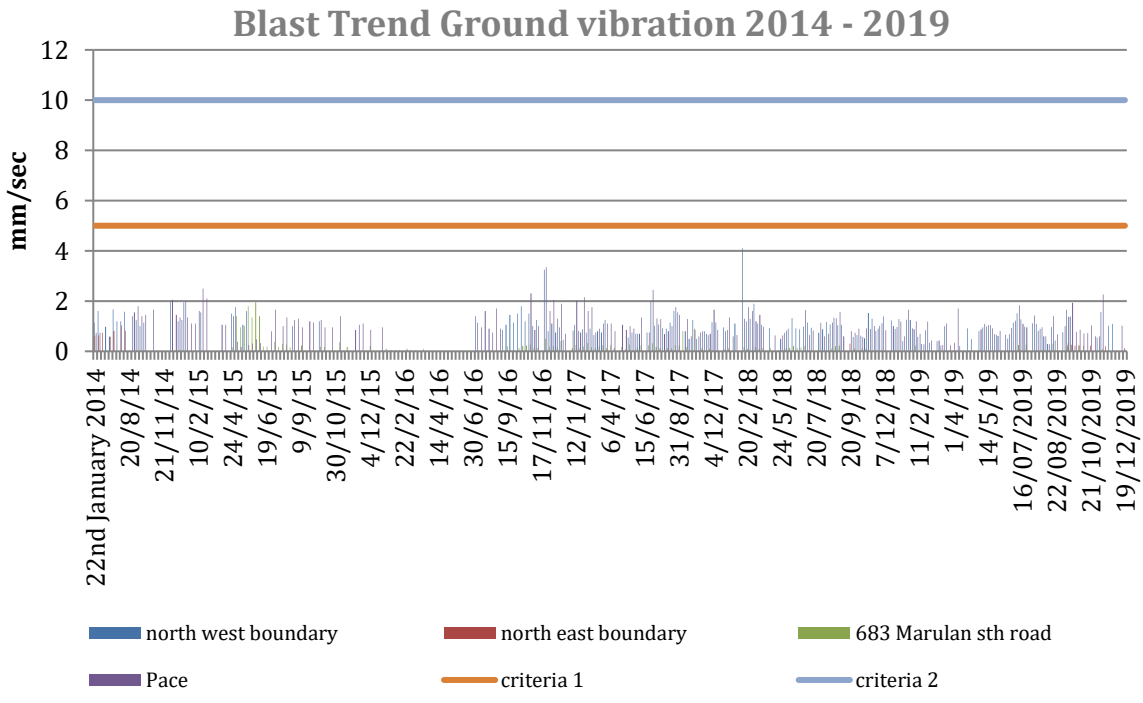
Blasting Ground Vibration Performance for 2019



Long Term Blast Trends – Overpressure

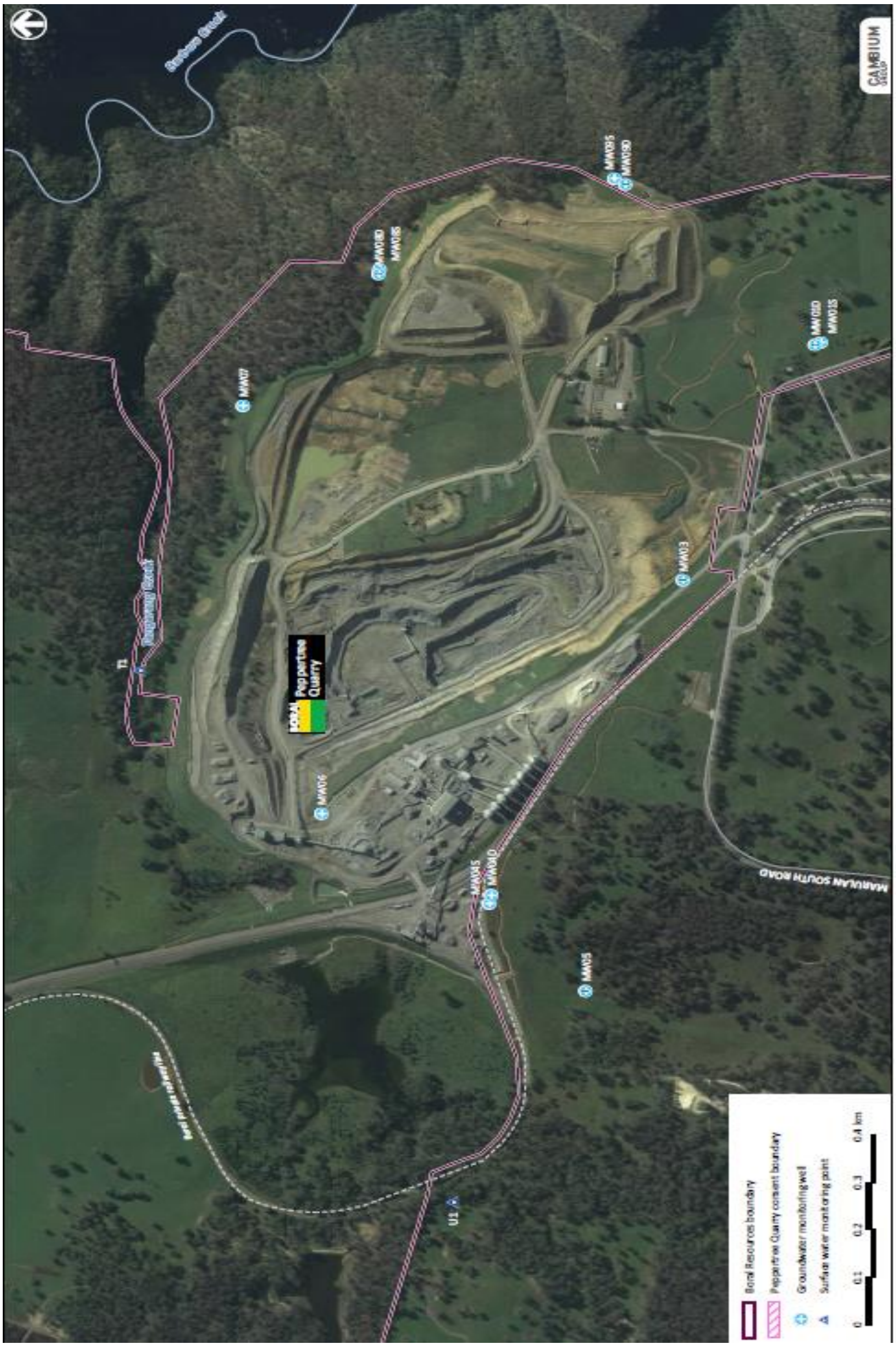


Long Term Blast Trends – Vibration



APPENDIX 5 SURFACE AND GROUNDWATER MONITORING INFORMATION

Surface and groundwater monitoring locations



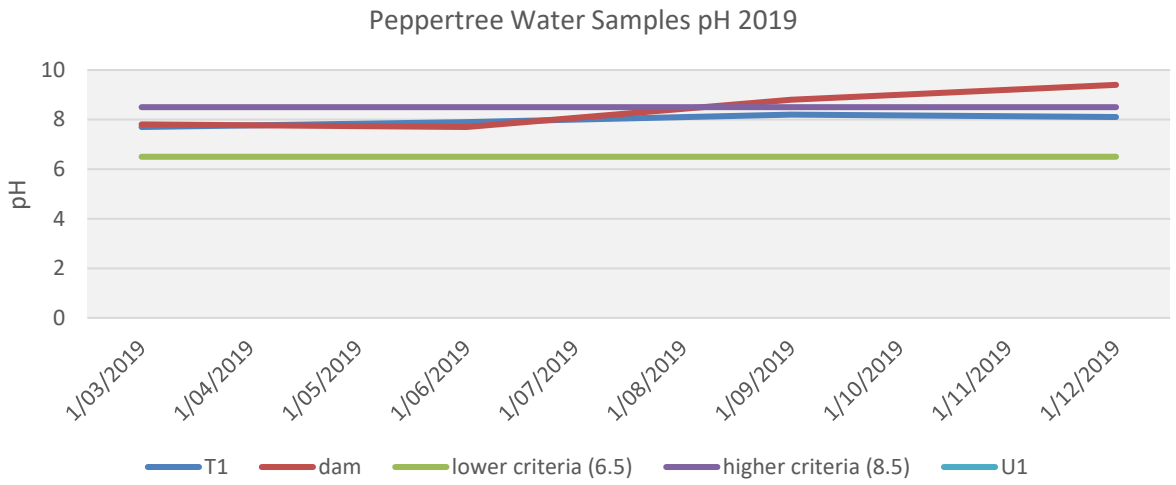
Surface Water Monitoring Results (2019)

Parameter	Dam				Tangarang Ck - Downstream				Tangarang Ck - Upstream				Marulan South Ck			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
pH	7.8	7.7	8.8	9.4	7.7	7.9	8.2	8.1	No Flow	7.6	No Flow	No Flow	7.8	7.7	7.6	No Flow
Total Suspended solids (mg/l)	8	29	15	12	<5	<5	<5	<5	No Flow	35	No Flow	No Flow	<5	21	10	No Flow
Total Dissolved solids (mg/l)	264	242	403	574	362	470	456	483	No Flow	235	No Flow	No Flow	352	320	566	No Flow
Ammonia -N (mg/l)	0.11	0.17	0.11	0.08	<0.01	<0.01	0.02	0.01	No Flow	<0.01	No Flow	No Flow	<0.01	0.04	0.38	No Flow
Nitrate-N (mg/l)	0.12	0.13	1.41	0.02	0.06	0.25	0.13	0.02	No Flow	0.56	No Flow	No Flow	<0.01	0.71	0.41	No Flow
Nitrite-N (mg/l)	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	No Flow	0.01	No Flow	No Flow	<0.01	0.03	0.03	No Flow
Sulphate (mg/l)	20	26	47	50	8	16	16	3	No Flow	4	No Flow	No Flow	24	22	31	No Flow
Chloride (mg/l)	43	48	132	180	87	141	128	128	No Flow	62	No Flow	No Flow	99	115	259	No Flow
Turbidity (NTU)	7.2	18.1	14.9	11.5	3	1	1.3	0.5	No Flow	37.6	No Flow	No Flow	7.3	40.1	15.4	No Flow
Calcium (mg/l)	28	40	42	45	36	57	52	57	No Flow	23	No Flow	No Flow	30	22	39	No Flow
Potassium (mg/l)	7	7	5	7	3	4	3	2	No Flow	5	No Flow	No Flow	11	8	11	No Flow
Magnesium (mg/l)	10	13	20	25	22	34	32	36	No Flow	10	No Flow	No Flow	16	16	32	No Flow
Sodium (mg/l)	31	36	64	87	48	72	65	76	No Flow	28	No Flow	No Flow	43	45	96	No Flow
Total phosphorus (mg/l)	0.03	0.08	0.02	0.08	0.01	<0.01	<0.01	<0.01	No Flow	0.19	No Flow	No Flow	0.17	0.21	0.3	No Flow
total nitrogen	1.1	1.2	2	1.3	0.4	0.6	0.3	0.2	No Flow	1.7	No Flow	No Flow	1.5	1.9	2.2	No Flow
Hardness (CaCo3) (mg/l)	114	137	96	122	180	236	218	299	No Flow	62	No Flow	No Flow	86	50	117	No Flow

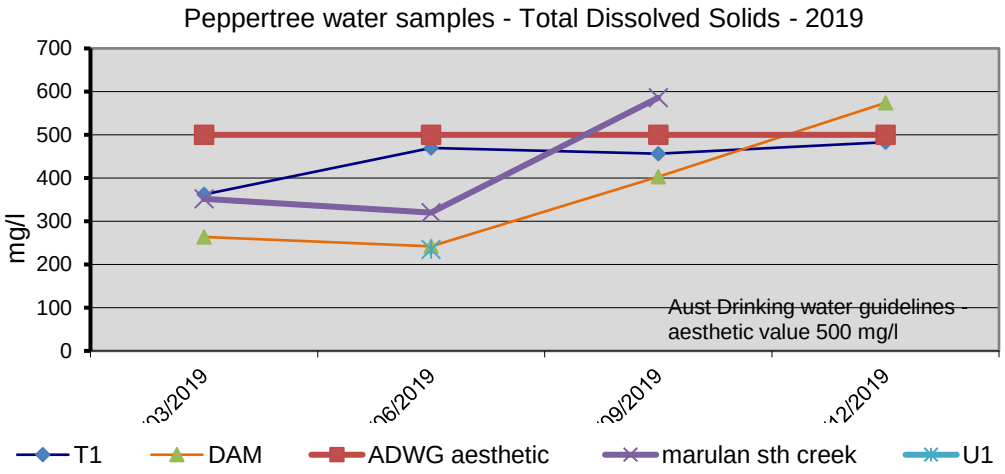
Parameter	Dam				Tangarang Ck - Downstream				Tangarang Ck - Upstream				Marulan South Ck			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
TKN (mg/l)	1	1.1	0.6	1.3	0.3	0.3	0.2	0.2	No Flow	1.1	No Flow	No Flow	1.5	1.2	1.8	No Flow
Faecal Coliform (cfu/100ml)	110	110	18	20	43	180	84	36	No Flow	5200	No Flow	No Flow	4100	18000	83000	No Flow
TPH C10-C14 (µg/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	No Flow	No Flow	No Flow	<50	<50	<50	<50
TPH C15-C28 (µg/l)	110	110	110	110	<100	<100	<100	<100	<100	No Flow	No Flow	No Flow	<100	<100	<100	<100
TPH C29-C36 (µg/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	No Flow	No Flow	No Flow	<50	<50	<50	<50
sum TPH C10-C36 (µg/l)	110	110	110	110	<50	<50	<50	<50	<50	No Flow	No Flow	No Flow	<50	<50	<50	<50
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Acenaphthylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Acenaphthere	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Flourene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Phenanthrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Anthracence	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Benzo(a)anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Chrysene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Benzo(b+k)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	No Flow	No Flow	No Flow	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-cd)pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1

Parameter	Dam				Tangarang Ck - Downstream				Tangarang Ck - Upstream				Marulan South Ck			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Dibenzo(a,h)anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	No Flow	No Flow	No Flow	<1	<1	<1	<1
Benzo(g,h,i)perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	No Flow	No Flow	No Flow	<0.5	<0.5	<0.5	<0.5

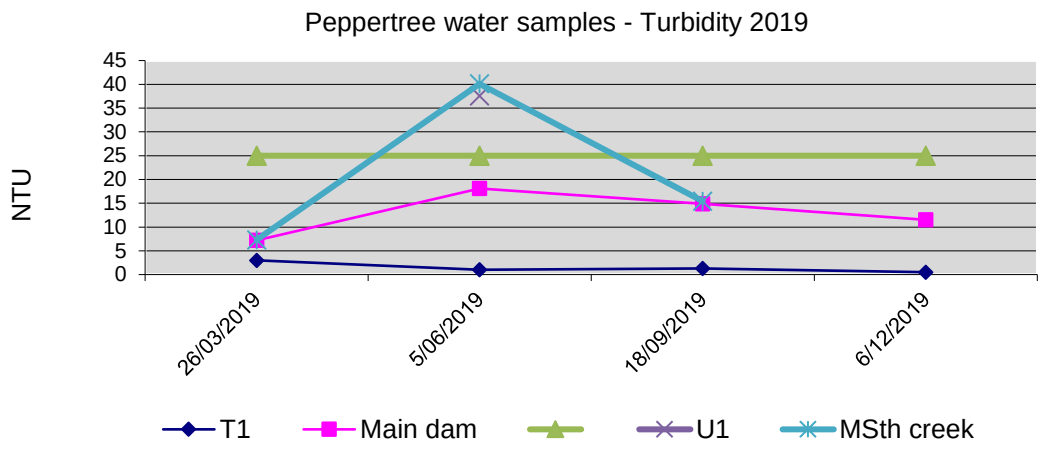
pH Surface Waters Trends 2019



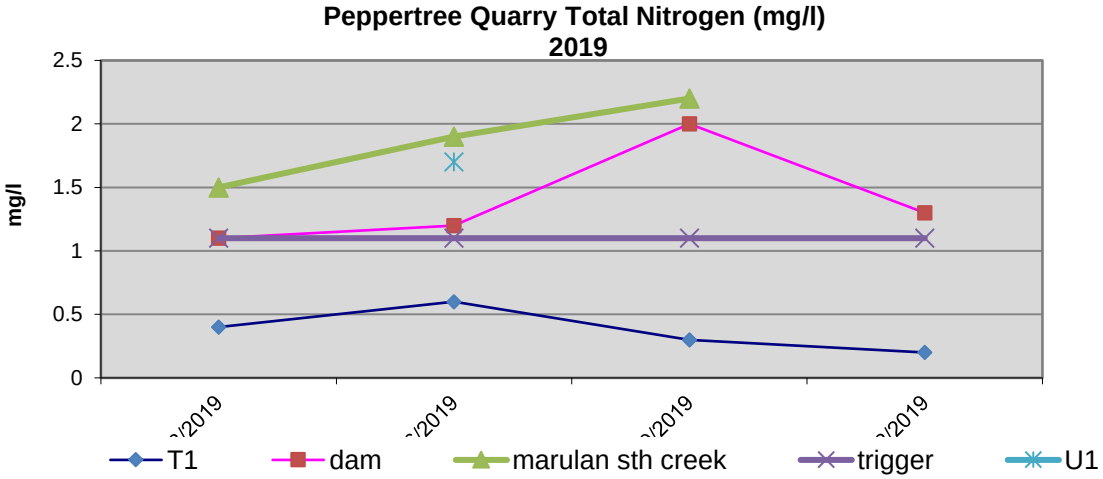
TDS surface water trends 2019



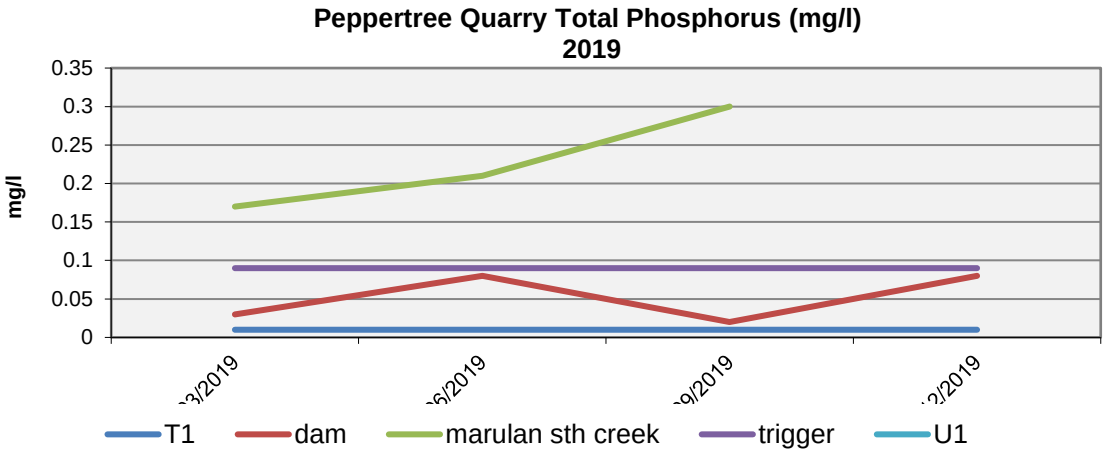
Turbidity surface water trends 2019



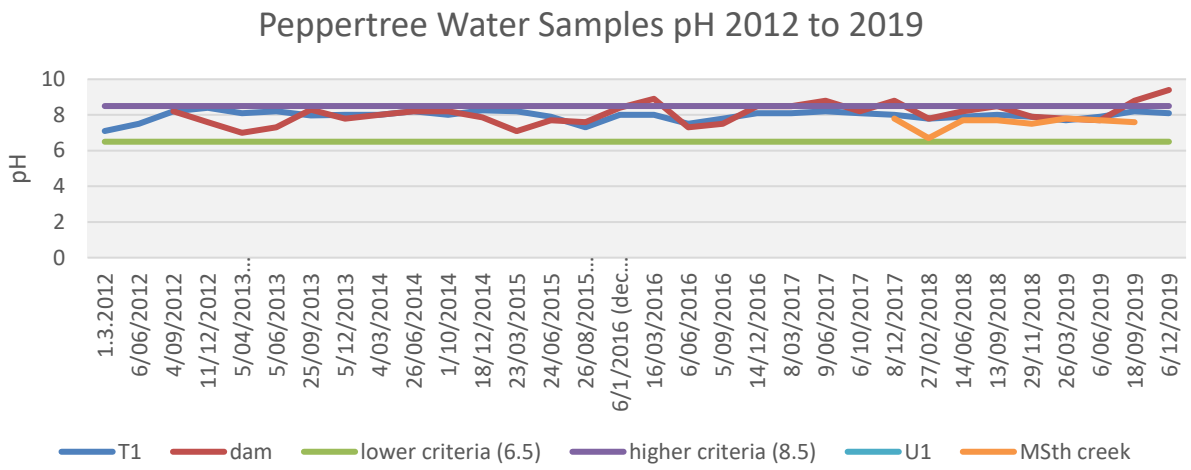
Nitrogen surface water trends 2019



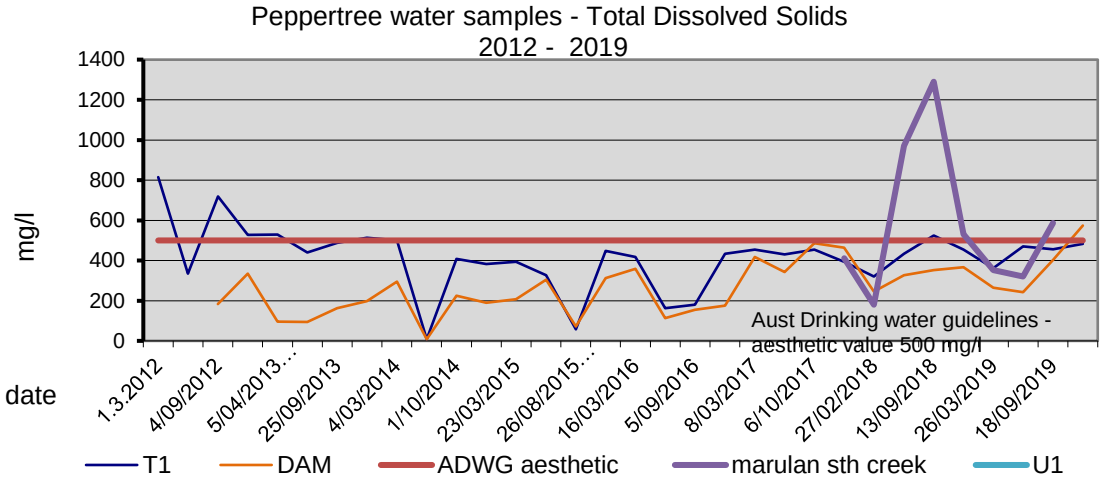
Total phosphorus surface water trends 2019



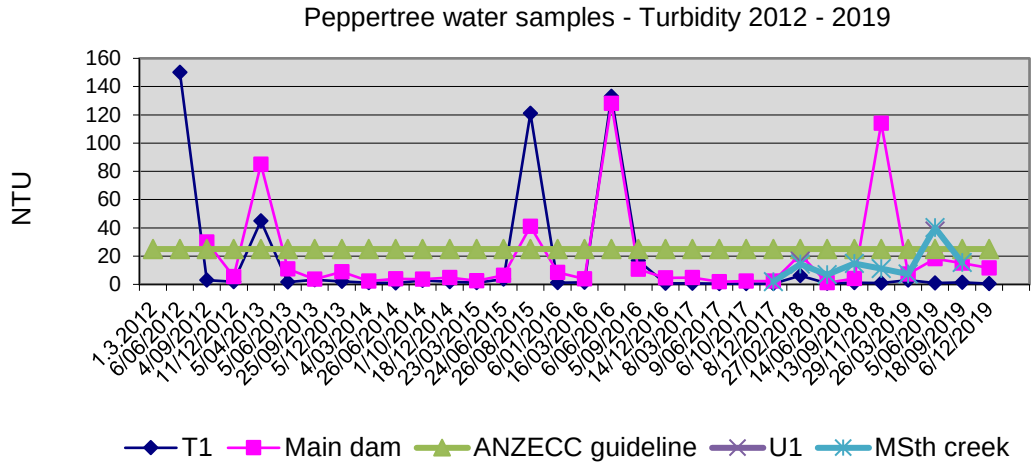
Long Term Water Quality - pH



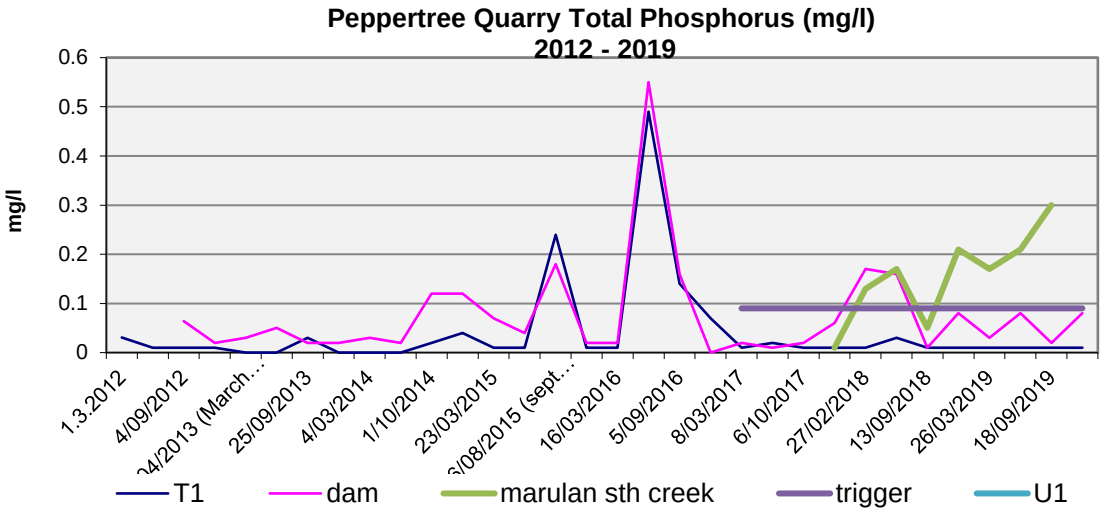
Long Term Water Quality – TDS



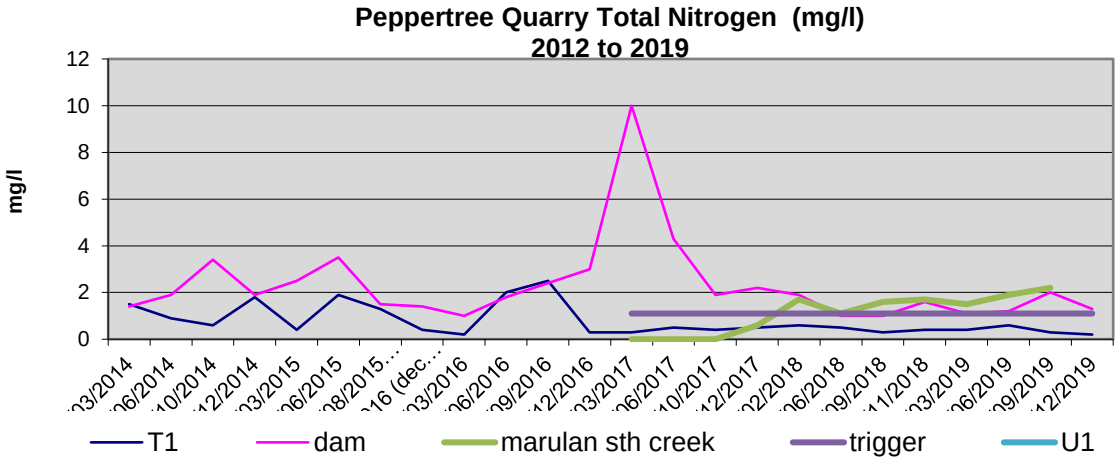
Long Term Water Quality – Turbidity



Long Term Water Quality – Total Phosphorus



Long Term Water Quality – total Nitrogen



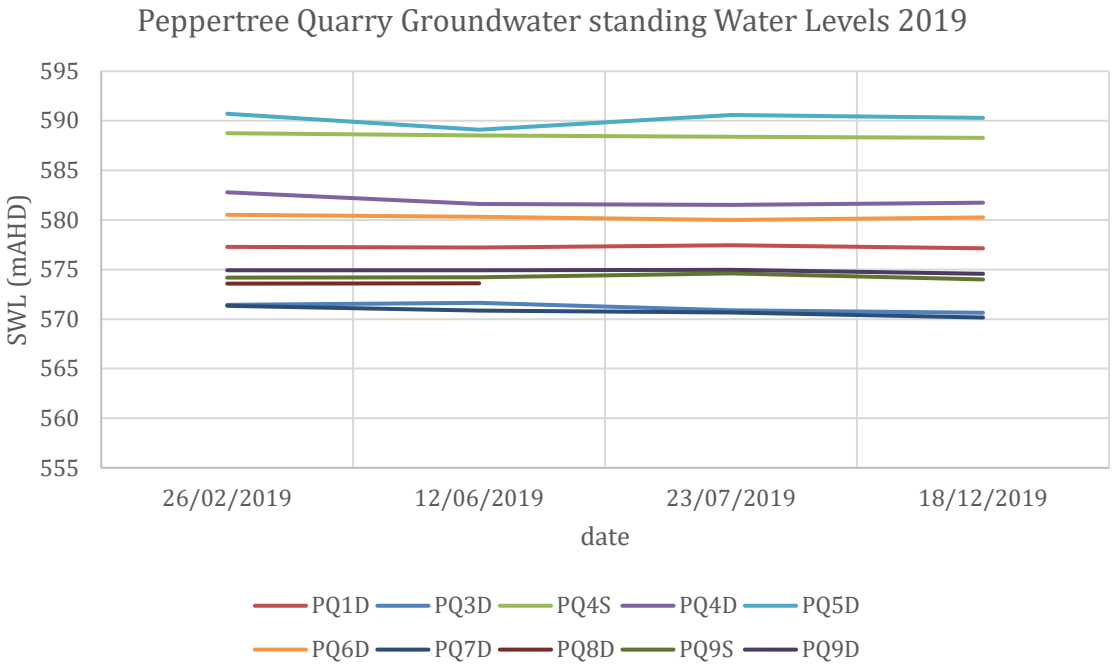
Groundwater Field Parameters

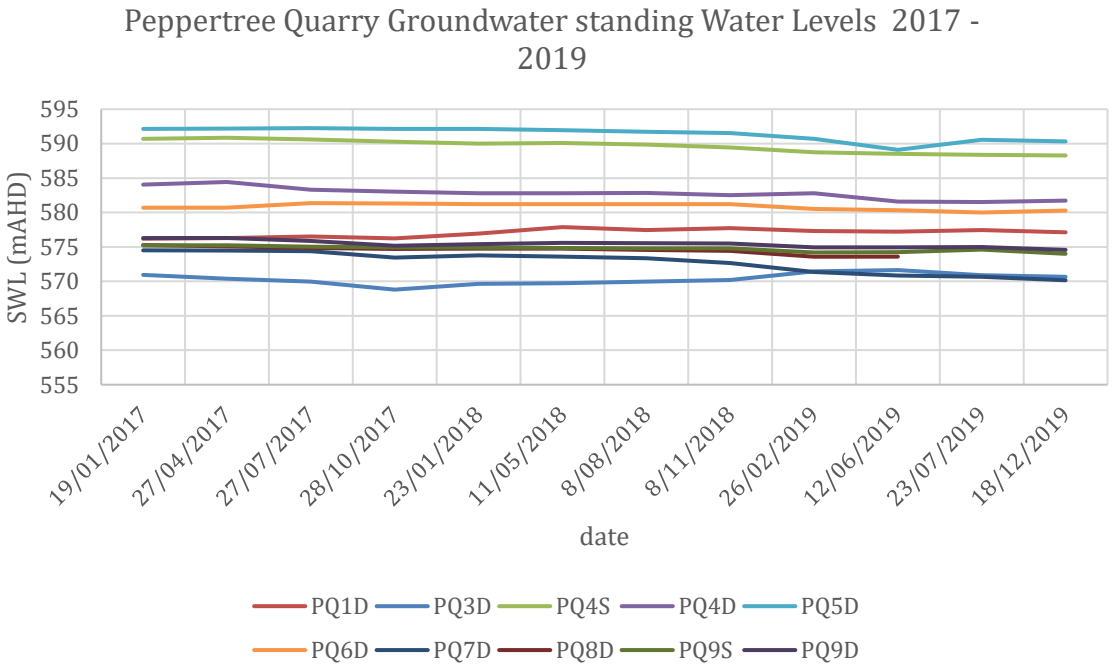
Bore ID	Field Parameters											
	pH				EC (µs/cm)				DO (%)			
	Feb	June	July	Dec	Feb	June	July	Dec	Feb	June	July	Dec
PQ01S	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
PQ01D	8.67	8.94	8.03	NS	3310	2990	3250	NS	14	37.3	34.4	NS
PQ03D	11.79	11.95	NS	NS	2750	2610	NS	NS	26.8	29.1	NS	NS
PQ04D	7.7	NS	NS	NS	1226	NS	NS	NS	44.9	NS	NS	NS
PQ04S	7.5	9.02	6.86	7.24	2579	2630	3010	2510	25.3	45.6	40.8	13.9
PQ5D	7.42	8.52	7.02	7.18	1598	1581	1637	1514	15.3	46.4	43.5	18
PQ6D	11.63	11.7	NS	NS	2660	2590	NS	NS	24.6	45.4	NS	NS
PQ7D	8.98	9.53	9.02	7.3	1032	783	1105	1080	39.7	34.2	41.6	16.3
PQ8D	7.39	8.24	6.82	6.84	2487	2630	2710	2460	31.6	62.5	45	35.8
PQ8S	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
PQ9D	7.96	7.46	7.07	7.14	1590	1438	1659	1485	24.7	50.69	33.2	15.4
PQ9s	6.83	7.63	6.85	6.81	2108	2042	2510	2130	36.5	72.2	66.1	48.9

NS: Not Sampled

Groundwater Standing Water Levels

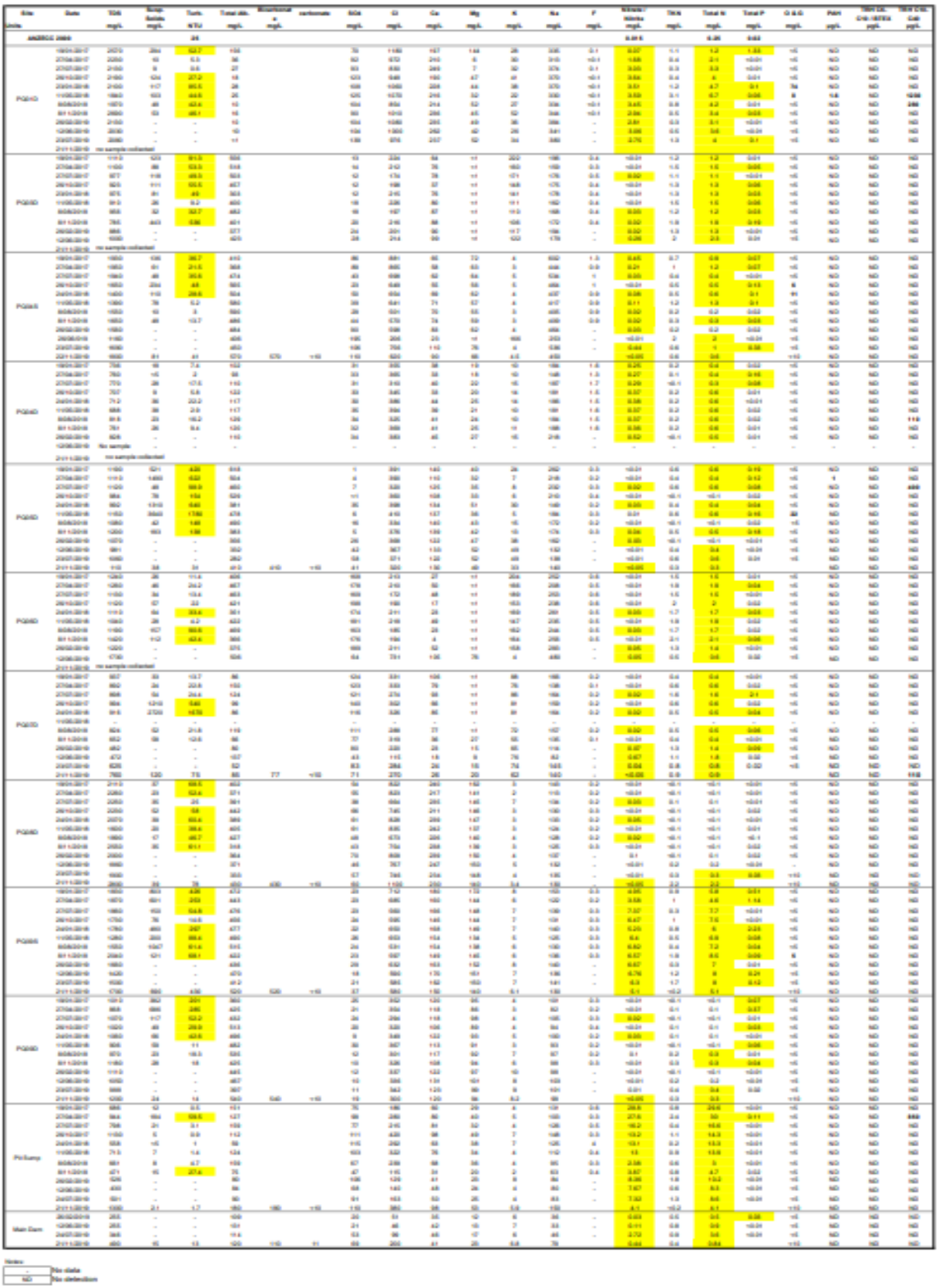
Bore ID	Standing Water Levels (mAHD)			
	February 2019	June 2019	July 2019	December 2019
PQ01D	577.29	577.23	577.45	577.14
PQ01S	DRY	DRY	DRY	DRY
PQ03D	571.45	571.64	570.69	570.64
PQ04D	582.79	581.60	581.52	581.74
PQ04S	588.75	588.51	588.39	588.28
PQ5D	590.71	589.1	590.58	590.31
PQ6D	580.52	580.31	580	580.27
PQ7D	571.34	570.85	570.68	570.16
PQ8D	573.59	573.61	NS	572.73
PQ8S	DRY	DRY	DRY	DRY
PQ9D	574.92	574.93	574.97	574.57
PQ9s	574.19	574.22	574.61	574


Peppertree Quarry Groundwater standing Water Levels 2019
595
590
585
580
575
570
565
560
555
SWL (mAHD)
26/02/2019
12/06/2019
23/07/2019
18/12/2019
date
PQ1D
PQ3D
PQ4S
PQ4D
PQ5D
PQ6D
PQ7D
PQ8D
PQ9S
PQ9D

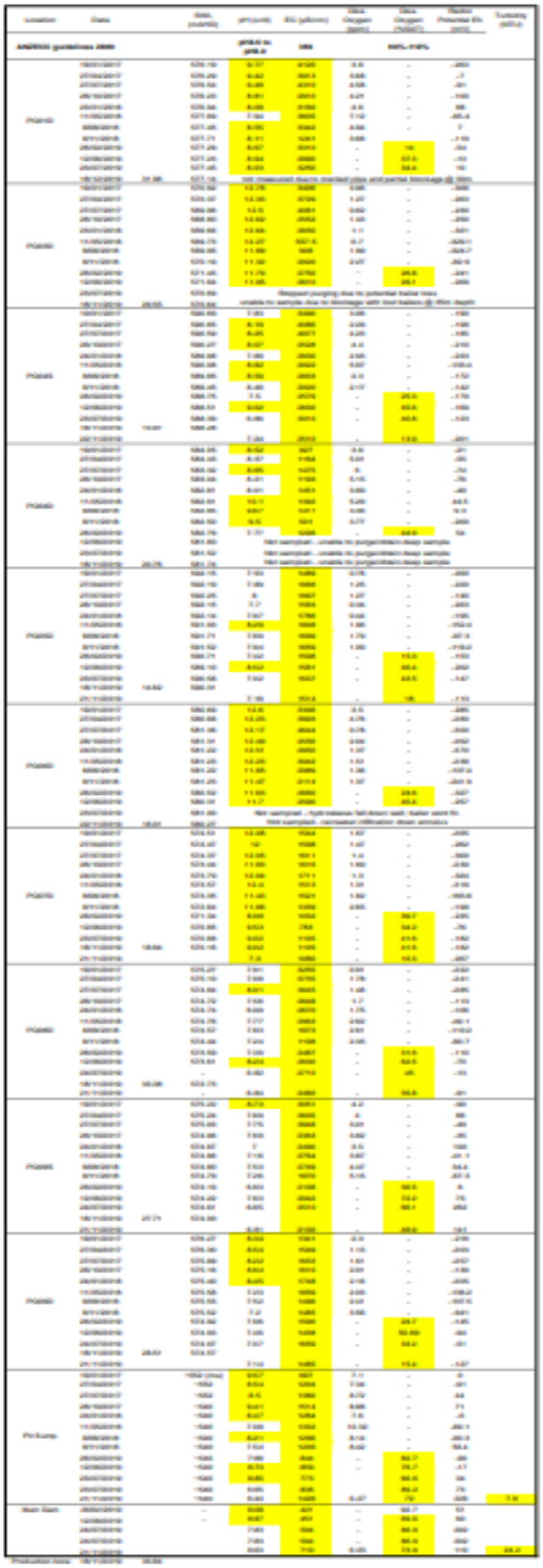

Peppertree Quarry Groundwater standing Water Levels 2017 - 2019
595
590
585
580
575
570
565
560
555
SWL (mAHD)
19/01/2017
27/04/2017
27/07/2017
28/10/2017
23/01/2018
11/05/2018
8/08/2018
8/11/2018
26/02/2019
12/06/2019
23/07/2019
18/12/2019
date
PQ1D
PQ3D
PQ4S
PQ4D
PQ5D
PQ6D
PQ7D
PQ8D
PQ9S
PQ9D

Groundwater - Laboratory Analysis Results (2017 - 2019)

Summary of Laboratory Results
Peppertree Quarry, Marulan South NSW



Summary of Field Results
Peppertree Quarry, Marulan South NSW



APPENDIX 6 INDEPENDENT AUDIT RESPONSE AND STATUS OF ACTIONS

No.	Condition / recommendation # Issue / observation	Recommendation	Response
PQ 1/18	COA, Schedule 3, Condition 9 The NBMP generally meets the criteria as outlined in this condition. However, the plan does not include a section on best practice (as referenced in the condition).	The NBMP should be updated to include a section on best practice and how activities are reviewed to ensure they align with current best practice.	The NBMP will be reviewed in line with the Modification 5 Approval and will include a section on Best practice and how activities are reviewed to ensure they align with current best practice.
PQ 2/18	COA, Schedule 3, Condition 10 The NBMP has been developed in compliance with the condition and adequately addresses all assessment criteria. However, the following observations have been made: • The plan does not reflect the recent changes to noise mitigation brought about from the Voluntary Undertaking. • A number of references are still made to activities that are to be completed in 2017. • Table 2 in the plan references the incorrect condition.	The plan should be updated to reflect the recent changes to noise mitigation brought about from the Voluntary Undertaking. It is recommended that when the Noise Management Plan is next updated, all dated references are checked and updated / removed where relevant. Table 2 in the plan should be updated to reference the correct condition.	The NBMP will be reviewed in line with the Modification 5 Approval and will include a section on Best practice and how activities are reviewed to ensure they align with current best practice.
PQ 3/18	COA, Schedule 3, Condition 17 Boral undertook a review of dust deposition gauges for the last three years to identify the root cause of non-compliances (through Todoroski Air Sciences). They found that higher than usual levels have occurred during the Spring and Summer months for EPL monitoring location D1. In most cases, these are also associated with low levels of ash and therefore high levels of organics. The organic matter is primarily bird related. Air quality monitors are located within Boral's property boundary. When exceedances are modelled to receiver locations as specified in this condition i.e. 'at any residence on privately owned land, or on more than 25 percent of any privately-owned land' the dust deposition levels are found to be below criteria.	It is recommended that discussion with EPA and DP&E are continued regarding the relocation of these monitoring points to as more representative area that aligns with the requirements of the MCoA. Alternatively, this condition of consent may require modification to align with the current arrangement and ensure that it can be implemented effectively.	Discussions have been held with EPA regarding the relocation of the monitoring points for Air Quality Monitoring. The EPA have recommended a program to undertake monitoring at both the current and proposed locations for a period of time to understand the data. This will be reviewed for implementation by Peppertree in 2020.
PQ 4/18	COA, Schedule 3, Condition 19 The AQMP generally meets the criteria as outlined in this condition. Some best management practice measures that have been implemented including the use of weather zone forecasting system for wind to identify high risk days and the application of citrus based dust suppression polymers to exposed areas. However, the plan has not been kept up to date with current best practice in relation to air quality monitoring.	The AQMP should be updated to include a section on best practice and how activities are reviewed to ensure they align with best practice. An investigation of best practice relating to air quality at similar facilities should be undertaken to understand the feasibility and value of implementing best practice systems (e.g. continuous air quality monitoring)	The AQMP will be reviewed in line with the Modification 5 Approval and will include a section on Best practice and how activities are reviewed to ensure they align with current best practice.
PQ 5/18	COA, Schedule 3, Condition 29	Baseline water flow monitoring for Barbers Creek (collected by Marulan	A review of the water monitoring requirements will be undertaken as part of the revision of the

No.	Condition / recommendation # Issue / observation	Recommendation	Response
	Water *quality* monitoring occurs within Tangarang Creek and Barbers Creek. Water *flow* monitoring occurs within Tangarang Creek. However, water *flow* monitoring does not occur within Barbers Creek in accordance with the condition. This is a result of Barbers Creek being inaccessible and unsuitable for installation of flow monitoring equipment. However, baseline data is collected by Marulan south within Barbers creek.	south) should be included in WMP and AEMR reporting	WMP and including ongoing water *flow* data collection in Barbers Creek.
PQ 6/18	COA, Schedule 3, Condition 41 As flagged within the 2015 Audit and the DP&E 2016 audit. Since these audits the waste management provider has been changed. Veolia is now the primary provider, Fast Skips – steel and Endeavour Industries collects office waste. However, no evidence was sighted that recommendations from the previous audit have been implemented. No formal waste management plan or document is in place to support the implementation of reasonable and feasible measures to minimise waste generated by the project. Arcadis understand that a plan is being developed by Boral.	Boral should establish a clear procedure around monitoring and recording waste generation. It is recommended that the waste contractors are engaged to assist with this process.	A waste management plan has been prepared which outlines the current management of waste on the site and the programs in place for minimisation and recycling.
PQ 7/18	COA, Schedule 3, Condition 42 During the site visit it was observed that Veolia bins on site were not being utilised for the marked waste types. I.e. bins marked for recycling not receiving recyclable materials	As above	On completion of a new stores area, a number of recycling bays will be established with the areas clearly identified for recycled materials.
PQ 8/18	COA, Schedule 3, Condition 46 Production data is provided within the AEMR. However, no evidence has been sighted of this data being provided to DRE.	Production data should be provided to DRE using the standard form for that purpose in accordance with the requirements of the condition.	A copy of the production data has been issued to the Department of Planning and Environment outside of the annual AEMR.
PQ 10/18	COA, Schedule 5, Condition 9 Environmental performance data is not located on Boral Peppertree's specific web page but on the Boral website and the website is difficult to navigate to find the relevant information.	The web page should be redesigned to be easier to navigate. Information on the page could benefit from being aligned to this condition of approval (at a high level) so information is easier to find.	The Peppertree Quarry website has been developed to align with all other Boral quarry website information. Feedback has been provided to Boral Corporate as to the Audit findings and whether changes to the website design and navigation can be undertaken.
PQ 12/18	EPL,M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint. Contact line is available, but it is not clear on the website that this line that can be used for complaints.	The website should be updated to clearly identify the telephone number through which complaints can be made.	The Peppertree Quarry website has been developed to align with all other Boral quarry website information. Feedback has been provided to Boral Corporate as to the Audit findings and whether changes to the website design and navigation can be undertaken.

No.	Condition / recommendation # Issue / observation	Recommendation	Response
	However, it is noted that the complaints hotline is included in the local newsletter.		
PQ 13/18	COA, Schedule 3, condition 41 (a) Waste management review to be undertaken and procedures to be put in place for management, including data collection and analysis. Procedures to be in place by July 2017	Boral should establish a clear procedure around monitoring and recording waste generation. It is recommended that the waste contractors are engaged to assist with this process. Arcadis understand that a waste management plan is being developed by Boral.	A waste management plan has been prepared which outlines the current management of waste on the site and the programs in place for minimisation and recycling.
PQ 14/18	PQ 6/15 Peppertree Quarry website is difficult to navigate, and it is unclear if the data on the website meets all requirements under the conditions of consent.	It is recommended that the website be redesigned to present the required data more clearly. Peppertree Quarry could be separated from the Marulan South Limestone Mine page to avoid confusion. It is recommended that headings are aligned to those in the McoA to make navigating the site easier.	The Peppertree Quarry website has been developed to align with all other Boral quarry website information. Feedback has been provided to Boral Corporate as to the Audit findings and whether changes to the website design and navigation can be undertaken.
PQ 15/18	PQ 9/15 Boral does not appear to be tracking waste or identifying areas of further improvement. Boral identified that the primary waste contractor has recently changed and this data is now being collected.	It is recommended that Boral engage with waste contractors to track waste with the aim of implementing and monitoring waste minimisation strategies.	A waste management plan has been prepared which outlines the current management of waste on the site and the programs in place for minimisation and recycling.